



## Faculty Education, Academic Rank, and International Exposure as Drivers of University Internationalization: Evidence from an Indonesian Public University

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DOI: <https://doi.org/10.61987/bamj.v4i1.2108>

### Article History:

Received: 30 March 2026

Revised: 20 May 2026

Accepted: 24 May 2026

### Keywords:

University Internationalization,  
Faculty Qualifications,  
Professorial Rank, Teaching  
Certification, Public Universities

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### Abstract :

Internationalization has become a strategic priority for universities, but evidence on how faculty-level human resource characteristics translate into measurable internationalization performance remains limited in developing-country universities. This study examines whether doctoral qualifications, professorial rank, professional teaching certification, and overseas educational background explain faculty-level internationalization performance at the university. Using balanced panel data from 16 faculties over 2018-2024, the study constructs an internationalization performance index based on active international collaborations, international students, and internationally indexed publications, using principal component analysis. Panel regression is then estimated, with faculty budget included as a control variable and model selection based on Chow and Hausman tests. The results show that overseas educational background and faculty budget have positive and statistically significant effects on internationalization performance. Doctoral faculty shows a positive relationship in the baseline model, while the proportion of professors is negatively associated with internationalization performance, and certified lecturers are not statistically significant. These findings suggest that formal academic status alone is insufficient to strengthen global engagement. Universities need internationally connected faculty development, incentives for global collaboration, and adequate financial support for faculty to improve internationalization outcomes.

## INTRODUCTION

The internationalization of higher education has become a central strategic priority for universities seeking to enhance academic quality, global competitiveness, and institutional reputation in an increasingly interconnected world. Internationalization extends beyond student and staff mobility to include international research collaboration, globally oriented curricula, and institutional engagement with the global academic community (Abbas et al., 2021; Ahmed et al., 2025). Prior studies demonstrate that such efforts improve service quality and student loyalty (Amzat et al., 2023; Abazov, 2021), positioning internationalization as a strategic imperative rather than a purely academic aspiration.

In Indonesia, internationalization has become increasingly important because public universities are expected to improve global rankings, expand research collaboration, attract international students, and demonstrate international visibility. However, the pathway is challenging. Universities in developing-country contexts often face limited international networks, uneven faculty capacity across academic units, funding constraints, and administrative systems that are still adapting to global performance indicators (Sok & Bunry, 2021; Soysal et al., 2022; Yousef, 2024). At Universitas Padjadjaran, internationalization initiatives have been pursued through partnerships, mobility programs, international student recruitment, and publication strategies (Rosyidah et al., 2020; Fuadi et al., 2025). These efforts make the university a relevant case for examining how faculty-level resources support internationalization performance.

A university may be considered highly internationalized when it demonstrates strong global collaboration, attracts international students, and delivers curricula aligned with international standards (Horta et al., 2021; Li & Xue, 2022; Mardiana, 2024). These dimensions are consistent with global performance indicators that emphasize international networks, student diversity, and scholarly output. In this sense, internationalization represents not only a policy agenda but also an observable organizational outcome reflecting institutional capacity for global engagement (Jon & Fry, 2021).

Among the determinants of internationalization, the quality of faculty human resources plays a critical role. Faculty members are central actors in teaching, research, curriculum development, and international collaboration (Calikoglu et al., 2020; Fadda et al., 2021). Their contributions extend to building global academic networks, supporting international research, and enhancing institutional reputation. Prior research highlights the importance of academic qualifications, international exposure, language competence, and intercultural adaptability in supporting internationalization (Hung & Yen, 2022; Yassin et al., 2020; Sok & Bunry, 2021). Faculty involvement in internationalization also influences institutional climate, diversity, and global learning outcomes.

Contemporary research shows that internationalization is not achieved only by institutional policy but also by academic actors who possess research capability, global networks, intercultural experience, and the ability to translate international exposure into collaboration and publication outcomes (Calikoglu et al., 2020; De Wit & Altbach, 2021; Dehtjare & Uzule, 2023; Moshtari & Safarpour, 2023). Human capital theory explains why doctoral training, teaching certification, and academic experience may strengthen faculty productivity. The resource-based view (RBV) further suggests that faculty expertise and international networks are strategic resources that competing institutions find difficult to imitate. Institutional theory complements these perspectives by explaining how universities build internal capacity to respond to global expectations and ranking pressures (Edwards & Ashida, 2020; Ryu & Nguyen, 2021; Pedro et al., 2023).

Faculty human resource quality can be operationalized through measurable indicators such as doctoral qualifications, professorial rank, professional certification, and overseas educational background. These indicators reflect academic capability, professional maturity, pedagogical competence, and international exposure (Droissart & Tuytens, 2024; Sušanj et al., 2020; Chan et al., 2018). High-quality faculty members contribute to research productivity, institutional reputation, and the ability to attract international students and partners (Chan et al., 2018). Strategic human resource

management, including training, career development, and performance evaluation, further supports the development and retention of such faculty (Sušanj et al., 2020).

State-of-the-art research has advanced the understanding of higher education internationalization by examining institutional strategies, international student recruitment, mobility, and research collaboration. However, much of this literature remains concentrated on national policy, university-level strategy, or student-centered outcomes. Fewer studies test, with longitudinal institutional data, whether specific faculty characteristics explain measurable internationalization outputs across faculties. This leaves an empirical gap in understanding which dimensions of faculty quality actually matter for internationalization performance in Indonesian public universities.

The objective of this study is therefore to examine the effect of faculty educational qualifications, academic rank, professional certification, overseas educational background, and faculty budget on internationalization performance. The study contributes to the literature in three ways. First, it provides faculty-level panel evidence rather than relying only on conceptual or qualitative discussion. Second, it situates the analysis in Indonesia, an underrepresented Southeast Asian context where internationalization ambitions are rising but faculty and financial capacities vary across units. Third, it links faculty human capital indicators to an empirically constructed internationalization performance index, thereby offering a framework useful to university leaders for designing targeted faculty development and resource allocation policies.

