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MANAGEMENT MODEL FOR HIGHER EDUCATION INSTITUTIONS BASED ON RANKING OF UNIVERSITIES

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Abstract:
The demands and pressures of the market are felt in higher education, necessitating continuous improvement in every aspect. A desirable approach would be implementing a management model of excellence in education, particularly emphasizing evaluation, and service enhancements. Such assessments can influence the positioning of universities in the market and enable them to identify their strengths and weaknesses. This study proposes a conceptual model of excellence management for HEIs (Higher Education Institutions), based on analysing university rankings. The model will be developed by identifying convergent factors of the EFQM and BCPE Management Models, verifying convergence factors among the leading five international rankings, and presenting the procedures for using Rankings as Performance Indicators. This research has a bibliographic character. As a result of this research, it was possible to propose a management model of excellence in which university rankings are used as performance indicators. The proposed model is flexible and can be utilized by different HEIs.

Keywords: model of excellence, rankings, HEI's

1. Introduction

With the expansion of higher education worldwide, there has also been growing interest in quality in Higher Education Institutions (HEIs), both in the public and private sectors. In this context, according to Hou (2012), the quality of higher education has become both a challenge and a factor providing a competitive advantage.

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The need for new and efficient management systems has become evident with intense market competition. Such a system will enable HEIs to reach and maintain prominent positions in the educational market.

In this way, management excellence models for HEIs offer an alternative approach to improvement. Excellence models can assist senior Management in the continuous enhancement of HEIs. This process could leverage HEIs to achieve a position of educational excellence.

The movement in pursuit of educational excellence has motivated a series of questions. These queries are about what instruments should be used to measure quality in universities. According to Ramirez (2010), "*universities must have goals and plans to reach them, as well as mechanisms to evaluate their progress*."

The HEI rankings have dramatically influenced this quest for excellence in education (Ramirez, 2013). These instruments, which are applied globally, have changed how HEIs are viewed by governments and society.

Using rankings makes it possible to identify and visualize critical points or constrictions. These are criteria and indicators aimed at higher education and the approach to overcoming the obstacles to institutional behavior change.

Given these considerations, this study proposes a theoretical model of excellence management for HEIs based on the analysis of University Rankings.

The present study is structured around six topics. The first one introduces the topic. The following topics, 2 and 3, discuss the theoretical foundation of the work. The second topic is divided into four sub-items. In sub-item 2.1, Management, the concept, and utility models are analyzed. Sub-item 2.2 specifically addresses two management excellence models, EFQM and BCPE, outlining their key features. Sub-item 2.3 deals with the Higher Education Rankings, where a historical overview of the rankings and their use are discussed. Sub-item 2.4 refers specifically to international rankings, of which the five most essential rankings and their evaluation criteria are listed. The third topic presents the State of the Art, with studies on models of Management of excellence and rankings. The fourth topic presents the methodology applied to the study. Topics 5 and 6 are part of the results of the study. The fifth topic deals with creating the proposed model, showing the convergence process that leads to the model. The sixth topic presents the Model of Excellence proposed by the study, describing all its elements and the final considerations.

2. Literature Review

In this section, a review will be carried out on the following topics: Models of Management Excellence, Baldrige Criteria for Performance Excellence (BCPE), European Foundation for Quality Management (EFQM), Ranking of Universities, and International Rankings.

2.1 Models of Management Excellence

Management models emerged as part of organizations' strategies to achieve their objectives and goals and improve their quality levels through planned policies and actions.

According to Garel (2013), management models serve as frames of reference for an institution. Administrations of both public and private entities can use these models. According to Birkinsha and Ansari (2015), management models are sets of choices made by the institution's management in which the objectives, actions, resource allocations, and other factors related to the administration of an organization are defined.

There are only perfect management models that can be applied to some industries. There are many valid approaches. The most critical success factor is leadership commitment to effective management. This commitment has to be directed at achieving goals and objectives and continuously improving the institution.

An institution that aims at excellence in management must optimize the use and effectiveness of all the elements that comprise its activity. In a global context, this translates to promoting change from the inside out (Pruvot & Estermann, 2014). In other words, institutions seeking excellence must go beyond what is ordinary to achieve exceptional performances—currently, the competitive reality and the pace of the global market demand this stance from institutions.

From this perspective, several management models of excellence were built as strategic management tools, such as the Baldrige Criteria for Performance Excellence (BCPE) and the European Foundation for Quality Management (EFQM).

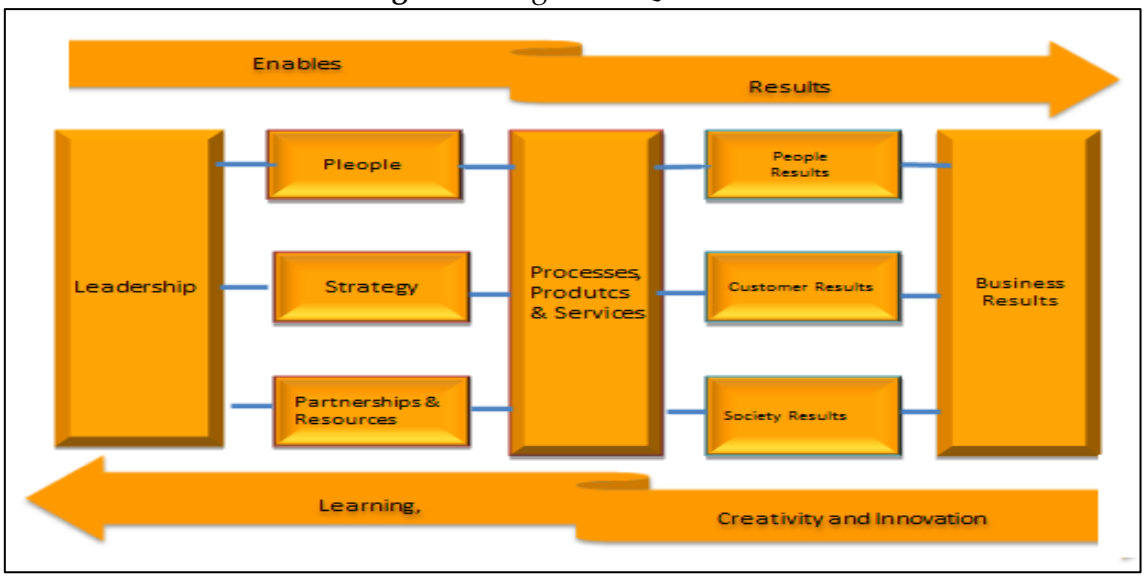
2.2 Baldrige Criteria for Performance Excellence (BCPE) and European Foundation for Quality Management (EFQM)

