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## **BIBLIOMETRIC RESEARCH ON PERFORMANCE MEASUREMENT AND EVALUATION SYSTEMS AND INTERNATIONALIZATION OF HIGHER EDUCATION**

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**Abstract:** In order to carry out a bibliometric study to identify and analyze publications that present interactions between theories of internationalization of higher education with theories of organizational performance evaluation systems, this article used the instrument: *Knowledge Development Process-Constructivist (ProKnow-C)*, developed by the Laboratory of Multicriteria Methodologies in Decision Support (LabMCDA) of the Federal University of Santa Catarina. The articles found were analyzed in relation to the year of publication, newspapers and references used. The instrument: *ProKnow-C* proved to be useful for the bibliometric study. The theories in sets are currently little explored, however the environment is conducive to new research on performance evaluation and internationalization of higher education.

**Keywords:** Internationalization of Higher Education; Performance evaluation; Bibliographic Analysis; *Knowledge Development Process-Constructivist; ProKnow-C.*

## INTRODUCTION

Influenced by the Fourth Industrial Revolution and the information society, the process of internationalization of higher education adopted a proactive profile in strategic issues and value creation for educational institutions (WIT, 2013). Through intangible assets arising from the interaction of students, professors and researchers with their international peers, living in other cultures, offering a language course, the possibility of double degrees, face-to-face and virtual mobility, higher education institutions are faced with an infinity of non-systematized data. (STALLIVIERI; VIANNA; GAUTHIER, 2019).

The systemic organization of data enables the transformation of data into information and knowledge to measure and evaluate

organizational performance (HORA; VIERA, 2008). Systematized internationalization data in higher education institutions can become a competitive advantage, as they create value for the organization. With the measurement and evaluation of performance, it is possible to obtain an assertive decision-making, based on the information obtained by the diagnosis of the organization's performance.

Given this scenario, the present research aims to carry out a bibliometric study to identify and analyze publications that present interactions between theories of internationalization of higher education with theories of systems of measurement and evaluation of organizational performance.

The article has as the starting point the discussion of central themes related to the internationalization of higher education and the measurement and evaluation of organizational performance. Then, in the methodology, the article presents the instrument: *Knowledge Development Process-Constructivist (ProKnow-C)* to collect and analyze the scientific productions related to the themes. It then proceeds to analyze the results of the bibliographic research and, finally, presents the final considerations.

## THEORETICAL REFERENCE

In this topic, the main concepts, definitions and models that are part of the theories of internationalization of higher education and of measurement and evaluation of organizational performance will be addressed.

## INTERNATIONALIZATION OF HIGHER EDUCATION

The changes that occurred in the internal and external environments of Brazilian higher education institutions due to globalization demanded the development of measures and actions to internationalize their organizations. According to Altbach and Knight (2007),

it is necessary to differentiate between internationalization and globalization. Globalization is conceptualized as political, economic and social forces that influence higher education institutions to seek greater international interaction. Altbach and Knight (2007) and Wit and Hunter (2015) point out that solid capital investments in knowledge industries, such as higher education institutions and training courses, resulting from the globalization of the economy and society reflected in the emergence of knowledge-oriented societies, in the rise of service sectors and reliance on knowledge products and highly skilled personnel for economic growth. Internationalization emerged, therefore, as a means to obtain the results demanded from the knowledge society by globalization.

The concept of internationalization of higher education is not a recent term (KNIGHT, 2005), it is dynamic, evolves over the years (WIT, 2013) and can have different operational definitions, varying in scale and scope and depending on, among other variables, institutional purpose and missions (HUDZIK, 2011).

Jane Knight (2005) conceptualizes the internationalization of higher education as a process of integrating an international, intercultural or global dimension in the purpose, functions or provision of higher education services. According to the author, internationalization is considered a process because it is an endless and continuous effort. It is composed of an international, intercultural and global dimension, which the author deliberately included as a triad to highlight the relationship between nations, the diversity of existing cultures and the global scope of the definition. The word integration is used in the concept to highlight that the process of incorporating the international and intercultural dimensions into policies

and programs ensures that the international dimension remains central and sustainable. The words purpose, function and service provision are used together to show that the concept must achieve the mission and objectives of the educational institution, the tasks of teaching, research and extension for society and the offer of courses and education programs both both in the country and outside the country.

