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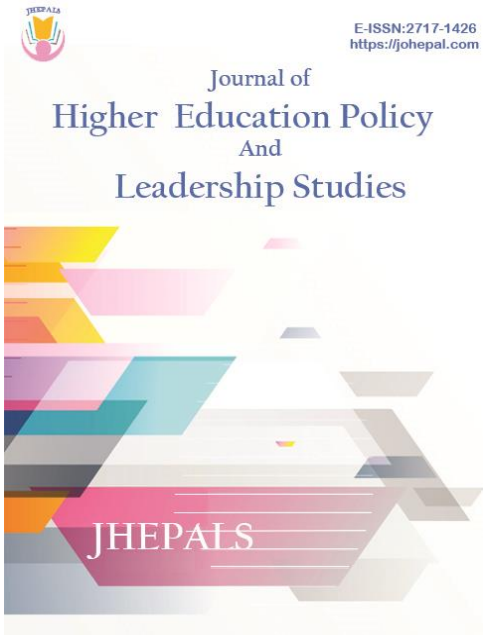

Management for Institutional Strengthening in Tertiary Education: A Model Proposal Based on an Empirical Study

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Abstract

For centuries, management has been primarily addressed in businesses and government structures. However, this research approach has not been developed in Higher Education Institutions to strengthen their institutional structures in terms of quality, decision-making, management, and leadership. This study proposes a management model for the Postgraduate Program of the State Polytechnic University of Carchi (UPEC) for institutional strengthening. A mixed methodology was used, which combines quantitative and qualitative approaches applied in the Postgraduate Program of the UPEC, Tulcán, Ecuador, with six interviews with directors and coordinators and a survey administered to a sample of fifty students from eight master's programs. Statistical tools such as Atlas.ti co-occurrence analysis were used for qualitative data, and the U Mann-Whitney SPSS test for quantitative data. The results revealed that the UPEC Postgraduate Program seeks academic excellence in its programs, and emphasizing the need to strengthen substantive processes such as research, internationalization, and quality assurance. Through a literature review, the European Foundation for Quality Management (EFQM) model was identified as an adequate framework for the proposed management model due to its recognition of excellence and quality, particularly in the context of higher education.

Keywords: EFQM; Institutional Strengthening; Management Model; Postgraduate; Proposal

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Introduction

Higher education is the cornerstone of nations social, economic, and cultural development. In this scenario, management models implemented by Higher Education Institutions (HEIs) represent a key factor in achieving educational excellence and quality. Brammer and Clark (2020) stated that the COVID-19 pandemic has intensified interest in strengthening education. Countries such as China, Japan, and South Korea have demonstrated the crucial impact of universities in the academic field during this period. However, this situation has also presented challenges associated with the management of teaching and the recruitment of new students.

Higher education has undergone a substantial metamorphosis in recent years, which is significantly motivated by the global COVID-19 pandemic. As García et al. (2021) noted, the abrupt closure of face-to-face classrooms forced universities to adopt a new digital learning environment, which accelerated the implementation of technological resources and the evolution toward online teaching. However, as Rapanta et al. (2021) argued, technology-based teaching is not a completely new concept in higher education. While technological resources are already present in traditional university practices, their use has not been effectively integrated into the digital teaching context.

Today's world demands universities to rethink their roles and management strategies. As De la Poza et al. (2021) noted, universities must make an active commitment to the implementation of the SDGs, involving all academic disciplines, and responding to the real needs of society. This involves adapting research, teaching, operations and governance, and fostering community participation within university management.

In the context of Latin American higher education, research is a substantive function of vital importance. As Paredes-Chacín et al. (2020) argued, this fundamental pillar must be intricately linked to digital technologies to guarantee their development and viability in the digital age. The close relationship between research and digital technologies is imperative for the progress of universities in Latin America. This synergy strengthens the production of knowledge, optimizes research processes and expands the possibilities of exploring new areas of knowledge.

In the context of Ecuadorian higher education, university management has become a central topic of debate. As Castro (2022) noted, research and quality have been the main axes of this management. However, the dizzying growth of higher education has driven the need to rethink teaching. In this sense, Macías et al. (2021) emphasized the importance of universities in Ecuador by periodically evaluating the relationship between academic management and administrative management. The main objective of this evaluation is to identify whether the activities carried out in one area negatively affect the others.

In summary, the research proposed a management model in UPEC postgraduate studies for its institutional strengthening. To this end, this will be based on knowing the management models of organizations, with emphasis on those applied in higher education; subsequently, the development of the diagnosis of the current situation of UPEC Postgraduate Studies, as a case study, will be conducted to identify the necessary elements that determine the design of the management model proposal.

Literature Review

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Management Models in Higher Education

From the point of view of Zhang et al. (2024), higher education management faces a spread of educational technologies as well as virtual platforms, which infers a profound transformation in higher education systems that will result in new learning management systems, intelligent tutorials, online courses, and educational softwares. Along the same lines, Rosak-Szyrocka (2024) added that universities are currently adapting to the digital world, as the era of industry 4.0 has brought digitalization with it, changing all educational levels, students, teachers, administrators, and other stakeholders, giving way to the evolution from university 1.0 to university 4.0.

In another perspective, Biloshchytskyi et al. (2024) examined the design of an information and educational system for quality management of higher and postgraduate education in Kazakhstan, where the following were evaluated: data integrity, reliability, relevance, consistency, security management, data access, efficiency, and stability. For his part, Jia (2024) analyzed the development of management mechanisms for education and student training in higher education environments, where he proposed a digital innovation model with big educational data to promote students' integral development. Li and Shu (2024) proposed a binding coordination model in which they proposed an innovative approach to accommodate the famous integration between political and ideological education and student education within the context of higher education.

Jing (2024) used a cognitive mapping model to evaluate academic attitudes, moral cultivation, and academic norms that are oriented toward innovation in the management of higher education as well as in student training mechanisms. For Jiang (2024), the capacity of higher management and the cultivation of students are necessary and important aspects that every university must improve, and for this purpose, he proposes a model based on digital management and cultivation. Donald et al. (2024) suggested a model of growth of employability capital within the context of education and employment to prepare students for transitioning from university to the labor market.