The BCPE and EFQM management models provide a holistic view of the objectives, approaches, and results to be achieved for institutional improvement. Therefore, they will serve as a basis for constructing the management model proposed by the present study.

The European model of excellence, the European Foundation for Quality Management (EFQM), created in 1991, is provided in Figure 1. It comprises nine evaluation criteria divided into two blocks: Means (leadership, people, strategy, partnerships, resources, and processes) and Results (people/customer results, company results, business results). These criteria are applied to evaluate an institution's quality and identify its position in relation to other institutions.

From a more straightforward analysis, EFQM is a cause-and-effect diagram. In other words, changing how the institution functions is necessary to achieve different results.

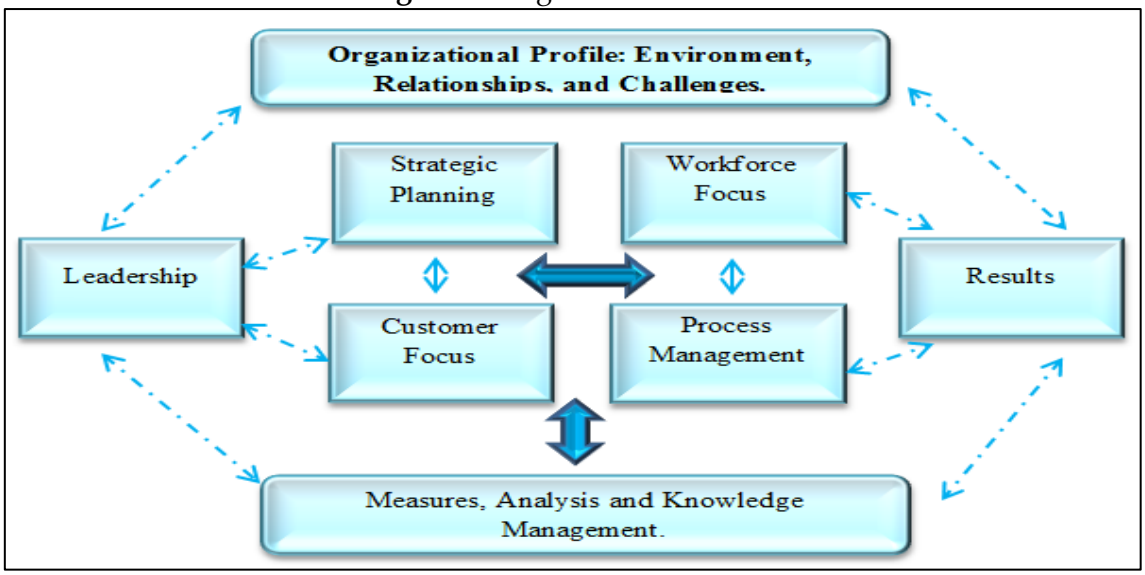
Figure 1: Original EFQM model



Source: EFQM, 2003.

The BCPE, created in 1987 in the United States, aims to support excellence in organizational performance. It comprises seven criteria: Leadership, Strategic Planning, Customer Focus, Measurement, Analysis, Knowledge Management, Focus on Human Resources, Process Management, and Results (Figure 2).

Figure 2: Original BCPE Model



Source: NIST, 2009.

The EFQM and BCPE management models evaluate institutional performance based on specific predefined criteria and indicators. It delivers an institutional diagnosis, which identifies the strengths and the critical factors that require improvement, showing an overview of the institution.

2.3 Universities' Rankings

With the increasing demand for improved quality and performance excellence in HEIs in the 1980s, universities in the United States began to use university rankings as mechanisms to evaluate quality and performance in higher education (Hazelkorn, 2011). According to Harvey (2011), "*ranking*" refers to "*classifying and ordering higher education institutions or study programs based on various criteria*."

The rankings define criteria based on various interests to evaluate educational institutions and promote academic competition. The data, which serve as a basis for evaluation, can be collected directly or through public data analysis (Hou, 2012).

According to van Vught *et al.* (2002), rankings influence global governments' policies related to improvements in institutional governance, improve performance and productivity, and facilitate fiscal responsibility and quality assurance to meet the market's needs.

Rankings have led to greater competitiveness among HEIs, and at the same time, they have become parameters for measuring the success or failure of institutions (Aghion *et al.*, 2007; Ritzen, 2010).

This mechanism has also worked as an inducer of improvements in HEIs. For example, institutions that do not occupy the first places can use rankings to identify aspects that need improvement to improve their market position (Beerkens, 2008).

Rankings have gained legitimacy because they are objective and work by statistical analysis methods, even though there is a certain degree of subjectivity regarding the choices of the ranking evaluation criteria. In addition, they have affected how higher education institutions are seen, both by the market and society in general.

2.4 International Rankings

Rankings classify universities by different criteria and indicators, as seen in Table 1, which lists the five most prestigious international rankings. Table 1 illustrates the facilitated visualization, criteria, and indicators of the rankings above. These criteria and indicators will be used in constructing the generic ranking model proposed in this study.