Wit and Hunter (2015) proposed an update of Jane Knight's concept, in which they consider internationalization as an intentional process of integrating an international, intercultural or global dimension into the purpose, functions or provision of higher education services in order to improve quality of education and research for all students and staff, and to make a significant contribution to society. The authors point out that this new definition reflects the awareness that internationalization has to stop being elitist and start playing an inclusive role by focusing more on the internationalization of the curriculum and on learning outcomes than simply on academic mobility. The authors complete emphasizing that internationalization is not an objective, but a means to raise the quality of education and knowledge and must not focus only on obtaining economic results.

Hudzik (2011) presents the concept of comprehensive internationalization (*Comprehensive Internationalization*). It is defined as a commitment, confirmed through actions, to interrelate international and comparative perspectives in all higher education teaching, research and extension actions. The author states that comprehensive internationalization shapes institutional ethics and values and affects the entire organization. It is essential that it be adopted by institutional leadership, governance, faculty, students, academic and support units. It must be treated as an institutional objective, not just as

a desirable possibility. Thus, according to the author, comprehensive internationalization does not only impact campus life, but also impacts the relationships with its stakeholders and their motivations and propositions are influenced by globalization. The author emphasizes in his theory the interrelation of 6 pillars considered essential in comprehensive internationalization, namely: (a) articulated institutional commitment, (b) administrative leadership, structure and personnel, (c) *currículum*, *co-currículum* and learning outcomes, (d) faculty policies and practices, (e) student mobility, and (f) collaboration and partnerships. Figure 1 illustrates the comprehensive internationalization model proposed by Hudzik:

## MEASUREMENT AND PERFORMANCE ASSESSMENT

Being competitive in order to survive and prosper in the face of competitors brings more and more challenges to organizations. Competitiveness, in this context, is understood as the organization's ability to be successful in its market by producing better than its competitors (MARIOTTO, 1991 and HORA; VIEIRA, 2008). Management and leadership become increasingly complex and challenging tasks, faced with a more dynamic and technological organizational environment, with a complex global economy and demanding and enlightened customers (SINK; TUTTLE, 1993). In response, organizations need to develop management at strategic, tactical and operational levels, through the use of systems that measure and evaluate their organizational performance (HORA; VIERA, 2008). Sink and Tuttle (1993) summarize by stating that "The essence of management is: we cannot manage what we cannot measure" (SINK; TUTTLE, 1993, pg. 1).

Theories about performance measurement

and evaluation present different concepts and are constantly evolving. Neely, Gregory and Platts, (2005) describe performance measurement (MD) as a process of quantifying the efficiency and/or effectiveness of action. Performance measurement system (SMD), according to the authors, is conceptualized as a set of metrics used to quantify the efficiency and effectiveness of actions. This concept is measurement oriented.

Extending the concepts of Neely Gegory and Platts, the studies by Melnyk et al., (2014), show that the performance measurement and management system (SMGD) is composed of two elements, being (i) the performance measurement system, in which it is characterized as the process of establishing objectives, collecting, analyzing and interpreting performance data, based on the set of metrics chosen to guide and influence the organization's actions. In short, it transforms data into information to assess the efficiency and effectiveness of the organization's actions. The other element, called (ii) a performance management system, plays the role of evaluating the differences between the actual and desired results, identifying and signaling critical points that require the intervention of managers, understanding the factors influencing the critical points, monitoring and make decisions through corrective actions to fill performance gaps. The two elements form an integrated, comprehensive and oriented system for the measurement and management of measured information. It is worth noting that Davenport (1997) presents the continuum of data, information and knowledge. In this continuum, data can be defined as "simple observations about the state of the world" (DAVENPORT, 1997, p. 9), in which they can be structured, obtained by machines, quantified and transferred. Information is defined as "data endowed with relevance and purpose" (DAVENPORT, 1997,

p. 9), in which human mediation, unity of analysis and consensus regarding meaning are required. Finally, the author defines knowledge as “valuable information from the human mind. It includes reflection, synthesis, context” (DAVENPORT, 1997, p. 9).