Amin and Dwitayanti (2023) emphasized that within the management of universities, the productivity of teaching staff must be prominent as part of the quality of higher education; in this sense, they proposed an additive ratio evaluation model that evaluates the performance of teachers. In turn, Fesenko et al. (2022) proposed a model framed on the quality of higher education educational programs, which allows innovation from the ambiguity of existing evaluations to categorize new evaluation criteria and tools.

In the field of Postgraduate studies, Manzoor et al. (2024) evaluated the impact of an image model of higher education to measure the satisfaction level of international postgraduate students, emphasizing that the role of tertiary education should be prioritized in capturing the attention of an increasingly competitive and uncertain market. In turn, Liu et al. (2023) proposed a structural equation model in which they identified the productivity that develops in postgraduate students through the quality of the environment at the university level. Similarly, Sohail and Hasan (2021) exposed the SERVPERF (Service - Performance) model as a mechanism for evaluating and measuring the quality of the service provided in higher education institutions, where reliability, responsiveness, and safety were the dimensions that most denoted undergraduate and graduate students.

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EFQM Model in Higher Education

Khokhlova et al. (2021) implemented the EFQM model as part of sustainable development at Stavropol State Agricultural University (Russia) to implement strategies, using this approach, to improve the management of the quality of services, the training of leaders, and the potential development of human talent. Similarly, Medne et al. (2020) indicated that current trends within the higher education context are new ways to improve efficiency and quality. In that context, they adapted the EFQM model for strategic and sustainable development. In this perspective, Qerimi et al. (2020) analyzed the guarantee of tertiary educational quality in Kosovo through the implementation of the EFQM model, where their findings determined the fundamental role of teachers as entities for the provision of academic improvement and excellence.

Under this scheme, Santos and Abreu (2019) proposed the EFQM model within a Portuguese higher education institution, facilitating institutional efficiency and continuous improvement in performance. In this regard, Laurett and Mendes (2019), through a literature review, expose the need for higher education institutions to apply of the EFQM model due to its relevance and excellence in quality and management. In the context of Ecuador, Henriquez and Henriquez (2019) proposed the implementation of the EFQM model at the University of Guayaquil to cover the necessary elements that incur within quality consideration of the evaluation model of accreditation bodies. Within practice, the University of the Hemispheres [UHE] (2023) is the only Ecuadorian institution of higher education that executes the EFQM model, which led it to obtain the fifth star of international accreditation as part of academic excellence and continuous improvement.

Research Methodology

This research was developed in the Postgraduate Program of the State Polytechnic University of Carchi, Ecuador, with the aim of obtaining a deep understanding of its operation and areas for improvement. To this end, a mixed methodology was used that combined qualitative and quantitative approaches, allowing data to be collected and analyzed from various sources.

In the qualitative stage, interviews were conducted with Directors and Coordinators of master's programs. Five of the nine coordinators were selected from the programs with cohorts that had already completed their studies or were in the degree phase, which allowed them to offer valuable perspectives on the full experience of the programs. The remaining three coordinators, who were responsible for recent programs or were in the process of opening, were not included in the information collection because their experience did not cover the entire life cycle of a master's program.

In the quantitative phase of the research, online surveys were applied through Google Forms to students in eight master's programs: Agriculture, Agronomy, Food, Applied Statistics, Nursing, Education, Local Development, and Public Administration. The selection of the sample was performed rigorously considering the following criteria:

- Representativeness: The eight master's programs under the responsibility of the five interviewed coordinators were considered.
- Equity: The sample was divided by the number of students in each cohort to ensure proportional representation of each program and stage of the educational process.

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- Statistical accuracy: The sample calculation formula recommended by San Román (1978) was applied to ensure an adequate sample size that allowed reliable results to be obtained (Figure 1).

The application of the surveys through Google Forms facilitated data collection efficiently and securely, allowing students to respond from any device with internet access. The final sample of fifty students surveyed provides a complete overview of students' perceptions and experiences in relation to the master's degree programs.

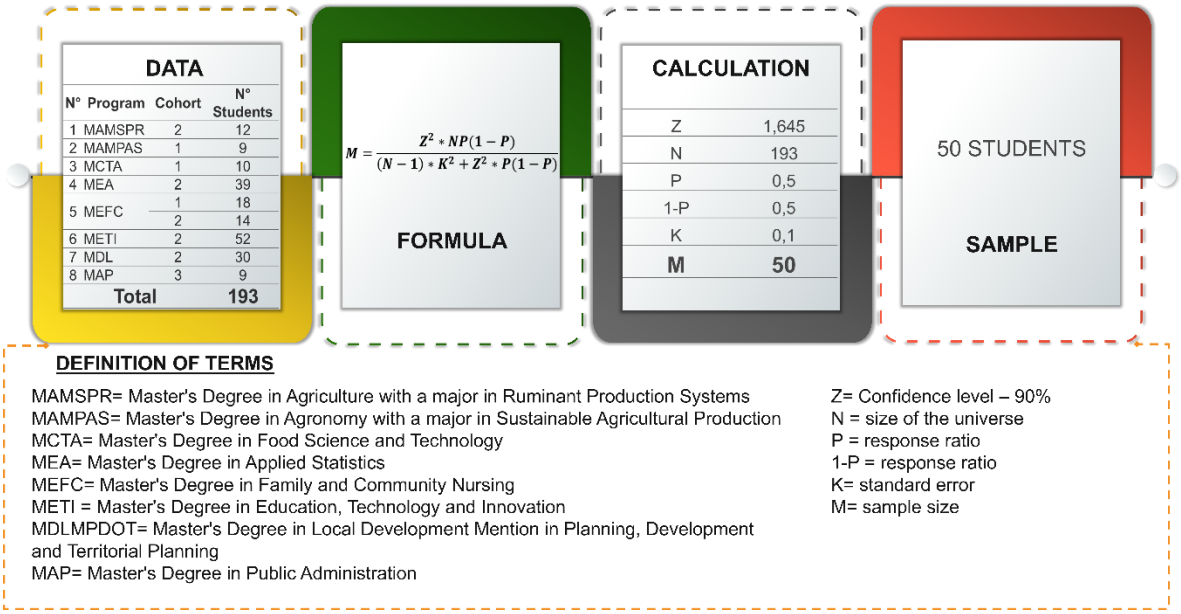

Figure 1. Sample Calculation - UPEC Graduate Students
Source. Graduate Student Database 2023 and Book of Statistics and Social Research Techniques (San Román, 1978).