Drawing on human capital theory, the resource-based view, and institutional theory, faculty qualifications and international exposure are considered strategic assets that enhance a university's capacity to engage in global academic activities. Human capital theory suggests that highly qualified academic staff contribute to knowledge development, innovation, and academic excellence, all of which are essential for international competitiveness. The resource-based view further emphasizes that unique and valuable faculty resources can create sustainable advantages in attracting international partnerships, students, and research opportunities. Institutional theory also highlights the importance of faculty credentials and global experiences in meeting international standards and strengthening institutional legitimacy. Therefore, a higher proportion of doctoral faculty is expected to influence university internationalization performance (H1) positively. Similarly, the presence of a greater proportion of professors is anticipated to enhance internationalization performance through stronger academic leadership, research productivity, and international networking (H2). Certified lecturers are also expected to contribute positively by ensuring academic quality and professional competence that support international engagement (H3). Furthermore, faculty members with overseas educational backgrounds are likely to possess broader global perspectives, intercultural competencies, and international academic networks, which can facilitate international collaboration and improve university internationalization performance (H4).

## RESEARCH METHOD

This study adopts a quantitative explanatory design using balanced panel data at the faculty-year level. The analysis was conducted at Universitas Padjadjaran, a major Indonesian public university that has actively pursued internationalization through global partnerships, international mobility, student recruitment, and international publication strategies. The observation period covers 2018-2024. The final dataset consists of 16 faculty members observed over seven years, resulting in 112 faculty-year observations.

The faculty level was selected because faculties are the main organizational units responsible for managing academic staff, research activities, international collaboration, and budget implementation.

The population comprises all faculties at Universitas Padjadjaran that were active throughout the 2018-2024 period. A faculty was included when it met four criteria: (1) it had annual human resource data for doctoral qualifications, professorial rank, teaching certification, and overseas educational background; (2) it had annual records for international collaborations, international students, and internationally indexed publications; (3) it had annual budget data that could be matched to the same faculty-year unit; and (4) the variable definitions were consistent across the observation period. Based on these criteria, all 16 faculties with complete and comparable records were included; no faculty within the defined population was deliberately excluded.

Data were obtained from official institutional sources, including faculty performance reports, human resource databases, institutional publication databases, financial reports, and records from the International Office and strategic planning units. The data were cross-checked across sources to ensure consistency of faculty names, reporting years, and variable definitions. When a value appeared inconsistent across sources, the dataset was verified against the primary administrative record before being included in the final panel. The operational definitions and measurements of the variables used in this study are presented in Table 1.

**Table 1. Variable Operationalization**

Variable	Measurement	Scale
Doctoral Faculty (X1)	Percentage of faculty members holding doctoral degrees relative to total faculty members in each faculty	Ratio
Professors (X2)	Percentage of faculty members with the rank of full professor relative to total faculty members	Ratio
Certified Lecturers (X3)	Percentage of faculty members holding professional teaching certification relative to total faculty members	Ratio
Overseas Education (X4)	Percentage of faculty members who obtained their highest degree from overseas institutions	Ratio
Faculty Budget (X5)	Natural logarithm of the annual faculty budget (in Indonesian Rupiah)	Ratio
Internationalization Performance (Y)	Composite index derived from the number of active international collaborations (Y1), proportion of international students, and (Y2) number of internationally indexed publications (Y3)	Ratio

The faculty budget was included as a control variable to account for differences in financial capacity across faculties. Financial resources play an important role in supporting internationalization activities in higher education institutions. Faculties with larger budgets generally have greater capacity to fund international research collaborations, academic mobility programs, international conferences, and institutional partnerships, all of which contribute to internationalization outcomes. In addition, sufficient financial resources allow faculties to invest in research infrastructure and academic development that may enhance publication productivity and global academic engagement. Therefore, controlling for faculty budget helps ensure that the estimated relationship between faculty human resource quality and internationalization performance is not confounded by differences in financial resources across faculties.

The relationship between faculty human resource quality and internationalization performance is estimated using panel data regression, which accounts for both cross-

sectional differences across faculties and temporal variation. The empirical model is specified as follows:

$$Y_{it} = \beta_0 + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \beta_4 X4_{it} + \beta_5 X5_{it} + \varepsilon_{it} \dots \dots \dots (1)$$

Where:

- $Y_{it}$  = Internationalization performance of faculty  $i$  in year  $t$
- $X1_{it}$  = Percentage of doctoral faculty
- $X2_{it}$  = Percentage of professors
- $X3_{it}$  = Percentage of certified lecturers
- $X4_{it}$  = Percentage of faculty with overseas education
- $X5_{it}$  = natural logarithm of the faculty budget (control variable)
- $\beta_0$  = Intercept
- $\beta_1 - \beta_5$  = Regression coefficients
- $\varepsilon_{it}$  = Error term

The dependent variable, internationalization performance, is conceptualized as a latent construct that cannot be observed directly. Instead, it is represented by three observable indicators: (1) the number of active international collaborations, (2) the proportion of international students, and (3) the number of internationally indexed publications. Because these indicators capture related dimensions of the same construct, they are combined into a single composite measure using factor analysis.

Principal component analysis (PCA) is used to extract a common component representing internationalization performance. The procedure involves assessing data suitability using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity, extracting components based on eigenvalues, and using the first component score as the performance index. Because the three indicators represent theoretically related dimensions of global engagement, PCA is used primarily as an index-construction technique. The KMO value is interpreted as evidence of minimum sampling adequacy. At the same time, the Bartlett result is considered together with the theoretical justification and factor loadings to assess whether the composite index is appropriate for subsequent regression analysis.