In the same line of reasoning about the measurement and management of measured information, Ensslin et al. (2013) uses the terminology performance evaluation (AD) and defines it as an instrument to help the decision maker. This is accomplished through activities that identify, organize and measure ordinally and cardinally the main performance factors, which allow the decision maker to understand the consequences of actions. Sobreira Netto (2007) uses the terminology Organizational Performance Measurement System (SMDO) and conceptualizes it as the “set of people, processes, methods, tools and indicators, structured to collect, describe and represent data, in order to generate information about multiple dimensions of performance for users at different hierarchical levels.” (ENSSLIN et al, 2007, pg. 1) and that the decision-making process of organizations is nourished by organizational performance information generated and evaluated in the SMDO.

According to Hora and Vieira (2008), measurement and evaluation systems are classified into two generations. In the first, which took place between 1880 and 1950, organizations used only economic and financial indicators and reports as performance criteria. In the second generation, which took place from the 1990s onwards and with the evolution of competitiveness, the performance criteria previously adopted became incomplete due to the strategic importance of information, appreciation of other intangible assets and the adoption of continuous improvement programs. Given this scenario, the SMDOs followed the evolution with the expansion of financial and non-financial indicators.

Sobreira Netto (2007) presents a different classification from Hora and Vieira. The author shows in his research that systems can be classified into three phases. The first, which took place between the 14th and 19th centuries, focused on accounting practices to control production processes and embryonic production management and control systems. The second phase, which took place between the 20th century and the mid-1980s, began to focus on systems for measuring and evaluating organizational performance in the planning and control cycle of organizations, even though the financial focus prevailed. An example of this phase is the Du Pont Pyramid system, whose characteristic was to reorganize the organization based on a process benchmark with a financial focus. The last and current phase, which began in the late 1980s, focuses, in addition to financial attributes, on attributes based on non-financial intangible assets and on organizational management based on data measured in organizational performance measurement and evaluation systems.

## **METHODOLOGICAL PROCEDURES**

In order to carry out a bibliometric study to identify and analyze publications that present the theories of internationalization of higher education and the evaluation of organizational performance, this research uses the instrument: *Knowledge Development Process-Constructivist (ProKnow-C)*, developed by the Laboratory of Multicriteria Methodologies in Decision Support (LabMCDA) of the Federal University of Santa Catarina to achieve the proposed objective.

The instrument assists in the construction of knowledge through a structured process for the selection and analysis of bibliographic literature. Created from the philosophy of constructivism, its purpose is to identify

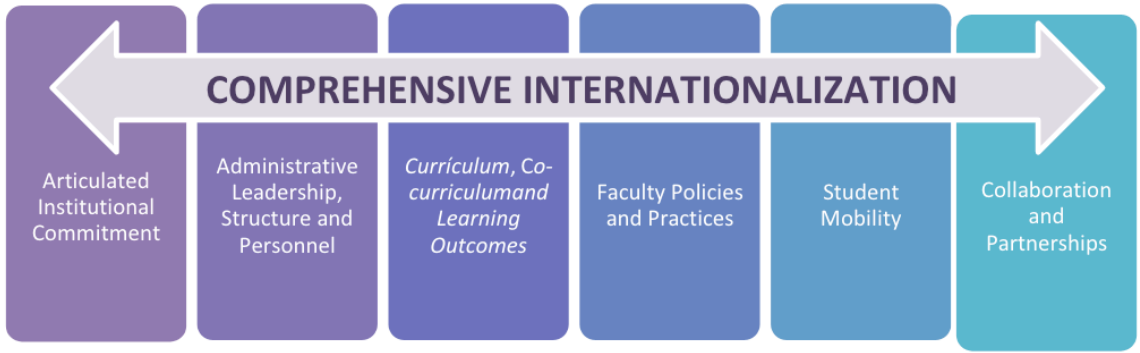


Figure 1 – Comprehensive Internationalization Model

Source: Adapted (HELMS; BRAJKOVIC, 2017)