As can be seen in Table 1, *University Rankings* (Quacquarelli Symonds) have complete, objective, quantitative, and direct criteria, and indicators. The *World University Rankings*, in turn, present insufficiently specific indicators for a more accurate assessment. The *Academic Ranking of World Universities* consists of indicators that most institutions cannot use, such as the number of Nobel Prizes that only some institutions have. The *U-Multirank* system makes a briefer analysis, and *SCImago Institutional Ranking* makes the classification through three excellent, comprehensive dimensions: research, innovation, and social impact.

The five international rankings evaluating HEIs through their criteria present similar criteria, yet some are more objective and quantifiable while others are not.

Table 1: The Top Five International Rankings

	Top University Rankings (Quacquarelli Symonds)	**The World University Rankings**	**Academic Ranking of World Universities**	**U-Multirank**	**SCImago Institutional Ranking**
Objectives	Highlight more than 800 of the best universities worldwide.	Evaluate the classification of 800 universities from 70 different countries.	Present the top 500 universities annually.	To compare the performance of HEI's.	Evaluate institutions through a mixed evaluation system (manual and automatic)
Assessed Criteria	1. Research (published articles, citations, awards, and others); 2. Teaching (grade collations, etc.); 3. Employability (employment rates, post-graduation, etc.); 4. Internationalization (international partnerships, exchange programs, and others); 5. Facilities (Infrastructure); 6. Distance Learning (history, faculty, etc.); 7. Innovation (economic and other outputs); 8. Social Responsibility (investments in the social area); 9. Arts and Culture (cultural investments); 10. Inclusion (accessibility scholarships and bursaries, disability access, etc.); 11. Special criteria (excellence in specific, narrow fields).	1. Teaching (the learning environment); 2. Research (volume, income, and reputation); 3. Citations (research influence); 4. International Outlook (employees, students, and research); 5. Industry income (knowledge transfer).	1. Number of alumni winners of the Nobel Prize and/or Field Medal; 2. Number of teachers awarded a Nobel Prize and/or Field Medal; 3. Numbers of researchers quoted by Thomson Reuters; 4. Amount of articles published in Nature; 5. Publication of articles in Science. Articles indexed in the Science Citation Index - Expanded and Social Sciences Citation Index; 6. Per capita teaching performance of a university.	1. Teaching and learning; 2. Research; 3. Transference of knowledge; 4. International guidance; 5. Regional engagement.	1. Research: 1.1. Total number of documents published; 1.2. International collaboration; 1.3. Standard impact; 1.4. Publications of high quality; 1.5. Excellence; 1.6. Scientific leadership; 1.7. Excellence in leadership; 1.8. Scientific talents 2. Innovation: 2.1. Innovative knowledge; 2.2. Technological impact (IT); 3. Social impact; 3.1. Web size; 3.2. Inbound connection domains.

3. State of Art

In this section, some papers that analyzed the models of excellence management will be presented, along with the rankings of HEIs around the world, namely:

3.1 Studies Based on BCPE and EFQM Management Excellence Models

Table 2: Studies that deal with BCPE and EFQM excellence models

Models	Authors	Studies
Baldrige Criteria for Performance Excellence (BCPE)	Asif, Raouf e Searcy (2013)	They came up with a paper with the objective of proposing improvements in the application of the criteria for performance excellence (CEEP) in the education domain. This formula may be called the educational version of the Baldrige Model, combining processes with organizational mission, and focusing on operations, customers, workforce, and performance measurement. As a result, a basis for future revisions of CEEP was established in terms of defining the desired results, key measures, indicators to monitor performance, and methods to assess institutional performance.
	Beard e Humphrey (2014)	They researched the alignment of university IT resources with the Baldrige criteria for performance excellence in education. A Balanced Scorecard (BSC) approach was used to evaluate IT in higher education institutions. The research proposed areas of potential IT impact on BSC measures in each of the Baldrige performance criteria. Thus, the work provided an assessment of IT resources and provided a broader perspective of the use of IT in the academic environment.
European Foundation for Quality Management (EFQM)	Calvo-Mora, Navarro-García e Periañez-Cristobal (2015)	They conducted a study that examined the potential of the EFQM Excellence Model to design and implement a Knowledge Management Project (KMP) that improves key business results. To this end, the surveyors queried about 225 companies with experience in the EFQM evaluation process. As a result, they were able to identify a positive contribution of EFQM in the implementation of KMP; the researchers also found that the use of process methodology and participation of suppliers and partners are significant factors for the success of KMP.
	Calvo-Mora, e Roldán (2016)	They carried out a study that deals with the strategic planning process in management systems of excellence (MSE) and the analysis of evidence regarding the efficient functioning of the MSE, to reach total quality management (TQM). In this study, the EFQM excellence model was used as a framework. The sample comprised of 225 companies and the methodology employed was the Partial Least Squares technique. As a result of the study, it was found that the actions and commitment of leaders and personnel to quality (EFQM social factors) should be translated into action through the design and implementation of a scheme of the main processes, management of adequate resources, and establishment of alliances with the key suppliers and partners. In addition, evidence suggested that the management of EFQM (technical factors) differs based on the degree of excellence with which the strategic planning process is employed in the organizations studied.

Table 2 presents the works involving the Baldrige Criteria for Performance Excellence (BCPE) and European Foundation for Quality Management (EFQM) management excellence models in the last four years. The works in Table 2 used the EFQM and BCPE Management Excellence Models as the basis for their studies. As in the presented works, we will use the EFQM and BCPE management models as the basic framework for constructing the proposed model in this study.

3.2 Studies on Rankings in Higher Education Institutions

Radojicic and Jeremic (2012) studied the most crucial factor in ranking higher education institutions: quality or quantity. They identified that many ranking models addressed quality dimensions based only on quantitative data, such as the number of published works. To solve this problem, the researchers applied the I-distance statistical method to a data set presented by the SCImago Institutions Rankings methodology**.** Consequently, it was identified that quality indicators such as Excellence Rate and Standardized Impact are much more important than the total number of published works.

