Analysis of University Mobility and Internationalization in Institutional Accreditation Processes in Higher Education in Peru

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Abstract*– This study examines the interconnections between university mobility, internationalization, and institutional accreditation processes in Peruvian higher education institutions. Using a quantitative, non-experimental cross-sectional design, data were collected from 68 licensed public and private universities through structured surveys administered to international relations and academic quality officials. Secondary data from Peru's National System for the Evaluation, Accreditation, and Certification of Educational Quality (SINEACE) were incorporated to verify accreditation records. Statistical analyses included Shapiro-Wilk normality tests, ANOVA, and Spearman rank correlations using R Studio. Results revealed consistently positive perceptions of internationalization policies across institutions, with no significant differences between public and private universities in academic mobility ($F(1,38) = 0.13$, $p = 0.721$). However, weak correlations were found between mobility, policies, resources, and accreditation outcomes ($\rho \leq 0.20$), indicating fragmented processes. Accreditation efforts were heavily concentrated at the undergraduate level (92.6%), with minimal representation in master's (5.9%) and doctoral programs (1.5%). Disciplinary segmentation emerged, with public universities leading in engineering and health program accreditation, while private institutions focused on social sciences. The findings suggest that despite progress in establishing internationalization frameworks, operational gaps and lack of synergy persist. This research contributes to understanding higher education quality assurance in Latin America and calls for more integrated approaches that leverage accreditation as a strategic tool for promoting transformative, context-sensitive internationalization rather than merely validating institutional compliance.

Keywords—Internationalization; Academic mobility; Accreditation; Quality assurance; Higher education.

I. INTRODUCTION

In today's globally interconnected academic landscape, Peruvian universities face the strategic challenge of integrating three fundamental pillars: student mobility, curriculum internationalization, and institutional accreditation. Internationalization is recognized as a key driver in enhancing educational quality and gaining global recognition for institutions [1]. However, despite its importance, accreditation—an essential element of internationalization [2]—is not consistently prioritized across all institutions, thereby limiting their global competitiveness and visibility.

This study seeks to explore the articulation of these three dimensions in the context of higher education in Peru, analyzing their joint potential to improve academic quality and address current challenges. According to [3], quality serves as a transversal axis that underpins the continuous development of programs and institutions, making it a cornerstone for the sustained growth of higher education. As emphasized by [4], internationalization should extend beyond isolated exchanges or partnerships; it must be an integrated, cross-cutting process that transforms institutional practices, enhances global academic recognition, and aligns with shared standards of excellence.

The research presents a model to analyze the interconnections between mobility, internationalization, and accreditation, using a mixed-methods approach. It incorporates quantitative data on policies, resources, mobility experiences, and accreditation outcomes, combined with a critical perspective grounded in the Latin American context. The central research question guiding this work is: How are the processes of university mobility, internationalization, and institutional accreditation interconnected in Peruvian universities, and how does their articulation impact educational quality? This methodological framework allows for the identification of correlation levels, differences based on institutional governance types, and strategic areas for improvement [5].

Despite ongoing efforts to promote mobility and accreditation, these processes often function independently, preventing the formation of a coherent system capable of fostering robust academic development with international projection [6]. The lack of integrated public and institutional policies reduces the ability of universities to meet international standards while also responding to local demands.

This research contributes to rethinking university governance from a systems-based perspective, advocating for a model that combines equitable internationalization, academic quality, and sustainable institutional management [7]. Its value lies in both its theoretical and applied contributions, offering a critical yet constructive vision for advancing a more interconnected, context-sensitive, and competitive model of higher education in Peru and Latin America.

In Latin America, higher education internationalization has often followed hegemonic models that emphasize competition between institutions, rankings, standardized curricula, and externally imposed quality metrics. These models, perpetuated by centralized knowledge production structures, reinforce dependency and restrict equitable academic collaboration. In contrast, non-hegemonic internationalization models advocate horizontal cooperation, engagement with local stakeholders, and the acknowledgment of territorial diversity, prioritizing localized needs over universal frameworks [8].

The synergy among student mobility, curriculum internationalization, and accreditation constitutes a major challenge for institutions operating within a globalized environment. As [9] points out, universities are under increasing pressure to meet global quality standards while embedding academic mobility into the core of comprehensive education.

Accreditation plays a pivotal role in higher education by verifying institutional compliance with quality benchmarks. It legitimizes academic programs and provides students with trustworthy information for making informed academic choices [10]. In this regard, national quality assurance systems have been instrumental in fostering both national and international accreditation. They set shared standards, provide clear guidelines, and offer incentives for higher education institutions to align with both domestic and global expectations.

Pursuing dual accreditation enhances institutional internationalization and visibility but also presents several challenges, such as navigating diverse regulatory frameworks, managing complex accreditation processes, and coordinating the efforts of various stakeholders [11]. According to [12], accreditation should not be limited to institutional validation but be recognized as a strategic tool to strengthen global academic competitiveness by promoting shared standards and reciprocal recognition among educational systems.