## RESULTS AND DISCUSSION

### Results

#### Descriptive Trends in Faculty Human Capital

Table 2 presents the descriptive statistics of the percentage of doctoral faculty across faculties during the period 2018–2024.

Table 2. Descriptive of Percentage of Doctoral Faculty Across Faculties

Faculty Name	X1						
	2018	2019	2020	2021	2022	2023	2024
Economics and Business	0.5238	0.5302	0.5510	0.5594	0.5827	0.5899	0.5778
Pharmacy	0.5873	0.6462	0.6818	0.7101	0.7612	0.8615	0.9118
Law	0.5000	0.5093	0.5794	0.6075	0.6364	0.6842	0.6947
Cultural Sciences	0.5116	0.5308	0.5538	0.5680	0.5902	0.6207	0.6435
Communication Science	0.3934	0.4344	0.4173	0.4480	0.5124	0.5294	0.5424
Social and Political Sciences	0.6023	0.6069	0.6082	0.6176	0.6509	0.6506	0.6667
Medicine	0.4141	0.4484	0.4688	0.4933	0.5336	0.5872	0.5964
Dentistry	0.3548	0.3571	0.3622	0.3889	0.4050	0.4609	0.4779

Nursing	0.1250	0.1705	0.1978	0.2088	0.2360	0.3068	0.3448
Mathematics and Natural Sciences	0.6094	0.5949	0.6443	0.6510	0.7196	0.7596	0.7886
Fisheries and Marine Sciences	0.5161	0.5224	0.5286	0.5352	0.5303	0.5645	0.5493
Agriculture	0.6136	0.6439	0.6617	0.6769	0.7143	0.7967	0.8099
Animal Science	0.6196	0.6374	0.6629	0.6591	0.7176	0.7059	0.6628
Psychology	0.3636	0.3704	0.3929	0.4286	0.4074	0.4082	0.4400
Geological Engineering	0.5962	0.6415	0.6296	0.6226	0.6078	0.6000	0.6400
Agro-Industrial Technology	0.4746	0.5410	0.5833	0.5902	0.6379	0.7833	0.7385
<b>Mean</b>	0.4878	0.5116	0.5327	0.5478	0.5777	0.6193	0.6303
<b>Std Dev</b>	0.1286	0.1265	0.1292	0.1250	0.1345	0.1436	0.1401
<b>Min</b>	0.1250	0.1705	0.1978	0.2088	0.2360	0.3068	0.3448
<b>Max</b>	0.6196	0.6462	0.6818	0.7101	0.7612	0.8615	0.9118

The data indicate a consistent upward trend in the proportion of faculty members holding doctoral degrees across the university. The mean value increased from 0.4878 in 2018 to 0.6303 in 2024, indicating a steady improvement in the academic qualifications of faculty members over time. This growth reflects the institutional effort to strengthen human capital through doctoral education, which is often associated with enhanced research capacity, higher academic productivity, and stronger international engagement. The gradual increase in the minimum value—from 0.1250 in 2018 to 0.3448 in 2024—also indicates that faculties with relatively lower doctoral representation have improved over time, suggesting a more balanced distribution of academic qualifications across faculties. In terms of faculty-level differences, several faculties consistently exhibit higher proportions of doctoral faculty. The Faculty of Pharmacy shows the most significant increase, rising from 0.5873 in 2018 to 0.9118 in 2024, making it the faculty with the highest proportion of doctoral-qualified staff in the most recent year. Other faculties with relatively high values include the Faculty of Agriculture, the Faculty of Mathematics and Natural Sciences, and the Faculty of Social and Political Sciences, all of which have maintained doctoral faculty ratios above the institutional average for several years. Conversely, some faculties display comparatively lower proportions of doctoral faculty. The Faculty of Nursing consistently records the lowest values throughout the observation period, although it also shows noticeable improvement, rising from 0.1250 in 2018 to 0.3448 in 2024. Similarly, faculties such as Dentistry, Psychology, and Communication Science have lower doctoral ratios than other faculties.

Table 3 presents the descriptive statistics of the percentage of professors across faculties during the period 2018–2024:

**Table 3. Descriptive of Percentage of Professors Across Faculties**

Name	X2						
	2018	2019	2020	2021	2022	2023	2024
Economics and Business	0.0884	0.1208	0.1156	0.1189	0.1295	0.1583	0.2000
Pharmacy	0.1111	0.1385	0.1667	0.1449	0.2239	0.3231	0.3676
Law	0.1019	0.1019	0.1028	0.1028	0.1313	0.1368	0.1579
Cultural Sciences	0.0388	0.0538	0.0462	0.0560	0.0574	0.0603	0.0609
Communication Science	0.0164	0.0164	0.0157	0.0240	0.0413	0.0672	0.0763
Social and Political Sciences	0.0585	0.0751	0.0760	0.0765	0.0947	0.1386	0.1579
Medicine	0.0969	0.0852	0.0893	0.0889	0.0897	0.1193	0.1435
Dentistry	0.0806	0.0794	0.0787	0.0873	0.0992	0.1043	0.1327
Nursing	0.0114	0.0114	0.0110	0.0220	0.0337	0.0341	0.0805
Mathematics and Natural Sciences	0.0677	0.0974	0.1082	0.1302	0.1640	0.1913	0.2171
Fisheries and Marine Sciences	0.0323	0.0597	0.0571	0.0563	0.0758	0.0968	0.1268