Hazelkorn (2013) conducted a study exploring how rankings reform higher education, providing an overview of rankings and analyzing the increasing rise and popularity of rankings. Further, she addressed the impacts and influences of rankings on higher education and the political issues of nations and presented a roadmap to be traced from the current reality, suggesting some alternative methodologies.

Marginson (2014) presented a study that evaluated six rating systems: *Shanghai ARWU, University of Leiden, QS, Scopus, Times Higher Education,* and *U-Multirank*, based on six social science criteria and two behavioral criteria. The criteria of social sciences are materiality (rankings must be linked to what is observable in higher education), objectivity (opinion surveys should not be used), externality (the university should not be a source of data about itself), comprehensiveness (should cover as many functions as possible); particularity (classification systems should avoid multiple indicators with different weights); and ordinal proportionality (vertical distinctions between universities should not be exaggerated). The behavioral criteria align with ranking tendencies for performance improvement and transparency, which means accessibility to the elaboration of strategies aimed at leveraging the institutional position. It was identified through the evaluation that most rankings need to be more comprehensive; in contrast, it was found that *U-Multirank* was up-to-date and comprehensive; however, it depended on subjective opinions collected through a survey.

Millot (2015) conducted a similar study comparing the methodologies and results of the leading university rankings and the *U21 system*. The new annual ranking system, Universitas *21* (U21), measures national higher educational performance in 50 countries over 25 attributes. The correlation between input and output measurements allows for assessing the effectiveness of different systems**.** As a result, it was found that the methodologies of the two types of rankings share some similarities. Therefore, their results also tend to converge. In addition, it was pointed out that the ranking systems need to be more inclusive regarding the number and type of countries they cover. Also,

they need to reflect better on the diversity of missions undertaken by national higher education systems.

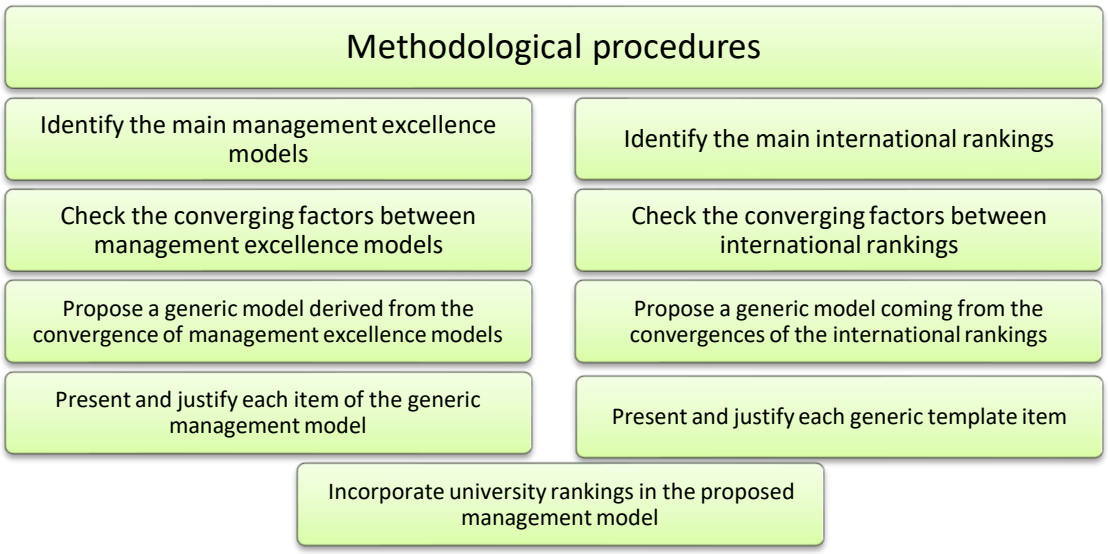
Collins and Park (2016) critically studied the globalization process of higher education by analyzing two leading universities in South Korea. This analysis considers how university rankings have generated a new environment of institutional reputation and includes the quality, classification, and new types of institutional behavior that are emerging. The research presented two critical factors that contribute to the university's reputation. The first factor was a critique of the metrics used in academic ranking and their implications for the quality of institutions. The second contribution was the proposal to use academic reports in classification and reputation systems, emphasizing their successes and failures and their implications for the future of universities.

As a reference for this research, we will use the study by Hazelkorn (2013) on the optics of the popularity of rankings and their influence on higher education.

4. Material and Methods

This work was initiated with bibliographical research. The reference articles were selected based on *Web of Science, Scielo*, and S*cholar Google* databases. Regarding the timeline, articles published between 2008 and 2016 were chosen, and the language was English. On the keywords, we opted to search using accessible terms without controlled vocabulary. The inclusion and exclusion criteria were based on the level of information directed to the theme. Other articles outside the timeline were also incorporated based on their relevance to the topic. Figure 3 shows the methodological procedures adopted in this work.