In Peru's current higher education context, there is a pressing need to harmonize the processes of academic mobility, internationalization, and accreditation. Although initiatives like international agreements, student exchange programs, and quality assurance policies have advanced, they often lack strategic coordination. This absence of synergy weakens the global recognition of Peruvian universities, undermines the perceived quality of academic offerings, and limits international learning opportunities for both students and faculty.

While academic mobility and internationalization are increasingly recognized in accreditation standards [13], a fully developed model that leverages their interdependence to improve educational quality and system-wide competitiveness has yet to emerge.

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II. METHODOLOGY

This study adopts a quantitative, non-experimental approach with a cross-sectional design and correlational scope. Its primary objective is to examine the relationship between academic mobility, curriculum internationalization, and institutional accreditation processes in Peruvian universities. The target population included all licensed public and private universities in Peru. From this population, a sample of 68 universities was selected based on accessibility and the availability of institutional data.

Data collection was carried out through a structured survey directed at officials responsible for international relations or academic quality within each university. This instrument captured institutional perceptions regarding internationalization policies, available resources, and practices related to academic mobility. In addition to survey data, the study incorporated secondary data analysis from public records provided by the National System for the Evaluation, Accreditation, and Certification of Educational Quality (SINEACE), enabling the verification of up-to-date information on accredited undergraduate and postgraduate programs (master's and doctoral levels) [14].

Data processing and statistical analysis were performed using R Studio. Initially, the Shapiro-Wilk test was applied to assess the normality of variable distributions [15], [16]. This step determined the suitability of using either parametric or non-parametric statistical techniques. Subsequently, Analysis of Variance (ANOVA) was employed to identify statistically significant differences in internationalization and accreditation indicators between public and private institutions [17]. Additionally, the Spearman rank correlation coefficient was used to measure the strength and direction of relationships among key variables, including academic mobility, internationalization policies, institutional resources, and accreditation outcomes [18].

The unit of analysis in this research consisted of academic programs across all three levels of university education: undergraduate, master's, and doctoral programs. This approach enabled the identification of differentiated patterns in accreditation processes and their potential link to the degree of institutional internationalization [19].

III. RESULTS

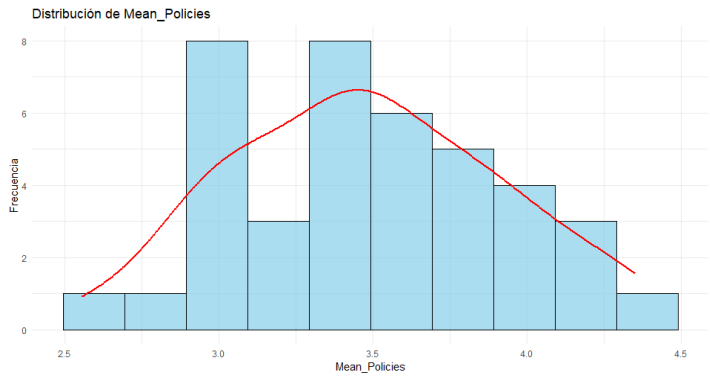

Fig. 1 **Distribution Shape: Mean_Policies**

The data is displayed as a histogram with a superimposed density curve (in red). The X-axis ranges from 2.5 to 4.5, indicating that responses fall within a moderately high range. The density curve suggests an approximately symmetrical distribution, with a slight skew toward higher values (mild positive skew).

Most observations are concentrated between 3.0 and 4.0, with frequency peaks ranging from 6 to 8 responses within these intervals. There are no extreme values or long tails, indicating a lack of evident outliers.

This distribution suggests that participants perceive internationalization policies in their institutions in a moderately favorable light. The symmetrical shape and concentration of higher values support the validity of using parametric analyses, as confirmed by the Shapiro-Wilk test.

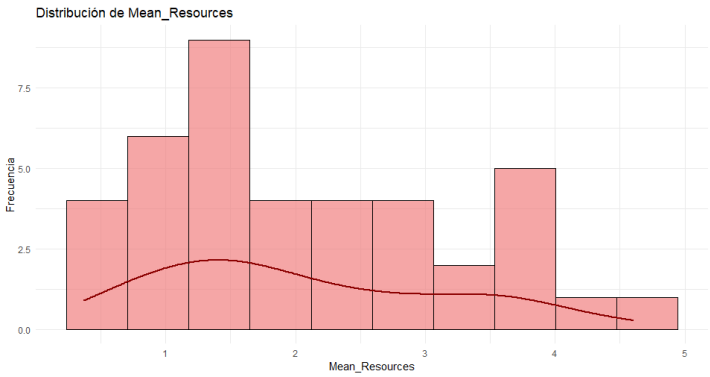

Fig. 2 **Distribution Analysis: Resources for Internationalization**

The variable Mean_Resources spans a range from 0 to 5, indicating a broad scale of perception. The overlaid density curve reveals a slight asymmetry, possibly skewed to the left (mild negative skew), though not strongly pronounced. Most responses are clustered between 2.5 and 4.0, suggesting a tendency toward moderate to high perceptions.