Name	X2						
	2018	2019	2020	2021	2022	2023	2024
Agriculture	0.1061	0.0909	0.1053	0.1154	0.1429	0.1951	0.2893
Animal Science	0.1087	0.0989	0.0787	0.0682	0.0824	0.1059	0.1163
Psychology	0.0545	0.0556	0.0536	0.0536	0.0370	0.0612	0.0800
Geological Engineering	0.0962	0.1321	0.1296	0.1509	0.1569	0.1800	0.2000
Agro-Industrial Technology	0.0508	0.0492	0.0500	0.0492	0.0690	0.0667	0.0615
<b>Mean</b>	0.0700	0.0791	0.0803	0.0841	0.1018	0.1274	0.1543
<b>Std Dev</b>	0.0324	0.0358	0.0399	0.0390	0.0512	0.0697	0.0826
<b>Min</b>	0.0114	0.0114	0.0110	0.0220	0.0337	0.0341	0.0609
<b>Max</b>	0.1111	0.1385	0.1667	0.1509	0.2239	0.3231	0.3676

The proportion of professors increased substantially and consistently from 0.0700 in 2018 to 0.1543 in 2024, indicating significant progress in strengthening academic seniority, research leadership, and institutional intellectual capital. This upward trend reflects the university's success in promoting academic career advancement and enhancing research capacity, both of which are critical for improving scholarly productivity and international competitiveness. The simultaneous rise in minimum values suggests that improvements occurred across nearly all faculties, demonstrating a broad-based institutional effort rather than isolated growth. However, the increasing standard deviation indicates that the expansion of professorship was uneven, with certain faculties—such as Pharmacy, Agriculture, and Mathematics and Natural Sciences—advancing more rapidly than others. This disparity may reflect differences in research culture, publication performance, availability of senior academics, and opportunities for promotion, suggesting that while the university has strengthened its overall academic profile, challenges remain in achieving a more balanced distribution of professorial expertise across faculties.

Table 4 presents the descriptive statistics of the percentage of certified lecturers across faculties during the period 2018–2024.

**Table 4. Descriptive of Percentage of Certified Lecturers Across Faculties**

Name	X3						
	2018	2019	2020	2021	2022	2023	2024
Economics and Business	0.7959	0.7919	0.8435	0.8811	0.8849	0.8777	0.8667
Pharmacy	0.7619	0.7231	0.7576	0.8406	0.8657	0.8615	0.8382
Law	0.8519	0.8333	0.8598	0.9252	0.9293	0.9158	0.9053
Cultural Sciences	0.7674	0.7923	0.8462	0.8720	0.8852	0.8966	0.9043
Communication Science	0.7131	0.7213	0.8189	0.8560	0.8595	0.8655	0.8220
Social and Political Sciences	0.7427	0.7341	0.8070	0.8412	0.8343	0.8193	0.7719
Medicine	0.4890	0.4843	0.5848	0.6489	0.6547	0.6651	0.6502
Dentistry	0.8065	0.7460	0.7402	0.7778	0.7686	0.8000	0.7965
Nursing	0.6477	0.8523	0.9231	0.9341	0.9438	0.9432	0.9425
Mathematics and Natural Sciences	0.9063	0.8769	0.9021	0.8854	0.8889	0.8743	0.8686
Fisheries and Marine Sciences	0.7581	0.6866	0.7571	0.7887	0.8030	0.7903	0.6761
Agriculture	0.9015	0.8864	0.8797	0.9000	0.9048	0.9024	0.8760
Animal Science	0.9457	0.9011	0.8876	0.8750	0.8706	0.8588	0.7907
Psychology	0.7818	0.7593	0.7500	0.8214	0.8148	0.7959	0.7600
Geological Engineering	0.7692	0.7547	0.8333	0.8302	0.8627	0.8800	0.9000
Agro-Industrial Technology	0.8136	0.7869	0.8333	0.8197	0.8103	0.7833	0.7385
<b>Mean</b>	0.7783	0.7707	0.8140	0.8436	0.8488	0.8456	0.8192
<b>Std Dev</b>	0.1044	0.0967	0.0801	0.0660	0.0675	0.0656	0.0819
<b>Min</b>	0.4890	0.4843	0.5848	0.6489	0.6547	0.6651	0.6502

<b>Max</b>	0.9457	0.9011	0.9231	0.9341	0.9438	0.9432	0.9425
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The proportion of certified lecturers remained consistently high throughout the observation period, rising from 0.7783 in 2018 to a peak of 0.8488 in 2022, then slightly declining to 0.8192 in 2024. This pattern indicates that the university has largely succeeded in institutionalizing professional teaching standards, with certification becoming a common qualification among academic staff. The high and relatively stable values suggest that professional competence and compliance with national quality assurance requirements have reached a mature stage across most faculties. Faculties such as Nursing, Law, Cultural Sciences, Geological Engineering, and Agriculture demonstrated particularly strong achievement, reflecting effective professional development and academic governance. In contrast, the lower certification rates observed in Medicine and Fisheries and Marine Sciences may be associated with distinct professional career pathways, heavier clinical or technical responsibilities, or differing certification dynamics within those disciplines. The findings imply that while lecturer certification has become a well-established institutional strength, remaining disparities across faculties highlight the need for targeted support to ensure more equitable attainment of professional qualifications throughout the university.

Table 5 presents the descriptive statistics of the percentage of faculty members with overseas educational backgrounds across faculties during the period 2018–2024.