The research instruments applied in this study were previously reviewed and validated by three experts in the methodological, statistical, and field of study. Two software tools were used for data analysis and processing. For qualitative data, Atlas.ti was used where an analysis of co-occurrences was carried out through coding and spatial relationships, in which the assignment of codes determined better classification, categorization, and conceptual understanding of the data to create a meaningful narrative derived from the responses collected in the present study (Table 1).

Table 1.
Assignment of main codes for conceptual data analysis of interviews

Variable	Main code	Variable	Código principal
Dependent variable: Institutional strengthening	Philosophy	Independent variable: **Management Model**	Academic Management
	Governance and institutional leadership		Administrative Management
	Human talent development and management		Internationalization
	Academic quality and relevance		Research
			Connection with society
			Evaluation and continuous improvement

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Regarding quantitative data, SPSS was used using the Mann-Whitney U test to identify whether there were significant differences between ordinal variables composed of Likert scale questions, with nominal gender variables and age scale variables (Figure 2).

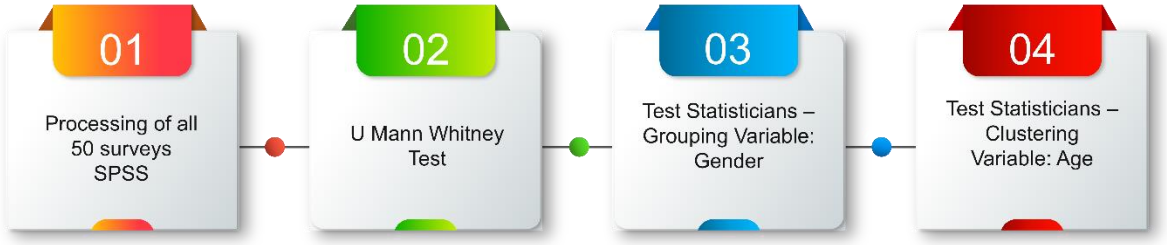

Figure 2. Quantitative data processing in SPSS - Surveys conducted on students of Graduate Programs.

With the test statistics, it was possible to identify the values $P<0.05$ and $P>0.05$, which are associated with the acceptance or rejection of the null hypothesis. This hypothesis is framed in the context of ordinal category questions with nominal and scale category variables. This test served as a resource to identify findings from the criteria of the students in the programs under study.

Results

Atlas.ti analysis determined that the responses of the directors and coordinators outline their postgraduate roles, linking the organizational structure as the initial source for academic processes and highlighting the importance of students in different programs. The role of research also emerges as a fundamental pillar in the training of new professionals in various fields. In addition, it was observed that certain factors predominate in the substantive function of Postgraduate Studies and to which more attention should be paid, such as internationalization, which is a crucial factor in strengthening knowledge and innovation in pedagogy. In the same way, planning, evaluation, and continuous improvement are processes that have a significant impact on quality assurance, so it is necessary to generate strategies that strengthen excellence in academic and professional fields.

An in-depth analysis of the conceptual data revealed a strong correlation between quality and academic relevance with evaluation and continuous improvement, as well as between philosophy and research. These associations, represented by darker colors in the conceptual data, highlight the importance of evaluation and continuous improvement as fundamental pillars to guaranteeing academic quality and relevance. In the same way, research stands as an essential bridge that connects philosophy with practical reality, allowing institutional principles to be translated into concrete actions.

Unlike the strong associations previously observed, the analysis revealed a lower co-occurrence between human talent development and management with evaluation and continuous improvement, academic quality and relevance with research, and institutional governance and leadership with evaluation and continuous improvement. As evidenced by the lower numerical values in Table 2, these issues were not addressed as frequently by the

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interviewed coordinators. This observation highlights the need to strengthen integration and emphasize these areas, which are crucial to institutional success.

Table 2.
Analysis of Co-occurrences - Interview with UPEC Postgraduate Coordinators

	Evaluation and continuous improvement Gr=22	Academic Management Gr=73	Administrative management Gr=24	Internationalization Gr=41	Research Gr=45	Connection with society Gr=11
Academic quality and relevance Gr=25	3	0	1	1	1	1
Human talent development and management Gr=18	1	1	1	0	1	0
Philosophy Gr=19	2	0	0	0	3	0
Governance and institutional leadership Gr=35	1	2	2	0	0	0

The Sankey diagram (Figure 3) provides a visual representation of the relationships between the variables analyzed. The thicker lines reflect how often coordinators mentioned these connections in their responses. It is evident that evaluation and continuous improvement occupy a main place in the philosophy of the Postgraduate Degree, being considered essential mechanisms to guarantee quality and academic relevance. Research, on the other hand, stands out as a transversal axis that permeates the mission, strategic objectives and policies of the institution, consolidating itself as a fundamental substantive process for the effective fulfillment of its purpose.