Figure 3: Flowchart of Methodological Procedures

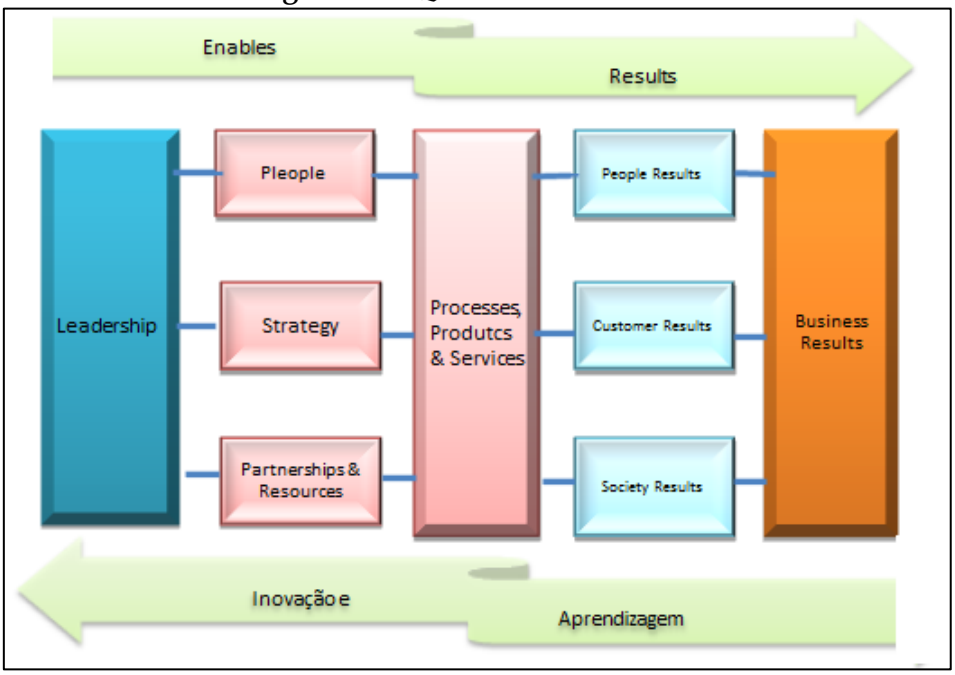


Source: Authors.

5. Construction of the Proposed Model

The proposed model was built by converging EFQM and BCPE management excellence models. As can be observed, Figure 4 represents the *EFQM Excellence Model*, Figure 5 represents the *BCPE Excellence Model*, and Figure 6 presents the proposed *Management Excellence Model*. The colors were intentionally applied to illustrate the convergences of the models.

Figure 4: EFQM Excellence Model



Source: Adapted from EFQM, 2003.

Figure 5: BCPE Excellence Model

Source: Adapted from NIST, 2009.

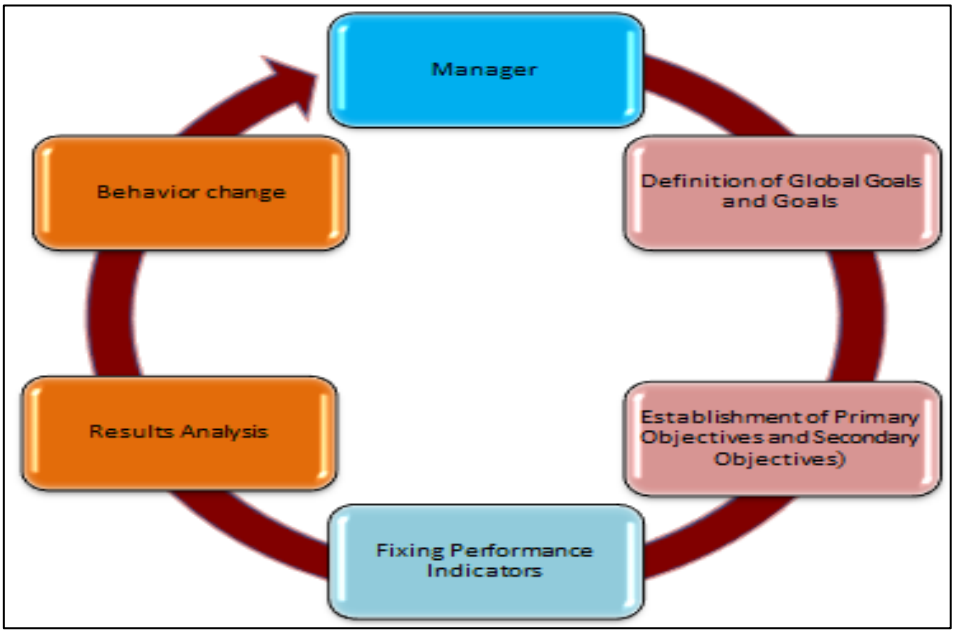


Figure 6: Proposed Management Model

As can be seen in Figures 4 to 6, the EFQM and BCPE Excellence Models were utilized to elaborate the proposed *Management Excellence Model*. These two models were analyzed to determine the convergences between them, which are signaled using colors, as shown in Table 3.

Table 3: Convergent factors between models of management excellence

Themes	**EFQM**	**BCPE**	**Proposed Management Model**
Leadership	**Leadership**	**Leadership**	**Manager**
Strategy	• People; • Strategy; • Partnerships & Resources; • Processes, Products & Services.	• Strategic planning; • Focus on human resources; • Process Management.	• Global Objectives and Goals; • Primary and Secondary Objectives.
Quality Measurement	• People Results; • Customer Results; • Society Results.	• Customer Focus; • Workforce Focus.	• Establishing Performance Indicators.
Results	• Business Result.	• Results; • Measures, Analysis and, Knowledge Management.	• Analysis of Results; • Behavior Change.

To facilitate understanding, Table 3 uses colors to present the convergences between the themes presented in the models. The dark blue color signifies the item leadership, which in the proposed model is called manager. The pink color represents all the items pertaining to an institution's strategic planning, having correspondence in the proposed model with the items Global Objectives and Goals and Primary and Secondary Objectives. The light blue color is related to quality measurement, which is done by

setting performance indicators (Rankings) in the proposed model. The orange refers to organizational results, which encompasses the Analysis of Results and Change of Behavior items in the proposed model. Thus, the convergences between the items presented in the models are demonstrated and used as a reference to build the proposed model.

6. Proposed Model of Management Excellence

An institution seeking to achieve excellence in quality needs to establish appropriate management systems to contribute to institutional development. Based on the management models presented in item 2.2 and the use of rankings as performance indicators, it was possible to establish a model that could be applied to HEIs, as shown previously in Figure 6.

This management model consists of the following elements: Manager, Global Objectives and Goals, Primary and Secondary Objectives, Establishment of Performance Indicators, Results Analysis, and Behavior Change.