The histogram bars show that the most frequent values fall within the 3.0 to 3.5 range, with frequencies reaching up to 8 observations. There are no long tails or clear outliers, although there is a slight spread toward lower values.

This distribution indicates that participants generally view institutional resources for internationalization in a moderately positive light, though with greater variability compared to other dimensions such as policy. The shape of the distribution, along with the Shapiro-Wilk test results (p-value < 0.05), suggests that the data does not follow a normal distribution, supporting the use of non-parametric tests for analysis.

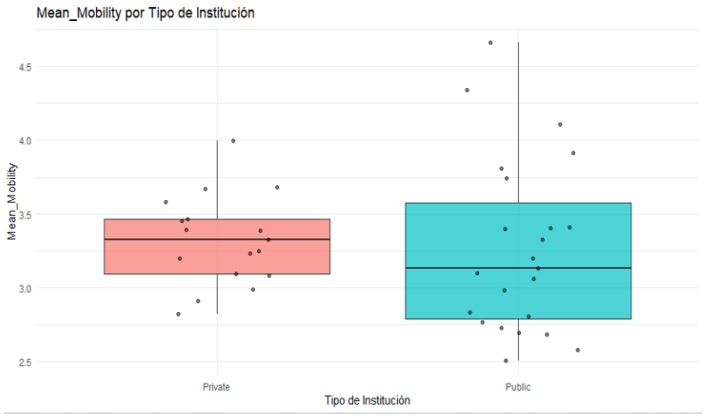

Fig. 3 **Analysis of Academic Mobility by Type of Institution**

The boxplot illustrates the distribution of Mean_Mobility across two types of institutions—private (in red) and public (in blue)—with individual data points overlaid. This visualization allows for a clear comparison of both overall trends and specific values within each group.

Both public and private institutions exhibit similar ranges of Mean_Mobility, roughly between 2.8 and 4.2. The medians are close—approximately 3.4 for private and 3.2 for public institutions—suggesting minimal difference in perceived academic mobility between the two groups. While the spread of data is comparable, public institutions show slightly greater variability, with a wider interquartile range and more dispersed outliers. Private institutions, on the other hand, display a modest concentration of values above 3.5.

These visual findings align with the results of the ANOVA test previously mentioned: $F(1, 38) = 0.13$, $p = 0.721$. This indicates no statistically significant difference in academic mobility perceptions between students from public and private institutions.

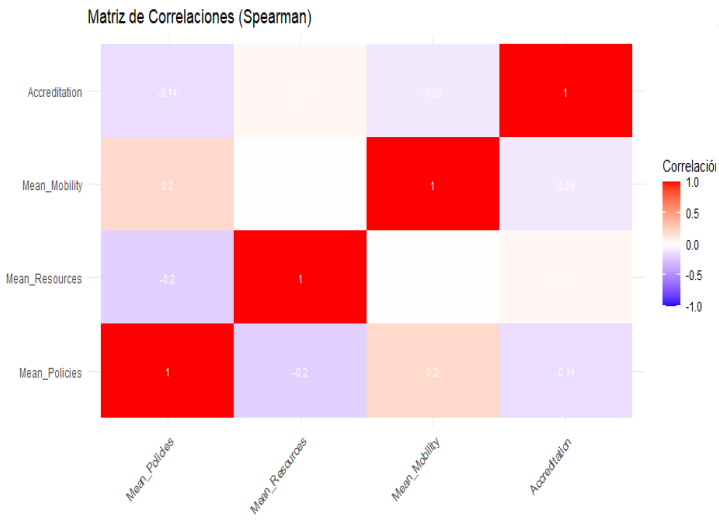

Fig. 4 **Spearman Correlation Analysis**

This analysis explores the relationships between key variables using Spearman's rank correlation coefficient (ρ), which measures the strength and direction of monotonic associations.

Mean_Mobility vs. Mean_Policies (ρ = 0.20):

A weak positive correlation suggests that higher perceptions of institutional policies are slightly associated with increased academic mobility.

Mean_Mobility vs. Mean_Resources (ρ = 0.20):

Similarly, this weak positive relationship indicates that institutions perceived as having more resources may offer more opportunities for academic mobility.

Accreditation vs. Mean_Policies (ρ = -0.14):

A weak negative correlation, implying no clear relationship between accreditation and policy perception.

Accreditation vs. Mean_Mobility (ρ = -0.09):

This very weak negative correlation suggests almost no association between accreditation and academic mobility.

Accreditation vs. Mean_Resources (ρ = 0.04):

Essentially no correlation, indicating that perceived accreditation status is not meaningfully linked to perceptions of institutional resources.