**Table 5. Descriptive of Percentage of Faculty Members with Overseas Educational Background Across Faculties**

Name	X4						
	2018	2019	2020	2021	2022	2023	2024
Economics and Business	0.2721	0.2685	0.2857	0.2797	0.2950	0.2806	0.2963
Pharmacy	0.2063	0.2154	0.2424	0.2464	0.2687	0.2923	0.3235
Law	0.0833	0.0833	0.0841	0.0841	0.0909	0.1053	0.1263
Cultural Sciences	0.2093	0.2000	0.1846	0.1920	0.2049	0.2069	0.2000
Communication Science	0.1148	0.1066	0.1024	0.0960	0.0992	0.0924	0.0847
Social and Political Sciences	0.1287	0.1329	0.1345	0.1353	0.1361	0.1325	0.1228
Medicine	0.1718	0.1614	0.1741	0.1822	0.1839	0.1927	0.1928
Dentistry	0.0565	0.0476	0.0630	0.0635	0.0661	0.0609	0.0619
Nursing	0.2273	0.2500	0.2637	0.2637	0.2921	0.3295	0.3333
Mathematics and Natural Sciences	0.2396	0.2308	0.2577	0.2604	0.2804	0.2787	0.2800
Fisheries and Marine Sciences	0.2903	0.2687	0.2714	0.2676	0.2576	0.2581	0.2394
Agriculture	0.2500	0.2500	0.2481	0.2538	0.2619	0.2764	0.2562
Animal Science	0.0978	0.1099	0.1348	0.1250	0.1412	0.1412	0.1395
Psychology	0.1818	0.1852	0.1786	0.1964	0.2037	0.2041	0.2200
Geological Engineering	0.3462	0.3396	0.3333	0.3396	0.3333	0.3400	0.3200
Agro-Industrial Technology	0.2203	0.2131	0.2333	0.2295	0.2759	0.2667	0.2615
<b>Mean</b>	0.1935	0.1914	0.1995	0.2010	0.2119	0.2161	0.2162
<b>Std Dev</b>	0.0781	0.0766	0.0768	0.0779	0.0810	0.0848	0.0849
<b>Min</b>	0.0565	0.0476	0.0630	0.0635	0.0661	0.0609	0.0619
<b>Max</b>	0.3462	0.3396	0.3333	0.3396	0.3333	0.3400	0.3333

The proportion of faculty members with overseas educational backgrounds increased gradually from 0.1935 in 2018 to 0.2162 in 2024, reflecting a steady enhancement of the university's international human capital and its commitment to

strengthening global academic engagement. Although the growth rate was relatively modest, the upward trend suggests continuous efforts to expand international exposure through overseas study opportunities and the recruitment of globally trained academics. Such exposure is strategically important because it facilitates access to international research networks, intercultural competencies, collaborative projects, and globally recognized academic practices. The slight increase in standard deviation indicates that internationalization of faculty qualifications remains uneven across faculties, with units such as Geological Engineering, Nursing, Pharmacy, and Economics and Business demonstrating stronger global orientation than others. In contrast, faculties with lower proportions of overseas-educated staff may face more limited access to international academic networks and global knowledge exchange. The findings suggest that while the university has made progress in internationalizing its academic workforce, further efforts are needed to reduce disparities and strengthen international exposure across all faculties to support broader institutional internationalization goals.

Table 6 presents the descriptive statistics of faculty budgets across faculties during the period 2018–2024.

**Table 6. Descriptives of Faculty Budget Across Faculties**

Name	X5						
	2018	2019	2020	2021	2022	2023	2024
Economics and Business	24.9345	24.9525	24.6957	25.1424	25.1922	25.3359	25.3024
Pharmacy	23.7857	24.0122	23.6576	24.0053	24.2056	24.3879	24.4522
Law	24.2131	24.3319	24.0239	24.4819	24.5297	24.6887	24.7693
Cultural Sciences	24.3558	24.4198	24.0716	24.4950	24.5093	24.5505	24.5893
Communication Science	24.3090	24.4472	24.1410	24.5396	24.6856	24.7751	24.8215
Social and Political Sciences	24.6737	24.7783	24.4519	24.9651	25.0060	25.1157	25.1368
Medicine	25.2630	25.4705	25.3887	25.8109	25.8220	26.0450	26.1572
Dentistry	24.4346	24.4669	24.2079	24.6012	24.7251	24.7570	24.7663
Nursing	23.9248	23.9741	23.6798	24.2515	24.2623	24.3131	24.3912
Mathematics and Natural Sciences	24.7789	24.8627	24.5744	24.9926	25.0872	25.1721	25.2842
Fisheries and Marine Sciences	23.4723	23.5586	23.2663	23.8980	23.9699	24.1130	24.1195
Agriculture	24.5104	24.6123	24.4337	24.8886	25.0805	25.0942	25.2066
Animal Science	24.1134	24.0557	23.6365	24.0695	24.2098	24.2604	24.3454
Psychology	24.0476	23.8340	23.2582	23.7167	23.9233	23.9411	23.9743
Geological Engineering	24.1799	24.3141	23.7829	24.1680	24.2842	24.3605	24.5947
Agro-Industrial Technology	23.6189	23.8164	23.5248	23.9713	24.0475	24.2707	24.2542
<b>Mean</b>	24.2885	24.3692	24.0497	24.4998	24.5963	24.6988	24.7603
<b>Std Dev</b>	0.4635	0.4794	0.5521	0.5368	0.5120	0.5277	0.5367
<b>Min</b>	23.4723	23.5586	23.2582	23.7167	23.9233	23.9411	23.9743
<b>Max</b>	25.2630	25.4705	25.3887	25.8109	25.8220	26.0450	26.1572

Table 6 presents the descriptive statistics of faculty budgets measured in the natural logarithm (Ln) form across faculties during the period 2018–2024. Overall, the data indicate a consistent increase in faculty budgets over time. The mean value increased from Ln 24.2885 in 2018 to Ln 24.7603 in 2024. When converted back to real monetary terms, this represents an increase from approximately IDR 35.3 billion in 2018 to approximately IDR 56.7 billion in 2024. This trend suggests that the overall financial capacity of faculties has improved over the study period. The growth in budget allocation may reflect institutional expansion, increased funding for academic activities, and stronger financial support for teaching, research, and internationalization initiatives.