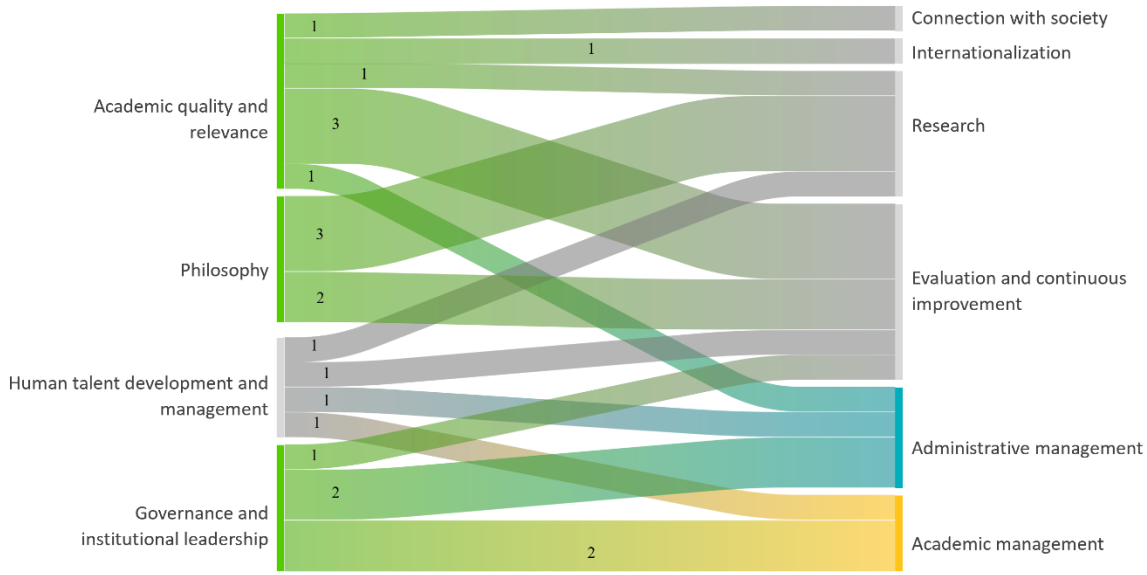

Figure 3. Sankey Diagram - Co-occurrence Analysis interview with UPEC Graduate Coordinators

Institutional governance and leadership although recognized as essential elements that guarantee the quality and relevance of education, exhibit a weaker correlation with

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academic and administrative management. This observation determined that although coordinators perceive governance as a necessary framework and direction, there is still considerable scope to strengthen it in response to a dynamic and ever-changing environment.

Internationalization and connection with society were the aspects that had the least co-occurrences, which is attributed to the fact that the interviewees mentioned them less frequently. This low frequency of mention indicates that although these aspects are part of the transversal axes of the institution, strengthening their development is crucial because they are essential elements for the institutional context and the quality and academic relevance of postgraduate programs.

The conceptual co-occurrences in the responses of the Postgraduate Directors reveal an interesting trend. Although most variables had a lower frequency of joint mention, determining that these topics were not addressed in detail in the interviews, there is one notable exception: the connection between philosophy and research. Like the coordinators, the directors emphasized research as a fundamental pillar that would strengthen and consolidate the institutional philosophy (Table 3).

The analysis of the conceptual data reveals that postgraduate directors consider academic quality and relevance together with the development and management of human talent as fundamental pillars to achieve greater compliance with management indicators. They recognize the importance of processes and procedures as essential mechanisms for achieving goals and indicators established in institutional strategic planning. In addition, they emphasize the need to align strategic objectives with institutional philosophy because doing so results in the visibility of the functions performed to comply with quality standards and guarantee academic excellence.

Table 3.
Analysis of Co-occurrences - Interview with UPEC Postgraduate Directors.

	● Evaluation and continuous improvement Gr=3	● Academic Management Gr=12	● Administrative Management Gr=9	● Internationalization Gr=3	● Research Gr=10
● Academic quality and relevance Gr=5	0	0	1	0	1
● Human talent development and management Gr=4	0	1	1	0	0
● Philosophy Gr=4	0	1	0	0	3
● Governance and institutional leadership Gr=0	0	0	0	0	0

Sankey's diagram (Figure 4) highlights a fundamental finding: research is consolidated as a central element in the perceptions of coordinators and directors. However, for this area to materialize its transformative potential and contribute to the achievement of academic objectives, strengthening its position and representativeness within the educational framework is imperative. In this regard, administrative management plays a crucial role in ensuring adequate budget execution for the development of academic activities, while self-management is linked to the creation of new postgraduate programs. However, it should be

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noted that these efforts would be ineffective without the presence of suitable and trained personnel to fulfill both academic and administrative functions.

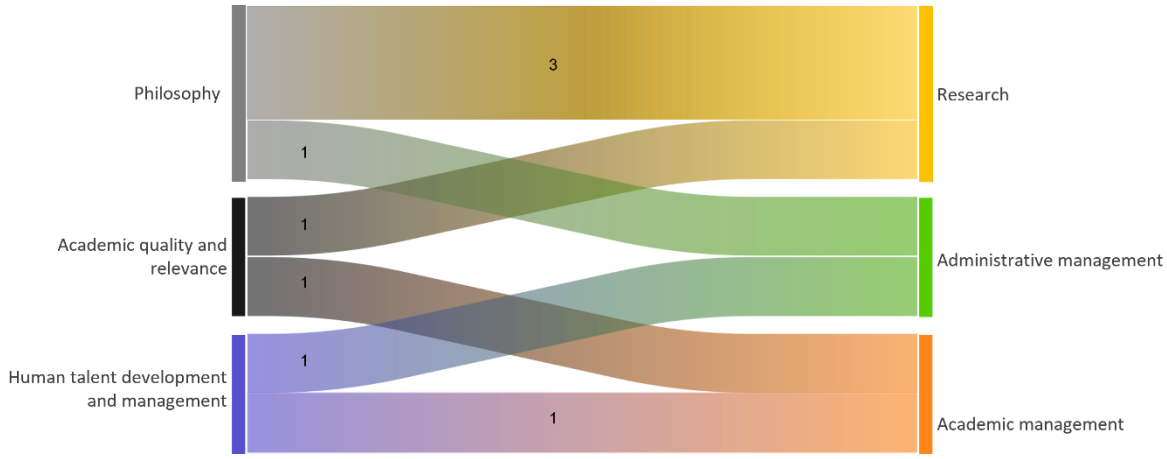

Figure 4. Sankey Diagram - Analysis of Co-occurrences interview with UPEC Postgraduate Directors

Analysis of conceptual co-occurrences in respondents' responses revealed distinctive patterns of frequency. The most frequent variables, such as research, demonstrate the vital importance that this area occupies in managers and coordinators perception of for compliance with academic quality standards. In the background, elements such as evaluation and continuous improvement, academic management, administrative management, development and management of human talent and quality, and academic relevance show a strong correlation with the criteria issued by the participants, which suggests a convergence of objectives in the search for academic excellence for students. These findings highlight the existence of mechanisms and strategic axes aligned to achieve of this fundamental objective.