Most of the correlations are weak or negligible, suggesting that the dimensions assessed—mobility, policies, resources, and accreditation—are relatively independent. The only slight positive associations appear between academic mobility and both policies and resources, which is conceptually reasonable: institutions with more supportive policies and resources may be better equipped to promote mobility. Accreditation, however, does not show meaningful connections with any of the other variables, possibly indicating that its perception is shaped by factors not captured in this analysis.

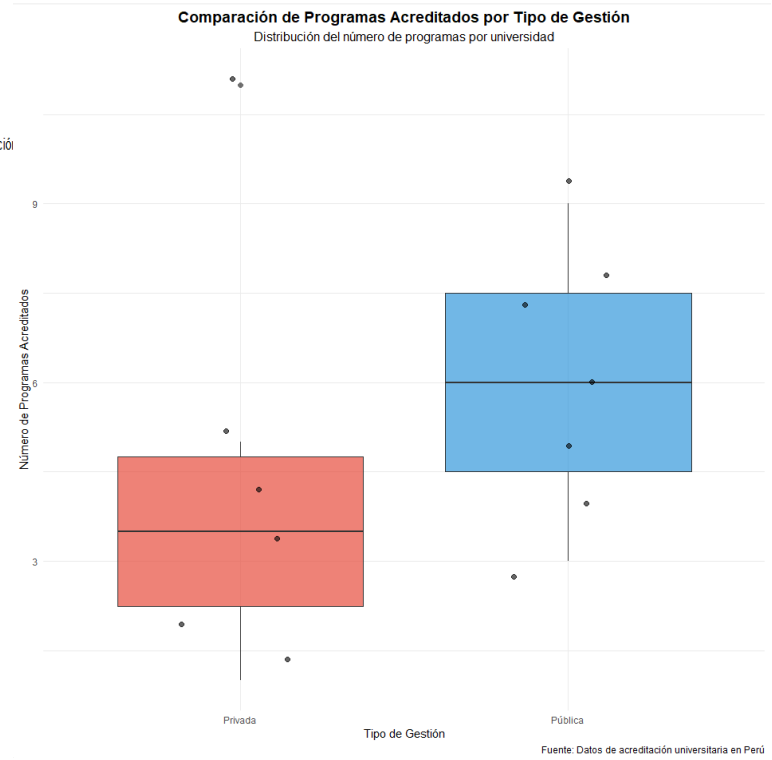

Fig. 5 **Analysis of Accredited Programs by Type of Institution**

The dot plot compares the number of accredited programs across universities, distinguishing between public and private institutions. Each dot represents a university, and the overlaid boxplots provide a summary of the distribution within each group.

Private universities tend to cluster around mid-to-high levels of accreditation, typically between 5 and 15 programs. Public universities show a broader spread, with some institutions having very few accredited programs and others reaching numbers comparable to or exceeding those of private universities. While there is no stark contrast between the two groups, there is a slight tendency for private institutions to have a higher concentration of accredited programs.

This visualization supports comparative analysis between management types and could inform statistical testing, such as ANOVA or non-parametric methods if normality assumptions are not met. Importantly, the distribution suggests that accreditation is not exclusive to one type of institution, which is relevant for discussions on equity and educational quality policies.

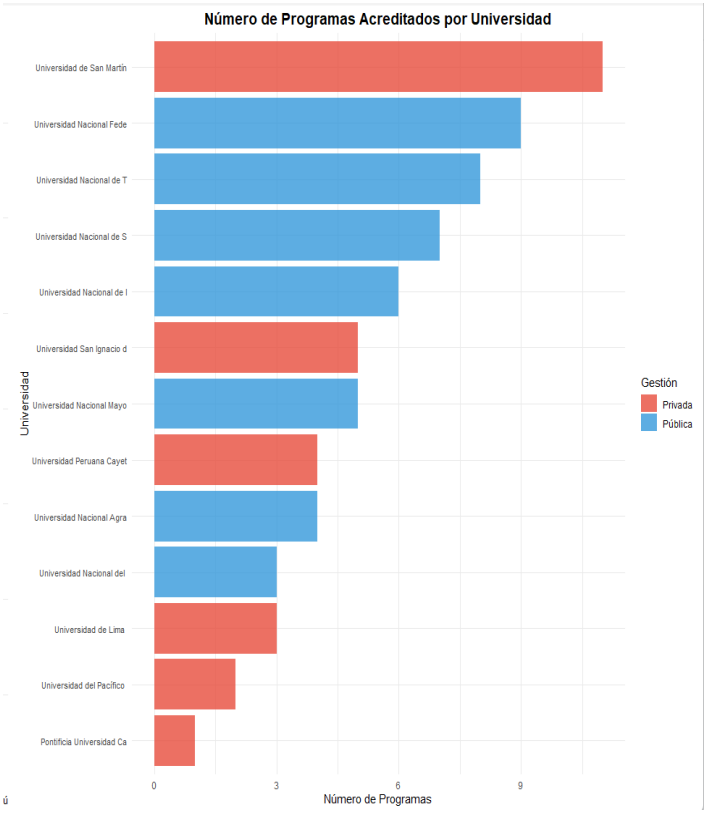

Fig. 6 **Accredited Programs by University: Comparative Overview**

The horizontal bar chart displays the number of accredited programs across various universities, with color coding to distinguish between private (red) and public (blue) institutions. The x-axis indicates the number of accredited programs, while the y-axis lists the universities, some abbreviated due to space constraints.