The proposed model features the Manager as the primary leader of the process. The Manager is responsible for the decisions and direction of the process. This process will have well-defined objectives and overall goals, as well as primary objectives (strategic) and secondary objectives (Operating) established. This process will be followed by setting performance indicators that will serve as the diagnostic parameters of reality. These diagnostics will be done by analyzing the results. The last step is formulating actions that enable behavior change to improve the percentages acquired in the assessed indicators.

6.1 Manager

The manager's role in a performance measurement system is to manage and make decisions (Dozier *et al.*, 2013).

According to the directives of this model, decisions start with defining the global objectives and goals of the institution. This element, the manager, acts as the link between all other model elements. It will be up to him to coordinate establishing primary and secondary objectives and setting performance indicators. The manager will be responsible for analyzing the results and deciding the actions to be taken. Thus, the manager will promote the change in organizational behavior and is an essential link in the organization's pursuit of continued institutional improvement.

6.2 Definition of Objectives and Overall Goals

The objectives and global goals refer to results that a company seeks to achieve in each period (Zairi, 2012). These aims and targets should follow the Mission set by the company's vision.

This model recognizes that although universities are educational institutions, they have their own Mission and vision that differentiate them. Therefore, a university must

consider its mission and vision in using such a model so that its characteristics are respected and incorporated into the proposed management model.

According to Zimmerman (2015), the mission is the purpose for which an institution is created. Thus, the organizational Mission should answer three fundamental questions: 'Who are we?" What do we do?' Moreover, 'What is the reason to do what we do?' In other words, the Mission reflects the business's core objectives while meeting external demands.

The vision of a company is a destination where the company wants to arrive; it is a picture of the desired future. [...] [Mission] is abstract. [...] [Mission] is "*advancing capacity of the man to explore the heavens*." Vision is "*a man on the moon by the end of the 60s.*" (Senge, 1990, p. 149)

Collins & Huge (1993) point out that vision must be long-term, such as 5, 10, or 20 years. Collins & Porras (1996) speak in terms of 10 to 30 years. Thus, the definition of goals and objectives should direct the institution to the desired place for all those who make up the institution.

6.3 Establishment of Primary (strategic) Objectives and Secondary (operational) Objectives

Primary objectives are related to the organizational plan to achieve its objectives and global goals.

Primary objectives are the stage for the elaboration of long-term planning. This planning incorporates creating a work-organized structure and the managerial procedures, responsibilities, and specific goals.

This step may be better understood in terms of the definition of "plan" by Ozbekhan (1969). For him: *"plan refers to a restriction on the hierarchically organized integrative action in which the functional way arranges various kinds of decisions*."

Operational or secondary objectives involve actions necessary to implement the plan. They are usually short-term measures that require monitoring, procedures, resources, deadlines, allocation of responsibilities for the establishment and implementation, and results.

In this step, it is necessary to consider how the institution is organized and analyze organizational culture to assess the plan's effectiveness. Also, it is necessary to control the agenda's direction, ensuring the stakeholders' participation in daily management.

6.4 Setting Performance Indicators

Although the current university rankings system has drawn criticisms from various quarters, its popularity and influence on higher education cannot be disputed. According to Hazelkorn (2013), rankings are used as an advertising tool and can bring national and international visibility to an institution. Rankings contribute to the institution's reputation and serve as a menu of choice for potential students. In addition, rankings can influence the process of choosing partnerships, cooperation programs, and networking and are also used as a criterion for investments and funding.

Many institutions do not use rankings results for decision-making and management choices, even though rankings constitute a potential management tool. From this perspective, it is proposed that the results of the rankings be used as a basis for elaborating actions aimed at improving institutional quality. Therefore, we have developed a flowchart demonstrating the procedures for formulating performance indicators, as shown in Figure 7.

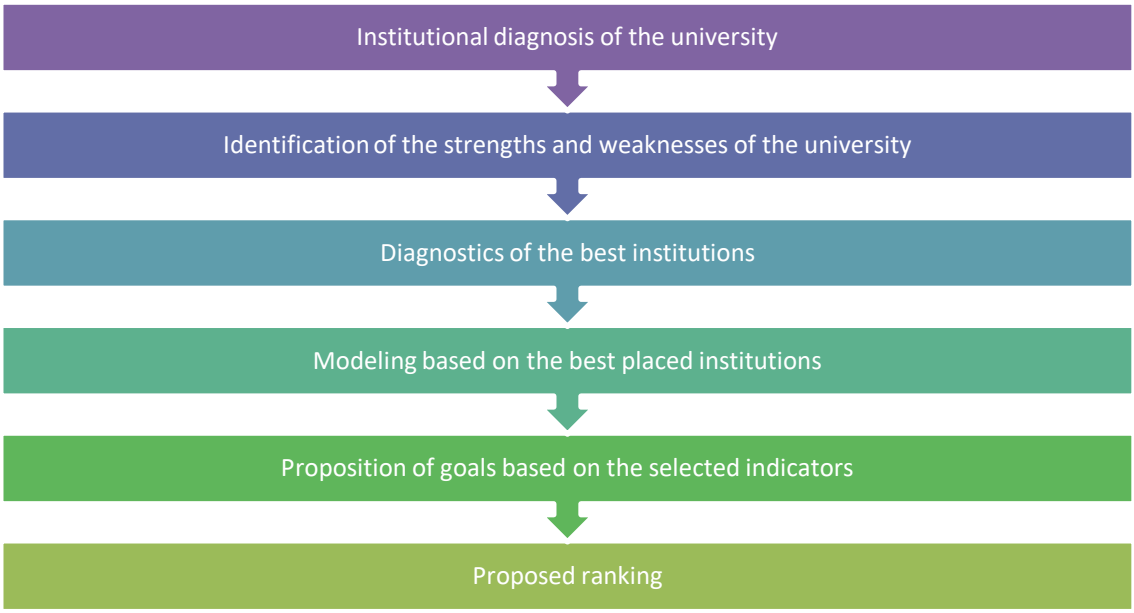


Figure 7: Flowchart of the Use of Rankings as Performance Indicators

According to Figure 7, rankings should begin with a diagnostic survey to verify the current situation, identifying the institution's weaknesses and strengths. A diagnosis of the best-ranked institutions may follow this.