At the faculty level, the Faculty of Medicine consistently recorded the highest budget values across the observation period. In 2024, the value reached Ln 26.1572, which corresponded to approximately IDR 229.0 billion in actual budget terms. This substantially larger budget likely reflected the higher operational costs of medical education, including clinical facilities, laboratories, and specialized academic programs. Conversely, the Faculty of Psychology recorded the lowest budget values in the later years of observation. In 2024, the value was Ln 23.9743, which corresponded to approximately IDR 25.8 billion. Earlier in the period, the Faculty of Fisheries and Marine Sciences also recorded relatively low budget levels, with Ln 23.4723 in 2018, equivalent to approximately IDR 15.6 billion. These lower budget levels may reflect differences in program scale, infrastructure requirements, and funding allocation across faculties.

### Descriptive Trends in Internationalization Outcomes

Table 7 presents the descriptive statistics of the number of active international collaborations across faculties during 2018–2024.

**Table 7. Descriptives of Number of Active International Collaborations Across Faculties**

Name	Y1						
	2018	2019	2020	2021	2022	2023	2024
Economics and Business	37	17	17	13	13	10	8
Pharmacy	4	4	1	0	1	1	2
Law	7	5	2	2	2	3	0
Cultural Sciences	10	3	1	5	3	1	2
Communication Science	1	1	1	4	1	1	1
Social and Political Sciences	48	19	11	34	38	8	5
Medicine	26	9	4	8	10	4	3
Dentistry	1	2	2	7	0	1	5
Nursing	4	0	4	1	7	5	3
Mathematics and Natural Sciences	10	3	6	5	8	13	7
Fisheries and Marine Sciences	4	1	5	9	5	1	1
Agriculture	18	2	6	1	3	5	2
Animal Science	0	1	1	10	5	1	0
Psychology	0	1	0	7	8	1	1
Geological Engineering	2	2	2	12	7	4	0
Agro-Industrial Technology	4	0	2	9	2	0	1
<b>Mean</b>	11.0000	4.3750	4.0625	7.9375	7.0625	3.6875	2.5625
<b>Std Dev</b>	13.8203	5.5888	4.2934	7.7336	8.7283	3.6524	2.3971
<b>Min</b>	-	-	-	-	-	-	-
<b>Max</b>	48	19	17	34	38	13	8

The number of international collaborations exhibited substantial fluctuations during 2018–2024, with the mean declining sharply from 11.00 collaborations in 2018 to 4.38 in 2019 and 4.06 in 2020, recovering to 7.94 in 2021 and 7.06 in 2022, before falling again to 3.69 in 2023 and 2.56 in 2024. This pattern indicates that international collaboration activities were highly sensitive to both institutional and external conditions, reflecting challenges in sustaining long-term global partnerships despite periodic improvements. The persistently high variation across faculties suggests that international engagement was concentrated within a limited number of faculties rather than being institution-wide. Faculties such as Social and Political Sciences, which recorded exceptionally high collaboration counts (48 in 2018 and 38 in 2022), and Economics and Business emerged as key drivers of international engagement, while several faculties reported very few or even zero collaborations in certain years. These findings imply that international collaboration capacity is strongly influenced by disciplinary characteristics, established research networks, and faculty-level strategic initiatives, highlighting the need for more balanced institutional support to reduce disparities and strengthen sustainable international partnerships across all academic units.

Table 8 presents the descriptive statistics of the proportion of international students across faculties during the period 2018–2024.

**Table 8. Descriptives of Proportion of International Students Across Faculties**

Name	Y2						
	2018	2019	2020	2021	2022	2023	2024
Economics and Business	34	4	1	2	221	60	6
Pharmacy	5	7	0	1	3	37	3
Law	1	2	0	0	0	1	0
Cultural Sciences	164	101	5	5	66	85	89
Communication Science	0	26	0	3	167	9	22
Social and Political Sciences	1	4	6	7	19	0	15
Medicine	10	21	3	2	27	5	0
Dentistry	37	18	0	0	0	36	15
Nursing	0	0	0	0	1	169	1
Mathematics and Natural Sciences	2	0	0	0	75	71	80
Fisheries and Marine Sciences	0	0	2	0	146	76	33
Agriculture	0	1	0	0	10	1	1
Animal Science	0	0	0	1	114	0	182
Psychology	0	0	0	0	8	0	0
Geological Engineering	9	18	0	0	157	1	1
Agro-Industrial Technology	0	25	0	0	0	160	5
<b>Mean</b>	16.438	14.188	1.063	1.313	63.375	44.438	28.313
<b>Std Dev</b>	39.773	24.311	1.886	2.022	71.883	54.188	47.903
<b>Min</b>	-	-	-	-	-	-	-
<b>Max</b>	164	101	6	7	221	169	182

The number of international students demonstrated extreme volatility during 2018–2024, with the mean decreasing from 16.44 students in 2018 to 1.06 in 2020 and 1.31 in 2021, before surging dramatically to 63.38 in 2022 and subsequently declining to 44.44 in 2023 and 28.31 in 2024. These fluctuations indicate that international student enrollment was highly vulnerable to external disruptions and institutional recruitment dynamics, reflecting the sensitivity of cross-border education to changes in global mobility conditions. The large standard deviations further suggest that international students were

concentrated in a limited number of faculties rather than distributed evenly across the university. Faculties such as Economics and Business (221 students in 2022), Cultural Sciences (164 in 2018 and 89 in 2024), and Animal Science (182 in 2024) emerged as major contributors to international enrollment. In contrast, several faculties consistently attracted few or no international students. This uneven pattern suggests that faculty-specific factors—including program reputation, international partnerships, curriculum appeal, and language accessibility—play a critical role in shaping international student demand, underscoring the need for broader institutional strategies to diversify and sustain international enrollment across academic units.

Table 9 presents the descriptive statistics of the number of internationally indexed publications across faculties during 2018–2024.