The Universidad de San Martín de Porres (USMP) stands out as the institution with the highest number of accredited programs, leading among private universities.

Several public universities also rank prominently, including Universidad Nacional Federico Villarreal, Universidad Nacional de Trujillo, and Universidad Nacional de San Agustín, reflecting active efforts in institutional accreditation.

While public universities show strong representation at the top, private institutions also demonstrate significant engagement in accreditation, indicating that both sectors are committed to educational quality.

This chart provides a useful basis for comparing accreditation efforts across management types. It supports further statistical analysis, such as ANOVA or non-parametric tests, depending on data distribution. Importantly, the presence of both public and private institutions among the top performers suggests that accreditation is not exclusive to one sector, which is relevant for discussions on equity and quality assurance in higher education.

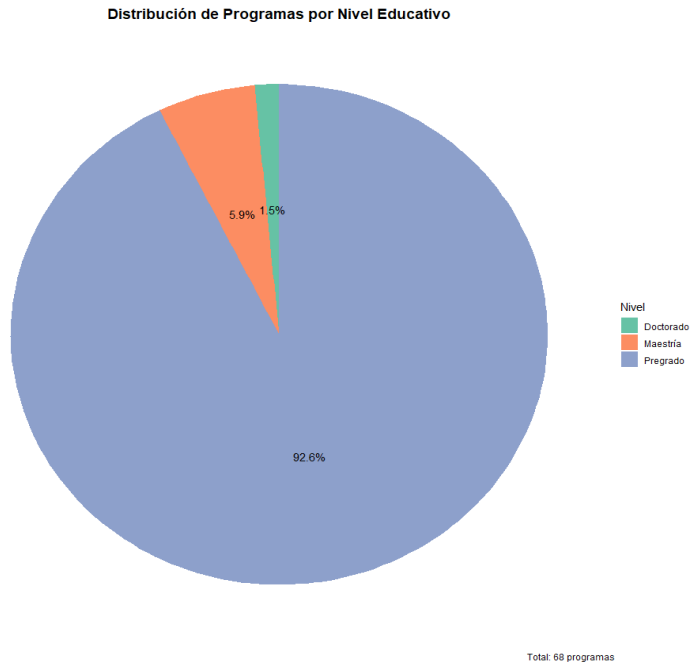

Fig. 7 **Distribution of Accredited Programs by Educational Level**

The pie chart illustrates the proportion of accredited academic programs categorized by educational level. The chart includes a total of 68 programs, divided into three levels:

Undergraduate (blue): 92.6%
This category overwhelmingly dominates the distribution, indicating that nearly all accredited programs are at the undergraduate level.

Master's (orange): 5.9%
Represents a very small share, suggesting limited accreditation activity at the graduate level.

Doctorate (green): 1.5%
This level is minimally represented, with only a residual portion of accredited programs.

The data reveals a strong institutional focus on undergraduate program accreditation, with graduate and doctoral levels receiving significantly less attention. This imbalance may reflect national priorities, resource allocation, or the maturity of quality assurance systems in higher education. The minimal presence of accredited doctoral programs suggests a potential area for development in future quality improvement in initiatives.

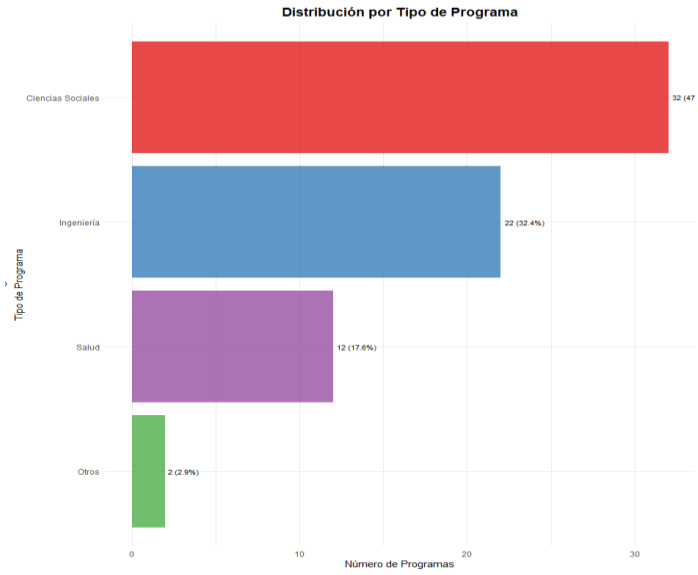

Fig. 8 **Distribution of Accredited Programs by Academic Field**

The horizontal bar chart categorizes accredited programs by thematic area, with the x-axis representing the number of programs and the y-axis listing the fields: Social Sciences, Engineering, Health, and Others. Each bar also includes the corresponding percentage of the total.