With these data, an analysis should be done to identify what the best-placed institutions do to differ from the others, setting up a benchmark process about the criteria that need to be improved.

In this process, an important step is to structure the relation between goals and indicators. The idea is to relate the goals with each indicator that composes the criteria that need to be improved by the HEIs. In this process, it is up to the Manager to propose the goals for each indicator.

Considering these factors, the university creates its *proposed ranking* to evaluate, monitor, and audit its development over time according to the criteria and indicators it intends to improve by its Management Plan.

Based on Item 2.4, this research adopted some criteria and indicators of rankings evaluation. It was done through convergence to create a generic ranking system, as shown in Table 4. This ranking is not obligatory but rather illustrative.

Table 4: Generic Ranking

Criteria	Indicators
1. Search	Number of scientific publications; Number of citations; Obtaining resources for research projects.
2. Teaching	Number of graduates; Notes of the courses in national evaluation; Technology used in distance education and student history; Number of MSc's and Ph.D.'s.
3. Internationalization	Number of students, professors, and technicians who study abroad; Exchanges; Cooperation agreements.
4. Employability	Number of registrations in the respective professional councils; Quantitative estimate of graduates employed in the 10 largest companies in the state/province.
5. Innovation	Number of patents; Number of technical reports with technology transfer.
6. Social Responsibility (Social, Inclusion, Extension, Art, and Culture)	Projects in the area of inclusion; Extension projects; Investments in artistic and cultural activities; Environmental engagement.

Source: Authors.

Based on Table 4, within the framework adopted, the first indicator is *research*, which refers to quality evaluations of the research. This indicator will assess the productivity criteria, publication in journals and books, citations, and research resources.

The *teaching* indicator is based on parameters such as the exam evaluation notes of the courses, number of graduates, academic registers, and technology used by distance education. This indicator also indirectly measures the quality of teaching through the number of MScs and Ph. Ds.

Internationalization measures the degree of internationalization achieved by the institution. This indicator measures the proportion of students, professors, and technicians who study abroad, the number of exchange students, and the number of international cooperation initiatives.

The *employability* criterion considers whether the graduates from the institution have access to the labor market. This criterion measures the rate of employment after the conclusion of the courses, as well as the current number of registrations in respective professional councils.

The *innovation* criterion is related to producing effective results that impact the economy, society, and culture. This criterion is considered an essential current factor in measuring quality in HEIs. It can be assessed regarding the number of patents and technical reports on technology transfer.

Social responsibility is a criterion that considers the institution's engagement with society in aspects such as extension, inclusion, environment, art, and culture. This criterion is measured by the direct investments made by the institution through projects

in inclusion and extension, as well as investments in artistic, cultural, and environmental activities.

In this sense, it may be assumed that the same process is relevant to all HEIs, hence the idea of universalizing the model, which could be applied to any other institution.

6.5 Analysis of Results

An analysis of the results should consider the monitoring and controlling of the processes involved.

Monitoring and controlling the process is fundamental to evaluating an institution's performance. Once the global and primary and secondary objectives that comprise the planning stage are established, it is necessary to evaluate the results obtained. After that, it is imperative to identify what needs to be done to maintain or improve these results, always seeking continuous improvement of the institution.

Thus, an analysis of the results should consider operating activities' development and performance that explain the results.

6.6 Behavior Change

In all management systems, there will always be aspects that need to be reassessed and improved, both in the execution of a current system and in the incorporation of new systems. After all, quality must be continually improved as it is essential for a company to remain competitive in the market.

At this point, it will be up to the manager to decide how to bring about the necessary behavior changes. In this regard, he must choose between inducing changes in the present system and creating a new system to reach better results.

It is noteworthy that the predefined performance indicators have a crucial role in the behavior change process since they help identify an institution's strengths and weaknesses. They provide direction on actions to assist in behavioral change by means such as process changes, training, accountability, reduction of waste, and other investments.

7. Final Considerations

The present study proposed a management model of excellence to help HEIs achieve a high-quality position.

Through the analysis of Management Excellence Models and HEIs Rankings, it was possible to build a conceptual management model that can be adapted to the universities' strategic plans. It was possible to suggest a generic ranking system with criteria and indicators that assess institutions and help monitor and audit their development in the long term.

The proposed management model establishes the *Manager* as the driving force of the process. The Manager is responsible for the decisions and direction of the process with well-defined *global goals and objectives*. In the sequence, the *setting performance indicators* will serve as reality checkers. The stage of *analysis of the results* follows. Finally,

the process concludes with formulating actions that will enable *behavior change* to improve the percentages acquired in the criteria and indicators evaluated.

The study's main contribution is to leverage the quest for excellence by applying a model that considers the peculiarities of HEIs. The model has been developed with the incorporation of university rankings as indicators of performance. The proposed model will promote not only the enhancement of interior quality but also reflect in the improvement of the position of the institutions in the rankings.

This management model can be applied to HEIs globally. It is a continuous assessment mechanism, providing an evolutionary quality institution diagnosis. Thus, it allows the identification of the strengths and weaknesses of the institution, as well as evaluating whether institutional goals and objectives are being achieved. It could ensure that institutional behavior changes are adopted for quality improvement.

In addition, the framework also suggests a modeling process based on the best institutions placed in the rankings. This way, misplaced institutions can raise their indices in the rankings.