**Table 9. Descriptives of Number of Internationally Indexed Publications Across Faculties**

Name	Y3						
	2018	2019	2020	2021	2022	2023	2024
Economics and Business	80	112	80	78	81	145	135
Pharmacy	105	145	157	197	282	259	226
Law	11	25	17	31	20	57	59
Cultural Sciences	6	24	21	25	16	34	35
Communication Science	93	99	53	80	23	39	49
Social and Political Sciences	43	134	57	101	68	106	118
Medicine	143	171	298	459	495	562	574
Dentistry	54	47	86	79	104	152	174
Nursing	4	17	24	69	120	90	95
Mathematics and Natural Sciences	245	312	287	410	311	501	485
Fisheries and Marine Sciences	62	69	52	47	50	69	84
Agriculture	64	125	70	118	129	140	140
Animal Science	30	58	39	35	30	46	87
Psychology	7	23	22	27	48	49	40
Geological Engineering	54	53	26	44	27	61	58
Agro-Industrial Technology	31	63	84	53	84	155	151
<b>Mean</b>	64.500	92.313	85.813	115.813	118.000	154.063	156.875
<b>Std Dev</b>	60.046	73.451	85.331	127.744	128.987	154.146	150.534
<b>Min</b>	4	17	17	25	16	34	35
<b>Max</b>	245	312	298	459	495	562	574

Table 9 presents the descriptive statistics of the number of internationally indexed publications across faculties during the period 2018–2024. Overall, the data indicate a substantial increase in international research publications over time, suggesting a strengthening of research productivity and global academic engagement across the university. The mean number of publications increased from 64.50 in 2018 to 156.88 in 2024, indicating that the average research output more than doubled during the observation period. Although there was a slight decline in 2020 compared with 2019, the overall trend demonstrates consistent growth from 2021 onwards, reflecting increased research activity and publication in internationally indexed journals. This upward trend suggests improvements in research capacity, institutional research support, and incentives for publishing in international journals, which are important indicators of

academic internationalization. The increasing standard deviation over time also indicates that differences in research productivity among faculties have widened, suggesting that some faculties have expanded their international publication output more rapidly than others.

The Faculty of Medicine consistently recorded the highest number of internationally indexed publications across most years. Its publication output increased dramatically from 143 in 2018 to 574 in 2024, the highest value in the dataset. Similarly, the Faculty of Mathematics and Natural Sciences demonstrated strong research productivity, producing 485 publications in 2024, down from a peak of 501 in 2023. Other faculties with relatively high research output included Pharmacy, which recorded 226 publications in 2024, and Agriculture, which maintained more than 100 publications in recent years. Conversely, several faculties recorded comparatively lower numbers of internationally indexed publications. The Faculty of Nursing consistently showed the lowest output in the early years, with only 4 publications in 2018, but this increased to 95 publications in 2024, indicating significant improvement over time. Similarly, the Faculty of Cultural Sciences and the Faculty of Psychology generally produced fewer international publications than other faculties, although they also showed gradual growth during the observation period.

### Construction of the Internationalization Performance Index

To construct a comprehensive measure of institutional internationalization performance, a factor analysis was conducted using three indicators: the number of active international collaborations (Y1), the number of international students (Y2), and the number of internationally indexed publications (Y3). The results are presented in Table 10.

**Table 10. Factor Analysis**

Variable	Communality	Factor Loading	Component Score Coefficient
International Collaborations (Y1)	0.535	0.731	0.628
International Students (Y2)	0.164	0.405	0.348
International Publications (Y3)	0.466	0.683	0.586
Factor Analysis Test	Value		
Kaiser–Meyer–Olkin (KMO) Measure	0.513		
Bartlett’s Test of Sphericity (Sig)	2.616 (0.455)		

The factor analysis indicates that the three indicators can be combined into a single measure of internationalization performance, although the strength of the underlying factor is relatively modest in strength. The KMO value of 0.513 exceeds the minimum acceptable threshold, suggesting sufficient sampling adequacy for factor extraction. At the same time, the non-significant Bartlett’s test implies that the correlations among indicators are not particularly strong. Nevertheless, the factor was retained because the indicators represent core dimensions of university internationalization and collectively capture its multidimensional nature.

Research-oriented dimensions primarily shape the extracted factor. International collaborations exhibited the highest communality (0.535) and factor loading (0.731), followed by international publications, with a communality of 0.466 and a factor loading of 0.683, indicating that these variables explain a substantial proportion of the common internationalization construct. In contrast, international students showed a considerably

lower communality (0.164) and a moderate loading (0.405), suggesting a weaker contribution to the shared factor. This pattern is reinforced by the component score coefficients, with international collaborations receiving the greatest weight (0.628), followed by publications (0.586), and international students contributing the least (0.348). These results imply that, within the observed institutional context, internationalization performance is more strongly reflected through research collaboration and global scholarly output than through international student mobility, highlighting the central role of research internationalization as the primary driver of institutional global engagement.

### Panel Regression Results

Panel data regression was used to estimate the relationship between faculty human resource quality and internationalization performance. The analysis compared the common effects, fixed effects, and random effects specifications using the Chow and Hausman tests. Diagnostic tests were also reviewed to assess normality, heteroskedasticity, serial correlation, and multicollinearity.

**Table 11. Panel Data Regression Results and Model Diagnostics**

Variable	Coeff.	Std. Error	t-stat.	Prob.	VIF
C	-26.37848	4.560792	-5.783750	0.0000	-
X1	1.887325	0.946913	1.993133	0.0488*	1.979326
X2	-5.008269	1.793657	-2.792212	0.0062*	2.236394
X3	-1.468207	0.943439	-1.556228	0.1226	1.123087
X4	4.833802	1.511291	3.198459	0.0018*	1.150587
X5	1.064178	0.187718	5.669033	0.0000*	1.244559
Adjusted R-squared					0.299931
F-statistic					10.51115
Prob(F-statistic)					0.000000
Prob(Jarque-Bera test)					0.602983
Prob(White test)					0.480900
Prob(Serial Correlation LM-test)					0.064800
Prob(Chow test)					0.000000
Prob(Hausman test)					0.072400
Model Decision	Random Effect Models (REM)				

The diagnostic tests confirm that the regression model satisfies the main econometric assumptions, as indicated by normally distributed residuals (Jarque-Bera probability = 0.602983), the absence of heteroskedasticity (White test probability = 0.480900), and the absence of significant serial correlation (LM test probability = 0.064800). Furthermore, low VIF values indicate that multicollinearity is not problematic. Model selection tests support the use of the random effects specification, with the Chow test ( $p = 0.000000$ ) confirming the presence of faculty-level heterogeneity and the Hausman test ( $p = 0.072400$ ) suggesting that unobserved faculty characteristics are not systematically correlated with the explanatory variables. These results indicate that the estimated coefficients provide a reliable basis for explaining variations in faculty internationalization performance.