Social Sciences: 32 programs (47%)
This category holds the largest share, nearly half of all accredited programs, indicating a strong emphasis on social science disciplines.

Engineering: 22 programs (32.4%)
Engineering represents nearly one-third of the total, showing significant accreditation activity in technical and applied sciences.

Health: 12 programs (17.6%)
Health-related programs make up a smaller but still notable portion of the total.

Others: 2 programs (2.9%)
This residual category includes a minimal number of programs, suggesting limited accreditation in fields outside the main three.

The data highlights a clear concentration of accreditation efforts in Social Sciences and Engineering, with Health following behind. The minimal representation of "Other" fields may point to either a lack of programs in those areas or lower prioritization in accreditation processes. These trends can inform policy decisions and resource allocation for quality assurance across academic disciplines.

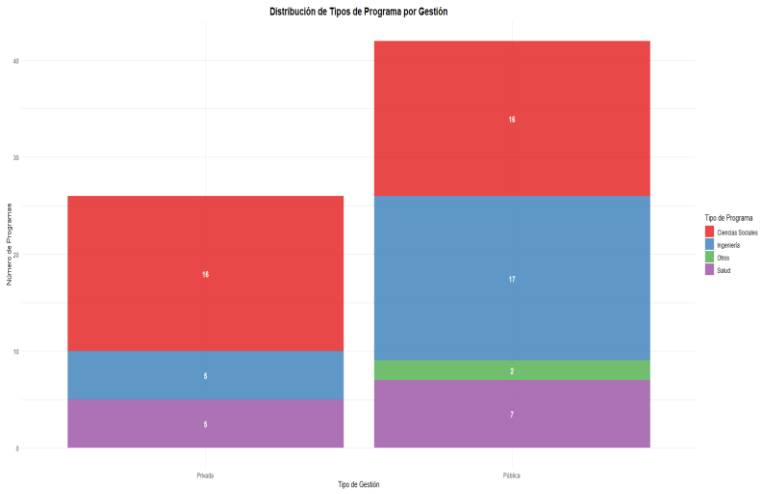

Fig. 9 **Distribution of Accredited Programs by Management Type and Program Category**

The stacked bar chart compares the number of accredited programs across public and private universities, segmented by academic field: Social Sciences, Engineering, Health, and Others. The x-axis represents the type of institution (Private vs. Public), while the y-axis shows the total number of accredited programs.

Public Universities:
Show a broader and more diverse distribution of accredited programs.
Lead significantly in Engineering (17 programs) and Health (7 programs).
Also have strong representation in Social Sciences (18 programs) and a small presence in other fields (2 programs).
Private Universities:

Concentrate their accreditation efforts primarily in Social Sciences (16 programs) and other fields (5 programs).
Have a notably lower presence in Engineering (5 programs).
Do not have any accredited programs in Health.
Interpretation:

The data suggests that public universities not only accredit a higher number of programs overall but also demonstrate greater diversity across academic fields—particularly in technical and health-related areas. In contrast, private institutions focus more narrowly on Social Sciences and miscellaneous fields, with limited engagement in Engineering and none in Health. This disparity, especially in Engineering (17 public vs. 5 private) and Health (7 public vs. 0 private), may reflect differences in institutional priorities, resources, or regulatory incentives. These findings could inform policy discussions on equity, specialization, and strategic development in higher education accreditation.

Discussion

The findings of this study reveal meaningful patterns and tensions between the institutional discourse on internationalization and the operational realities within Peruvian universities. The following discussion interprets key results considering previous research:

Governance and Institutionalization of Internationalization

The positive and consistent perception of internationalization policies across Peruvian universities aligns with [1], who emphasize that establishing institutional frameworks is a critical first step toward sustainable internationalization. However, as [4] cautions, having policies does not guarantee effective implementation. In Peru, while strategic guidelines are formulated, they often lack integration with accreditation processes and academic mobility initiatives.

The weak correlations found between policies, resources, and accreditation support the observations of [6], who note that in many Latin American and Asian systems, internationalization remains fragmented—more formal than functional.

Institutional Resources: Structural Gaps

The variability in perceptions of institutional resources points to significant operational gaps. This is consistent with [3], who identify unequal access to funding, technology, and trained personnel as major barriers to internationalization. [8] describe this phenomenon as a "paper internationalization," where institutional discourse is not backed by tangible infrastructure.