The close relationship between the variables analyzed determined that a solid and cohesive management model in all dimensions is essential for promoting institutional development. The findings of this study confirm that the UPEC Postgraduate Program has undertaken a roadmap to strengthen its management indicators. However, it is crucial to continue with continuous improvement efforts by implementing new indicators that contribute to accreditation of all academic programs. This strategic action will allow UPEC's postgraduate program to consolidate its leadership position in the academic field and strengthen its commitment to educational excellence.

However, regarding the analysis of quantitative data, the Mann-Whitney U test was used, which allowed the comparison of two variables: fixed and ordinal random to identify the P value. That is, if the P value is < 0.05, H0 is rejected and H1 is accepted, but if P value is > 0.05, H0 is accepted and H1 is rejected. For this specific case, the hypothesis to be evaluated was as follows: There are differences between the gender of individuals according to the opinions given in the answers to the items (questions) in the survey applied to UPEC Postgraduate students. In this way, H0 indicates that there are NO differences between the medians of the variables (they are equal); while H1 indicates that there are differences between the medians of the variables (they are different). With the calculation made, the result was that the p-value asymptotic (bilateral) is > 0.05, which concluded that the null

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hypothesis H0 is accepted, stating that the opinion given by the students does not infer their gender; consequently, the alternative H1 hypothesis that there is a statistically significant difference between gender and the opinion of UPEC postgraduate students was rejected (Table 4).

Table 4.
Test statistics – grouping variable: gender.

Item/Question	U Mann-Whitney	Z	Asymptotic sig. (bilateral)
1. Do you consider that the Postgraduate program adequately prepares you to face the challenges and demands of the work or academic field to which you are directed?	266,000	-1,166	,243
2. Do you feel that the Graduate program provides you with sufficient academic support and guidance from professors?	318,500	-,139	,889
3. Do you feel that the Graduate program provides you with sufficient academic support and guidance from the administrative staff?	307,000	-,381	,703
4. Would you recommend the postgraduate program to other students interested in your field of study?	284,500	-,957	,338
5. Do you consider that the teachers in the program demonstrate an important level of competence in their respective areas of teaching?	319,500	-,117	,907
6. Do you feel that teachers are using appropriate teaching resources and materials to facilitate learning in the classroom?	267,500	-1,200	,230
7. Have you experienced difficulties balancing your academic responsibilities with other personal or professional obligations?	311,500	-,262	,793
8. Do you consider that administrative procedures such as requesting information are conducted efficiently in Postgraduate Studies?	258,500	-,890	,373
8. Do you consider that administrative procedures such as document review are conducted efficiently in Postgraduate Studies?	271,500	-,360	,719
8. Do you consider that administrative procedures such as student records are conducted efficiently in Postgraduate studies?	226,000	-1,361	,173
8. Do you consider that administrative procedures such as problem solving are conducted efficiently in Postgraduate Studies?	281,500	-,394	,694
9. Do you feel that the administrative processes regarding enrollment are well organized and easy to follow?	240,000	-1,356	,175
9. Do you feel that the administrative processes in terms of virtual classrooms are well organized and easy to follow?	282,000	-,136	,892
9. Do you feel that the administrative processes in terms of teacher evaluation are well organized and easy to follow?	252,500	-,788	,431
9. Do you feel that the administrative processes in terms of recording notes are well organized and easy to follow?	210,000	-1,532	,125
9. Do you feel that the administrative processes in terms of qualifications are well organized and easy to follow?	248,000	-,868	,385
10. Have you received any scholarships or financial support during your postgraduate program?	268,500	-1,542	,123
11. Do you consider that the teaching and learning strategies used in the Postgraduate Program encourage the development of skills relevant to your field of study?	254,500	-1,433	,152
12. Do you feel that the contents and programs of study are linked to the needs and trends of the academic and professional field?	281,000	-,910	,363
13. Do you consider that the tutoring and academic support you have received has been of quality?	232,500	-1,922	,055
14. Do you know the mission and vision of Postgraduate?	312,000	-,258	,797
15. How is the active participation of students in research projects promoted?	320,500	-,089	,929
16. Would you study a new master's program at the institution again?	323,000	-,040	,968

Grouping the age variable, the hypothesis to be evaluated was as follows: There are differences between the age of individuals according to the opinions given in the answers to the items (questions) in the survey applied to UPEC postgraduate students. The ranges included for this analysis were between 20 to 25 and 36 to 40 years. As a result of the 23 observations made (questions), 3 present significant differences, since the P value

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Asymptotic Sig. (bilateral) is < 0.05, which concludes that the null hypothesis H0 is rejected, which indicates that the opinion of the students is similar between the proposed age ranges. Consequently, alternative hypothesis H1 is accepted, in which there is a statistically significant difference between the proposed age range and the opinions of the surveyed students (Table 5).

Table 5.
Test statistics – grouping variable: age.