The regression findings reveal that overseas educational background and faculty budget are the most influential determinants of internationalization performance. Overseas education ( $p = 0.0018$ ) significantly enhances international engagement by strengthening global networks, research collaboration opportunities, and international academic exposure. In contrast, faculty budget ( $p < 0.001$ ) provides the financial capacity

necessary to support mobility, partnerships, and publication activities. Doctoral qualifications also contribute positively and significantly, although with a smaller effect. In contrast, the proportion of professors has a significant negative effect ( $p = 0.0062$ ), suggesting that higher academic rank alone does not necessarily translate into stronger international engagement and may be associated with administrative responsibilities or limited participation in active global networks. Meanwhile, lecturer certification does not significantly influence internationalization outcomes. With an adjusted  $R^2$  of 0.299931 and a significant F-statistic, the model demonstrates that internationalization is driven primarily by globally connected human capital and resource availability rather than by formal academic status, highlighting the importance of investing in international exposure and institutional support mechanisms.

## Discussion

The findings refine the theoretical understanding of faculty human capital in university internationalization. Human capital theory suggests that education and professional development improve organizational performance. However, the results show that not all forms of human capital have the same value in terms of internationalization. Overseas educational background has the most consistent positive role because it is more directly connected with foreign academic networks, language exposure, intercultural competence, and familiarity with international research practices. This supports recent internationalization research that emphasizes the importance of faculty engagement and international experience in building sustainable global academic relationships (Dervenis et al., 2022; Cretu & Grosseck, 2025; Chirikov, 2022).

The positive role of doctoral faculty indicates that advanced academic training contributes to research capacity and scholarly productivity (Kareem & Abdullah, 2025; Kraja et al., 2024; Mahade et al., 2025). However, doctoral qualifications alone may not be sufficient to achieve internationalization outcomes unless accompanied by international collaboration opportunities, publication support, and institutional incentives. This interpretation is consistent with the resource-based view, which argues that resources create competitive advantage only when they are valuable, organized, and effectively mobilized. In this study, overseas education and budget appear to be more directly mobilized toward international engagement than formal credentials alone.

The negative relationship between professors and internationalization performance provides an important theoretical and managerial insight. Academic rank represents seniority and expertise, but it may also be associated with administrative responsibilities, internal governance roles, or discipline-specific career trajectories that do not always produce measurable international collaboration, international student attraction, or indexed publication output. Therefore, the finding does not imply that professors reduce internationalization; rather, it suggests that universities should not assume that a higher concentration of professors automatically improves global performance. Professorial capacity needs to be connected with clear internationalization assignments, collaborative research incentives, and mentoring roles that transfer global networks to younger academics (Yousef, 2024).

The insignificant effect of certified lecturers is also theoretically meaningful. Teaching certification mainly reflects pedagogical and professional teaching competence, whereas the dependent variable is dominated by international collaboration and publication-related indicators. The result suggests a potential mismatch between the

nature of certification and the measured internationalization outcomes. Certification remains important for teaching quality, but it may have limited direct influence on global research engagement unless certification programs also include international curriculum development, English-medium teaching, joint course delivery, and cross-border academic collaboration.

The faculty budget has a strong positive effect, confirming that internationalization requires organizational support rather than individual capacity alone. International partnerships, mobility, visiting scholars, conference participation, research dissemination, and publication support all require funding. This finding strengthens the institutional theory perspective: universities respond to global pressures through both symbolic commitments and material investments. Without adequate faculty-level resources, even academically qualified faculty members may have limited ability to participate in international networks.

These results imply that Indonesian public universities should design more targeted internationalization strategies. Faculty development should prioritize overseas doctoral pathways, postdoctoral exposure, visiting scholar schemes, international research grants, and structured collaboration with foreign partners. At the same time, senior academics and professors should be given explicit roles in leading international consortia, mentoring publication teams, and converting academic reputation into active global partnerships. Resource allocation should also be linked to measurable internationalization outcomes so that faculties with strategic international initiatives receive adequate financial support.

## CONCLUSION

This study demonstrates that faculty human resource quality influences university internationalization performance in different ways. Using balanced panel data from 16 faculties of Universitas Padjadjaran during 2018-2024, the findings show that overseas educational background and faculty budget are the most consistent drivers of internationalization performance, while doctoral qualifications provide a positive but more limited contribution, professional teaching certification is not significant, and professorial rank shows a negative association that requires careful managerial interpretation. The main implication is that universities should not rely solely on formal academic rank or certification to advance internationalization; they should build internationally connected faculty capacity through overseas education, research collaborations, visiting scholar programs, international publication support, and targeted funding. These findings contribute to the literature by showing that faculty human capital becomes strategically valuable when it is linked to global networks and supported by institutional resources. The study is limited to a single Indonesian public university and relies on quantitative indicators of internationalization; therefore, future research should compare multiple universities and incorporate qualitative evidence on faculty motivation, leadership, and institutional culture.

## ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to all parties who contributed to the completion of this research. Special appreciation is extended to the university management and faculty administrators who provided access to institutional data and supported the research process.

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