Similarly, [5] found that Chilean universities with lower institutional investment tend to adopt reactive rather than strategic international actions.

Academic Mobility and Equity

One of the most notable findings is the lack of statistically significant differences in academic mobility between public and private universities, which could suggest progress toward equity. However, [9] argue that low structural participation in mobility may not reflect equity, but rather a lack of institutionalization. In other words, similarly low levels of mobility across institutions may indicate shared limitations rather than democratization.

The weak correlations between mobility and accreditation also suggest structural disconnects, reinforcing. [11] assertion that many accreditation processes fail to incorporate robust internationalization indicators, missing opportunities to promote mobility as an evaluable component.

Accreditation Focused on Undergraduate Programs

The strong concentration of accredited programs at the undergraduate level (92.6%) mirrors findings by [7], who highlight a systematic lag in postgraduate accreditation in Peru. This gap is a structural weakness, especially considering that master's and doctoral programs are strategic for scientific output and international visibility.

[12] Argue that accrediting higher-level programs should be a priority, as it enables alignment with international standards and enhances global competitiveness. The emphasis on undergraduate accreditation may reflect licensing requirements rather than a comprehensive vision for educational improvement.

Disciplinary Disparities in Accreditation

The finding that public universities lead in accrediting engineering and health programs, while private institutions focus on social sciences, reveals significant disciplinary segmentation. [2] Note that internationalization is not discipline-neutral; fields like engineering and the hard sciences are more embedded in global networks and standards.

This disparity suggests the need for differentiated policies by academic field, as recommended by [3]. The absence of accredited health programs in private universities raises questions about enabling conditions and accreditation criteria that may be limiting expansion in these areas.

Conclusion of the Discussion

Overall, the study's findings support concerns raised in international literature regarding the fragmentation and lack of synergy among mobility, internationalization, and accreditation processes. Despite progress in institutional policies, operational gaps, institutional disparities, and weaknesses in postgraduate education persist. The weak correlations among key variables indicate that Peruvian universities still face challenges in building a cohesive system of educational quality with an international dimension.

This research encourages a rethinking of accreditation—not merely as an endpoint, but as a strategic tool to enhance mobility and foster a transformative, context-sensitive internationalization process, as proposed by [8].

IV. CONCLUSIONS

Based on the comprehensive analysis of 68 Peruvian universities examining the relationships between academic mobility, internationalization policies, and accreditation processes, this study presents the following key conclusions:

The weak correlations found between academic mobility, internationalization policies, institutional resources, and accreditation outcomes ($\rho \leq 0.20$) demonstrate that these processes operate in isolation rather than as integrated

components of a coherent internationalization strategy. This fragmentation limits the potential synergistic effects that could enhance overall educational quality and international competitiveness.

While universities demonstrate positive perceptions of internationalization policies, the considerable variability in resource allocation and limited correlation with mobility outcomes reveals a significant gap between institutional discourse and operational reality. This suggests that policy formulation must be coupled with robust implementation mechanisms and adequate resource allocation.

The overwhelming concentration of accredited programs at the undergraduate level (92.6%) indicates a quality assurance system that prioritizes initial professional training over advanced academic development. This pattern constrains universities' capacity to develop research capabilities and international academic partnerships that typically emerge from strong graduate programs.

The absence of significant differences in academic mobility between public and private universities ($F(1,38) = 0.13$, $p = 0.721$) suggests either successful democratization of international opportunities or, alternatively, uniformly limited access across all institutional types. This finding calls for deeper investigation into the actual extent and quality of mobility experiences.

The clear discipline between public universities dominating technical and health fields while private institutions focus on social sciences—creates an unbalanced quality assurance landscape. This specialization may reflect resource constraints, regulatory frameworks, or strategic institutional positioning, but it potentially limits comprehensive national development in all academic areas.

The study's findings collectively indicate that Peru's higher education system requires fundamental restructuring to achieve effective internationalization. Current approaches, characterized by isolated initiatives and uneven development, are insufficient to meet the demands of global academic integration while maintaining responsiveness to national development needs.

The research demonstrates that accreditation processes, currently functioning primarily as compliance mechanisms, possess untapped potential as strategic tools for promoting internationalization and academic mobility. Realizing this potential requires reimagining accreditation standards to explicitly incorporate and reward international engagement.

This investigation reveals that Peruvian universities operate within a paradoxical framework: while institutional commitment to internationalization appears strong at the policy level, operational integration remains weak, and outcomes are unevenly distributed across educational levels, disciplines, and institutional types. The path forward requires systematic reform that transforms accreditation from a bureaucratic requirement into a catalyst for integrated, equitable, and transformative internationalization that serves both global competitiveness and national development objectives.

The study contributes empirical evidence supporting the need for comprehensive policy reform in Latin American higher education, providing a foundation for developing more effective models of international academic integration that respect local contexts while meeting global standards.