Item/Question	U Mann-Whitney	Z	Asymptotic sig. (bilateral)
1. Do you consider that the Postgraduate program adequately prepares you to face the challenges and demands of the work or academic field to which you are directed?	13,500	-,443	,658
2. Do you feel that the Graduate program provides you with sufficient academic support and guidance from professors?	14,000	-,370	,711
3. Do you feel that the postgraduate program provides you with sufficient academic support and guidance from the administrative staff?	12,000	-,733	,464
4. Would you recommend the postgraduate program to other students interested in your field of study?	10,000	-1,216	,224
5. Do you consider that the teachers in the program demonstrate an important level of competence in their respective areas of teaching?	15,000	-,183	,855
6. Do you feel that teachers are using appropriate teaching resources and materials to facilitate learning in the classroom?	6,000	-1,911	,056
7. Have you experienced difficulties balancing your academic responsibilities with other personal or professional obligations?	14,000	-,365	,715
8. Do you consider that administrative procedures such as requesting information are carried out efficiently in Postgraduate Studies?	6,000	-1,820	,069
8. Do you consider that administrative procedures such as document review are carried out efficiently in Postgraduate Studies?	7,000	-1,665	,096
8. Do you consider that administrative procedures such as student records are carried out efficiently in Postgraduate studies?	6,000	-1,911	,056
8. Do you consider that administrative procedures such as problem solving are carried out efficiently in Postgraduate Studies?	8,000	-1,465	,143
9. Do you feel that the administrative processes regarding enrollment are well organized and easy to follow?	3,000	-2,381	,017
9. Do you feel that the administrative processes in terms of virtual classrooms are well organized and easy to follow?	4,000	-2,220	,026
9. Do you feel that the administrative processes in terms of teacher evaluation are well organized and easy to follow?	6,500	-1,740	,082
9. Do you feel that the administrative processes in terms of recording notes are well organized and easy to follow?	9,000	-1,295	,195
9. Do you feel that the administrative processes in terms of qualifications are well organized and easy to follow?	6,500	-1,661	,097
10. Have you received any scholarships or financial support during your postgraduate program?	8,000	-2,089	,037
11. Do you consider that the teaching and learning strategies used in the Postgraduate Program encourage the development of skills relevant to your field of study?	10,500	-1,046	,295
12. Do you feel that the contents and programs of study are linked to the needs and trends of the academic and professional field?	10,000	-1,146	,252
13. Do you consider that the tutoring and academic support you have received has been of quality?	13,000	-,573	,567
14. Do you know the mission and vision of Postgraduate?	12,500	-,622	,534
15. How is the active participation of students in research projects promoted?	13,000	-,530	,596
16. Would you study a new master's program at the institution again?	15,500	-,095	,924

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The analysis of quantitative data using the U Mann-Whitney test showed statistically significant differences ($p < 0.05$) in students' responses to items P9 and P10 of the survey, which evaluate the perception of administrative processes and scholarships, respectively. These results determined that the perception of these aspects varies depending on the age of the students.

These differences can be both positive and negative. On the one hand, older students may have a more positive perception of administrative processes because they have more experience in their interactions with them. On the other hand, younger students may have a more critical view because they are less familiar with procedures and paperwork.

Discussion

This section focuses on the analysis of the findings derived from the research questions. In this context, it is crucial to highlight that management models implemented by Higher Education Institutions (HEIs) are fundamental for the achievement of various strategic objectives, including recognition in terms of quality, international prestige, human capital development and competitiveness (Guo, 2023). In this sense, quality, as the central axis of management in HEIs, together with organizational development, are essential elements for the satisfaction of both internal and external users, promoting the implementation of good management and governance practices (Amaral & Magalhães, 2023). The main challenge lies in the generation of new strategies that adapt to the demands of Industry 4.0, internalizing innovation through the incorporation of technology and directing HEIs toward academic excellence.

Considering the results obtained, the need to strengthen the current management model is evident. Although there is a greater favorable predisposition in the academic field, key aspects, such as academic monitoring and support, administrative processes, and the management of scholarships and financial aid for students need further strengthening. In this sense, this aligns with the perspective of Ferreiro et al. (2020), who highlighted the importance of strategic planning at the institutional and area levels to guide both academic and administrative activities towards the achievement of specific goals and indicators.

The application of the instruments made it possible to identify the criteria that UPEC Postgraduate members consider relevant. The findings are related to four fundamental areas: academic, administrative, research, and quality (Figure 5). In this regard, directors and coordinators of the Postgraduate Program have expressed the need to have an instrument that includes indicators for the monitoring of graduates and the self-evaluation of the programs, aspects that will significantly contribute to quality assurance.

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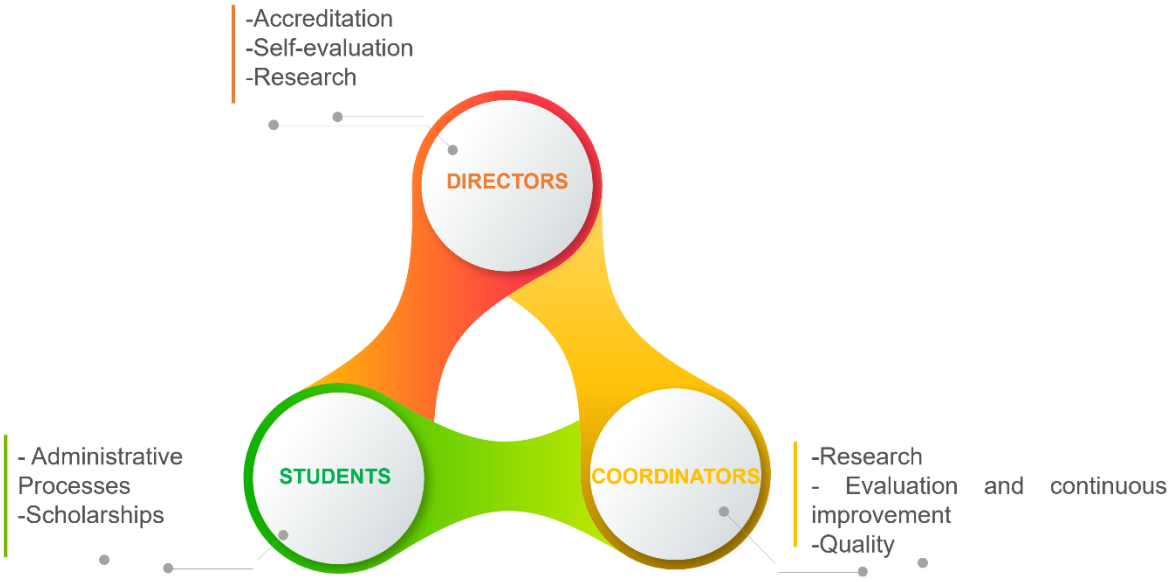

Figure 5. Triangulation of results based on the results obtained from the application of the research instruments

Other sections of the results refer to the development and management of human talent, a fundamental aspect that empowers both academic and administrative staff, involves them, and align them with the strategic objectives of the institution (Dehtjare & Uzule, 2023). Similarly, effective leadership in educational management is crucial to meeting current demands, where technology plays a fundamental role in the educational framework (Ahmad et al., 2023). This will contribute to strengthening the field of education in research (Poli et al., 2023), internationalization (Hung & Yen, 2022), quality assurance (Aldhobaib, 2024), and accreditation (Almurayh et al., 2022).