Finally, actions around the improvement of HEIs should be carried out continuously. In this regard, it is crucial to pay attention to the specificities of each institution as they engage in a dynamic, constant process of change. This study can contribute to improving HEIs continuously.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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References

Aghion, Phillipe & Dewatripont, Mathias & Hoxby, Caroline & Mas-Colell, Andreu & Sapir, Andre. (2007). Why Reform Europe's Universities? Bruegel policy brief

2007/04, September 2007. Retrieved from https://www.researchgate.net/publication/29997993_Why_Reform_Europe's_Universities_Bruegel_policy_brief_200704_September_2007

Asif, M., Raouf, A., & Searcy, C. (2013). Developing measures for performance excellence: is the Baldrige criteria sufficient for performance excellence in higher education?. *Quality & Quantity*, *47*(6), 3095-3111.

Beard, D. F., & Humphrey, R. L. (2014). Alignment of university information technology resources with the Malcolm Baldrige results criteria for performance excellence in education: A balanced scorecard approach. *Journal of Education for Business*, *89*(7), 382-388.

Beerkens, E. (2008). The emergence and institutionalisation of the European higher education and research area. *European Journal of Education*, *43*(4), 407-425.

Birkinshaw, J., & Ansari, S. (2015). Understanding Management Models. Going Beyond" What" and" Why" to" How" Work Gets Done in Organizations. *Foss, JN, & Saebi*, 85-103.

Bou-Llusar, J. C., Escrig-Tena, A. B., Roca-Puig, V., & Beltrán-Martín, I. (2009). An empirical assessment of the EFQM Excellence Model: Evaluation as a TQM framework relative to the MBNQA Model. *Journal of Operations Management*, *27*(1).

Calvo-Mora, A., Navarro-García, A., & Periañez-Cristobal, R. (2015). Project to improve knowledge management and key business results through the EFQM excellence model. *International Journal of Project Management*, *33*(8), 1638-1651.

Calvo-Mora, A., & Roldán, J. L. (2016). The role of strategic planning in excellence management systems Author-Name: Suarez, Eva. *European Journal of Operational Research*, *248*(2), 532-542.

Collins, B., & Huge, E. (1993). *Management by policy*. Asq Pr, Retrieved from https://www.abebooks.com/servlet/BookDetailsPL?bi=31446024452&searchurl=an%3Dcollins%2Bbrendan%2Bhuge%2Bernest%26ds%3D10%26sortby%3D17&cm_sp=msrp-_-msrpdesc-_-bdp

Collins, J. C., & Porras, J. I. (1996). Building your company's vision. *Harvard business review*, *74*(5), 65.

Collins, F. L., & Park, G. S. (2016). Ranking and the multiplication of reputation: reflections from the frontier of globalizing higher education. *Higher Education*, 1-15.

Del Mar Alonso-Almeida, M., & Fuentes-Frías, V. G. (2012). International quality awards and excellence quality models around the world. A multidimensional analysis. *Quality & Quantity*, *46*(2), 599-626.

Dozier, D. M., Grunig, L. A., & Grunig, J. E. (2013). *Manager's guide to excellence in public relations and communication management*. Routledge.

Fitzgerald, L., Johnston, R., Brignall, S., Silvestro, R. and Voss, C. (1991). *Performance Measurement in Service Businesses*, London, CIMA.

Ferlie, Ewan Lynn Ashburner, Louise Fitzgerald e Andrew Pettigrew (1996). *The New Public Management in Action*. Oxford University Press.

Flynn, B. B., & Saladin, B. (2006). Relevance of Baldrige constructs in an international context: A study of national culture. *Journal of Operations Management*, *24*(5), 583-603.

Garel, G. (2013). A history of project management models: From pre-models to the standard models. *International Journal of Project Management*, *31*(5), 663-669.

Green, D. (2014). What is quality in higher education? Retrieved from https://eric.ed.gov/?id=ED415723

Harvey, L. (2011). Analytic quality glossary. Quality Research International. Retrieved December 20, 2015 from http://www.quality-researchinternational.com/glossary/.

Hazelkorn, E. (2011). Rankings and the Reshaping of Higher Education: the Battle for World Wide Excellence. Retrieved from https://link.springer.com/book/10.1057/9780230306394

Hazelkorn, E. (2013). How rankings are reshaping higher education. Retrieved from https://arrow.tudublin.ie/cgi/viewcontent.cgi?article=1023&context=cserbk

Hou, A. Y. C. (2012). Impact of excellence programs on Taiwan higher education in terms of quality assurance and academic excellence, examining the conflicting role of Taiwan's accrediting agencies. *Asia Pacific Education Review*, *13*(1), 77-88.

Marginson, S. (2014). University rankings and social science. *European Journal of Education*, *49*(1), 45-59.

Millot, B. (2015). International rankings: Universities vs. higher education systems. *International Journal of Educational Development*, *40*, 156-165.

Ozbekhan, H. (1969). Planning Theory. *Ekistics*, 296-299.

Pruvot, E. B., & Estermann, T. (2014). Define thematic report: Funding for excellence. *European University Association*, 1-25.

Radojicic, Z., & Jeremic, V. (2012). Quantity or quality: What matters more in ranking higher education institutions? *Current Science*, *103*(2), 158-162.

Ramirez, F. O. (2010). Accounting for excellence: Transforming universities into organizational actors. In J. Portnoi, L. M., *et al.* (Eds.), Higher education, policy, and the global competition phenomenon (pp. 43–58). New York: Palgrave Macmillan.

Ramirez, F. O. (2013). World society and the university as formal organization. *Sisyphus-Journal of Education*, *1*(1), 124-153.

Ritzen, J. M. M. (2010). *A Chance for European Universities: Or, Avoiding the Looming University Crisis in Europe*. Amsterdam University Press.

Senge, P.M. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organisation*, Century Business

Van Vught, F., Van der Wende, M., & Westerheijden, D. (2002). Globalisation and internationalisation: Policy agendas compared. In *Higher education in a globalising world* (pp. 103-120). Springer Netherlands.

Zairi, M. (2012). *Measuring performance for business results*. Springer Science & Business Media.

Zimmerman, F. (2015). Strategy management using the Balanced Scorecard (BSC).