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REFERENCES

[1] S. Sibawaihi, D. Ratnasari, S. Purnami, and M. Brooks, "Internationalizing Islamic Higher Education in Indonesia: a Lesson Learned From Australia," *J. Pendidik. Islam*, vol. 11, no. 1, pp. 90–100, 2025, doi: 10.15575/jpi.v11i1.43950.

[2] A. Abasi, M. Farasatkhah, and M. Moazzami, "Analyzing higher education accreditation results with an emphasis on internationalization of higher education," *Q. J. Res. Plan. High. Educ.*, vol. 27, no. 4, pp. 25–54, 2022, doi: 10.52547/irphe.27.4.25.

[3] A. C. Valdivia and M. B. F. Cofré, "Standards, autonomy, and internationalization: accountability in graduate programs in Chile," *Rev. Bras. Educ.*, vol. 29, pp. 1–20, 2024, doi: 10.1590/S1413-24782024290054.

[4] G. N. Nahas, "Impact of Internationalization: The Lebanese Context," in *Unintended Consequences of Internationalization in Higher Education: Comparative International Perspectives on the Impacts of Policy and Practice*, 2023, pp. 194–210.

[5] M. T. Ramírez-Valdivia and P. Latorre, “The influence of national quality assurance policies on institutional planning for internationalization processes of Chilean universities,” *Qual. Assur. Educ.*, vol. 30, no. 3, pp. 387–400, May 2022, doi: 10.1108/QAE-08-2021-0127.

[6] R. J.-C. Chen, S. S.-H. Ho, F. Huang, and Y.-Y. Lu, “Internationalization of higher education institutions: a comparative study in Taiwan and Japan,” *Int. J. Comp. Educ. Dev.*, vol. 26, no. 3, pp. 189–207, 2024, doi: 10.1108/IJCED-06-2023-0050.

[7] P. Tipacti Rodríguez and A. Ramírez, “Hacia una Educación Superior de Calidad en el Perú: Evaluación y Acreditación,” *LATAM Rev. Latinoam. Ciencias Soc. y Humanidades*, vol. 5, no. 5, pp. 3663–3681, 2024, doi: 10.56712/latam.v5i5.2886.

[8] L. Echeverría-King, K. Paez, and O. Luque-Montaño, *La internacionalización de la educación superior: perspectivas descolonizadoras*. 2024.

[9] J. Gacel-Avila and M. Bustos-Aguirre, “Student mobility in Latin America and the Caribbean: Latest trends and innovative programs,” 2017, pp. 61–72.

[10] A. Hospido, H. Rodríguez, G. Feijoo, J. M. Garrido, and J. González-Álvarez, “15 years of IChemE-accredited degrees at the University of Santiago de Compostela: A description of the motivation, journey, and output,” *Educ. Chem. Eng.*, vol. 52, pp. 77–83, 2025, doi: 10.1016/j.ece.2025.05.002.

[11] I. B. Prastiwi, N. Sudibjo, and J. D. Tan, “Leading and managing international and national accreditations in higher education institutions: urgency, challenges and strategies,” *Int. J. Educ. Manag.*, vol. 39, no. 4, pp. 973–988, 2025, doi: 10.1108/IJEM-01-2025-0015.

[12] J. Gabalán-Coello and F. E. Vásquez-Rizo, “International Accreditation of Higher Education Institutions Based on Information Management Processes,” *J. Latinos Educ.*, 2025, doi: 10.1080/15348431.2025.2484271.

[13] A. de Alwis, A. Shrestha, and T. Sarker, “Exploring Governance for accreditation in the education sector using blockchain technology: a systematic literature review,” *Discov. Educ.*, vol. 4, no. 1, 2025, doi: 10.1007/s44217-025-00449-y.

[14] M. R. Nornadiah and B. W. Yap, “Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling tests,” *J. Stat. Model. Anal.*, vol. 2, no. January 2011, pp. 21–33, 2011.

[15] R. Tomšik, “Scholars Journal of Research in Mathematics and Computer Science Power Comparisons of Shapiro-Wilk , Kolmogorov-Smirnov and Jarque-Bera Tests,” *Sch. J. Res. Math. Comput. Sci.*, vol. 3, no. 3, pp. 238–243, 2019.

[16] R. Calfee and D. Piontkowski, *Design and analysis of experiments*. 2016.

[17] D. E. McNabb, “Exploring Multivariate Statistics,” *Res. Methods Public Adm. Nonprofit Manag.*, pp. 233–250, 2018, doi: 10.4324/9781315181158-21.

[18] A. Field, “Discovering Statistic Using IBM SPSS Statistic 5th,” *Sage Publ.*, vol. 53, no. 9, pp. 1689–1699, 2017.

[19] M. Boumidouna, *(Methodology in the Social Sciences) Rex B. Kline - Principles and Practice of Structural Equation Modeling-The Guilford Press (2023)*. 2024.