Taking on this challenge implies strengthening the quality of higher education and having innovation, professionalization, and evaluation as fundamental pillars-elements that will mark the path to excellence (Pohlenz, 2022). In this sense, the UPEC Postgraduate Program faces the challenge of directing its efforts toward continuous improvement and strengthening research as the central axis of the substantive process in the context of management and academic excellence. In addition, they must be actively involved in the competitive market, optimize the use of internal potential and undertake the search for new directions (Bogoviz et al., 2023).

Framed in this context and supported by an exhaustive bibliographic review, the design of a management model for UPEC Postgraduate Studies is proposed, adopting the EFQM model in the field of higher education as a basis (Figure 6). Multiple studies support the effectiveness of this model in tertiary education, highlighting its impact on the continuous improvement of processes and its contribution to the achievement of excellence. For the design of the model, the work of Henriquez and Henriquez (2019) was taken as a reference, while the REDER scheme (Results, Approach, Deployment, Evaluation and Review) was based on the experience of the University of the Hemispheres of Ecuador [UHE], (2023).

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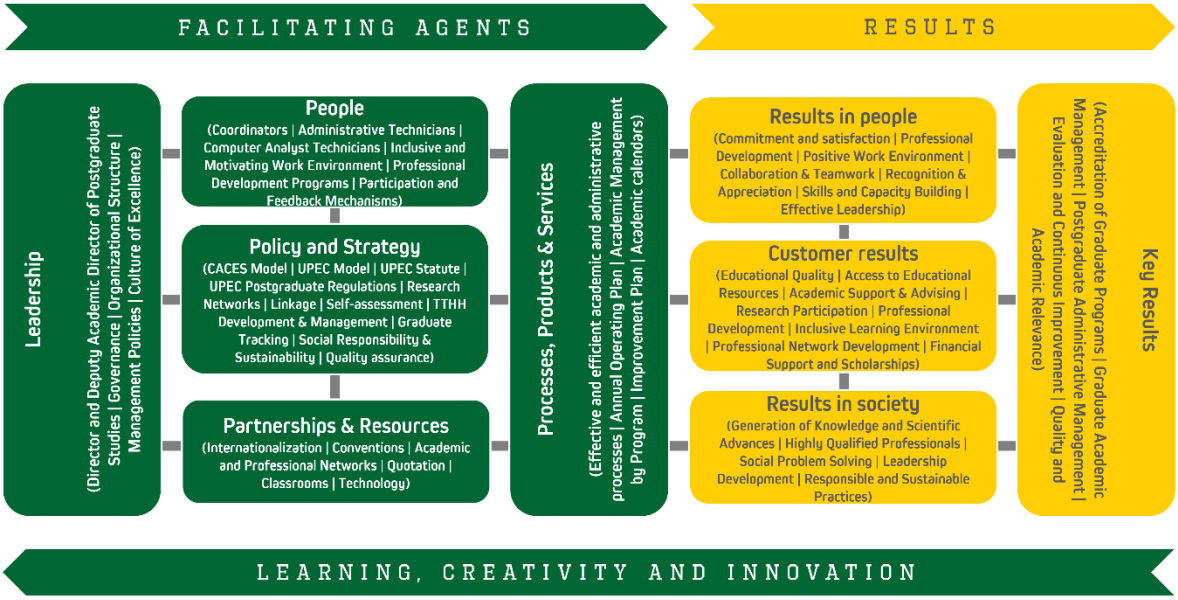

Figure 6. EFQM model applied to UPEC Postgraduate Studies
Source. Henriquez and Henriquez (2019).

To ensure the successful and sustainable implementation of the EFQM Model in UPEC Postgraduate Studies, it is crucial to adopt the REDER scheme as a fundamental guide. This scheme works as a roadmap that guides the postgraduate program toward effective integration of the model within a process of continuous improvement (Figure 7).

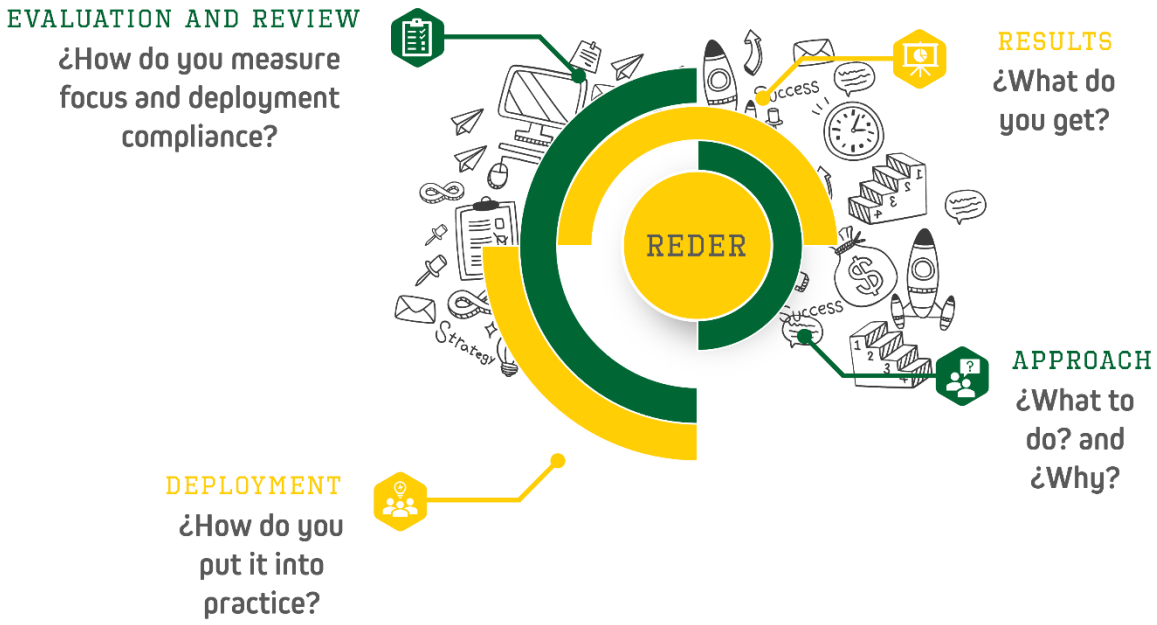

Figure 7. REDER Schemel - EFQM Model
Source. University of the Hemispheres of Ecuador [UHE], (2023).

Incorporating the REDER scheme into the Postgraduate management process will allow:

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- Answering key questions: The REDER scheme raises key questions that need to be answered by integrating the five enabling agent criteria and the four outcome criteria of the EFQM Model. These questions guide reflection and strategic decision-making for continuous improvement.
- Effective monitoring: The REDER scheme facilitates systematic monitoring of the implementation of the EFQM Model, allowing progress, challenges, and opportunities for improvement to be identified.
- Achieving excellence: The rigorous application of the REDER scheme will allow UPEC's postgraduate program to advance effectively on their path to excellence, consolidating its position as a benchmark for quality in Postgraduate Education.

As a preliminary step to the implementation of the EFQM model, an exhaustive self-assessment will be conducted, placing special emphasis on the criteria established by the Council for Quality Assurance in Higher Education [CACES], (2023). These criteria cover six fundamental aspects:

- Institutional Conditions: The physical spaces of the UPEC Postgraduate Program will be evaluated, ensuring that they meet the quality standards necessary for the optimal development of academic and administrative activities.
- Teaching: The profile of the teaching staff will be analyzed, considering both tenured professors at the institution and external staff. Special attention will be given to the training, experience and competence of each teacher.
- Conditions of academic staff and students: The situation of academic staff, including professors, researchers, and support staff, as well as that of students, will be evaluated. Aspects such as the quantity, distribution, and working conditions of each group will be analyzed.
- Research and Innovation: The scientific production of the UPEC Postgraduate Program will be examined, measuring the quantity and quality of publications, research projects, and innovation activities developed to date.
- Connection with society: The degree of interaction of the Postgraduate Degree with society will be evaluated through the organization and participation in seminars, congresses, events, and other activities related to the exchange of knowledge, academic-professional experiences, and learning strategies.
- Quality assurance system: The current structure of evaluation instruments, compliance indicators, and self-evaluation processes of graduate programs will be analyzed, with the aim of identifying areas for improvement and strengthening the quality management system.

By aligning the actions and strategies of the Postgraduate with the guidelines of the EFQM model and those of the accreditation bodies, it is ensured that the postgraduate and institution are on track to achieve the highest quality standards in Postgraduate education. This, in turn, contributes to strengthening the reputation of the Postgraduate Program and improving the student experience.

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Conclusions

Management models in Higher Education Institutions (HEIs) have been an unexplored topic since their application has focused on companies and organizations. However, this research highlights the importance of academic, administrative, quality assurance, and strategic planning processes. The latter is essential for HEIs to design a roadmap that will lead to excellence.

The background review presents studies on management models in various contexts, and answers one of the research questions of this study: ¿What are the existing management models in Higher Education Institutions? In this research, methodologies framed in qualitative, quantitative, bibliographic, and mixed approaches are observed, which seek to provide a real overview of the need to have management models that contribute to institutional strengthening.

The diagnosis made to the UPEC postgraduate program, through the triangulation of results, has yielded findings framed in two main axes: the research context and continuous improvement. The coordinators of the postgraduate program believe that research is essential to guarantee the quality of the programs, while the directors emphasize the importance of accreditation for their prestige. In this regard, work is being done on the development of instruments for the self-evaluation of master's degrees. On the other hand, students expressed the need to review and improve administrative procedures and processes, and the academic monitoring and support they receive.

The main objective of the proposal is to use the EFQM model as a tool to strengthen quality and academic excellence in UPEC postgraduate studies. To this end, the CACES evaluation model, the UPEC educational model, and the regulations in force in the field of higher education are considered. Note that the EFQM model has already been implemented in Ecuador by the University of the Hemisphere, demonstrating its effectiveness as a fundamental basis for obtaining national and international accreditation. The final objective of this proposal is to develop a specific management model for UPEC Postgraduate Studies that contributes to institutional strengthening.

One of the limitations of the study lies in the definition of the sample for the application of the survey. The initial objective was to survey students in all UPEC postgraduate programs. However, because the academic offerings were new, some programs were in their initial stages of development, with cohorts in the process of starting classes or admission and enrollment. In view of this situation, the decision was made to focus on programs that already had completed cohorts or were in the process of obtaining degrees. This strategic decision was adopted with the purpose of ensuring that the data collected had greater relevance and representativeness for the research, thus ensuring the inclusion of students with a more complete and consolidated experience in the evaluated programs.

The results obtained in this study can serve as a basis for future research into management models in the educational field. Higher education is going through a constant transformation, adapting to an ever-evolving environment where technology and innovation play increasingly significant roles in global competitiveness. In this context, research, internationalization and quality assurance become transversal axes that Higher

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Education Institutions (HEIs) must strengthen and internalize to successfully navigate the new era of Industry 4.0.

Declaration of Conflicting Interests

There is no conflinct of interest to be cited here.

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Human Participants

Prior to data collection, respondents and interviewees were provided with detailed information about the objective of the study and their consent was obtained by ensuring their anonymity.

Originality Note

This manuscript is the authors' original work, and if others' works are used, they are properly cited/quoted.

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