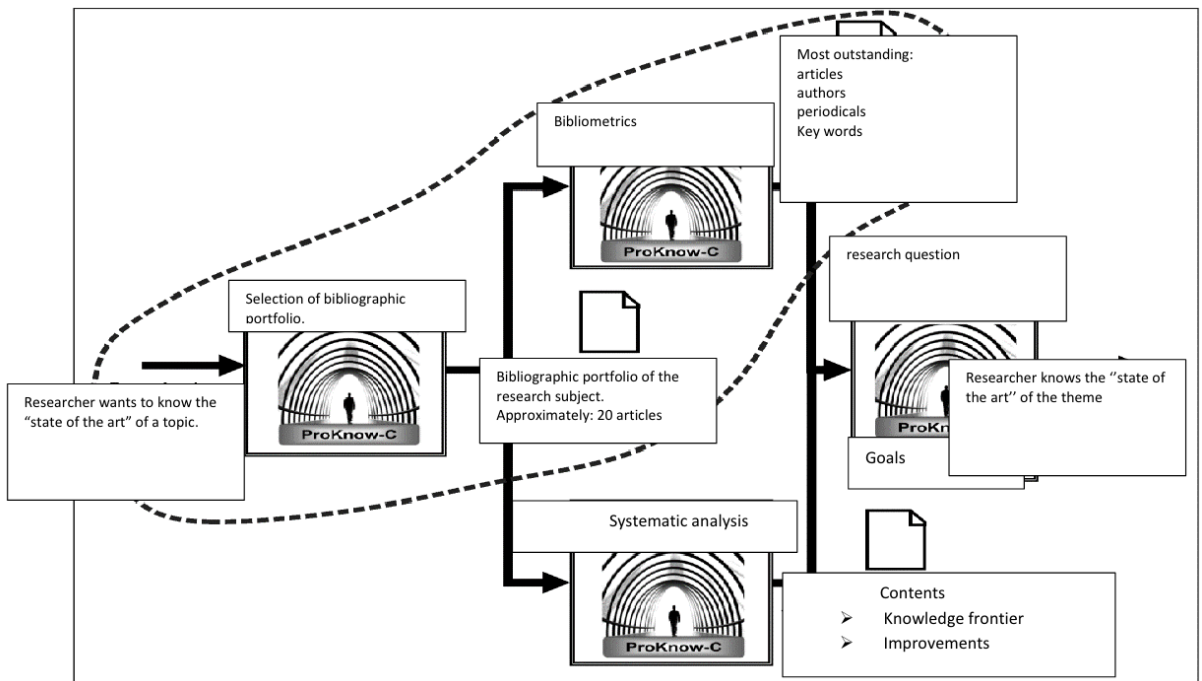


Figure 2 – Methodology steps: *ProKnow-C* used in this research

Source: Adapted from (ENSSLIN; ENSSLIN; PINTO, 2013)

relevant articles that generate knowledge and support future research. The structured process consists of four steps, (i) selection of the bibliographic portfolio; (ii) bibliometric analysis of the portfolio; (iii) systemic analysis; and, (iv) definition of the research question and research objective. This study will use the first two steps to obtain the proposed objective (ENSSLIN; ENSSLIN; PINTO, 2013 and SOUZA; ENSSLIN; GASPARETTO, 2016). Figure 2 presents the steps of the methodology applied in this research.

### **SELECTION OF BIBLIOGRAPHIC PORTFOLIO**

The selection of the Bibliographic Portfolio (BP) consists of three phases, (i) the selection of the raw article bank, (ii) the filtering of the article bank and (iii) the performance of a test of representativeness of the BP.

#### **SELECTION OF RAW GOODS BANK**

For the first phase, selection of the raw article database, it is necessary to initially define the search Axles that guide the selection of the raw database. For this research, two Axles were defined, the first related to the internationalization of higher education and the second related to performance measurement and evaluation.

We then proceed to carry out the following actions: definition of keywords; definition of databases; search for articles in databases with keywords; and carrying out the keyword adherence test.

The first action of the raw article bank selection step is the definition of keywords. For the Axle of the internationalization of higher education, the keywords were defined: *higher education*, and *internationali\**.

For the Axle related to performance measurement and evaluation, the keywords performance measurement\*, performance evaluation, performance management and

performance assessment were defined. The asterisks omitting the end of the word were used to inform the consulted database to search for documents that contain the derivatives of the requested radicals.

After defining the keywords, the next action is to choose the databases. Using the CAPES newspapers Portal, the Scopus and ISI Web of Science databases were selected, due to the expressive amount of newspapers adhering to the theme.

With the definition of keywords and databases, we move on to the next action, in which the Boolean combination was used (*Internationali\* AND "Higher Education" AND performance AND measur\* OR evaluation OR management OR assessment*) in the selected databases with the refinement of the search aimed at looking only in the titles, keywords and abstract of articles. A time period has not been defined. As a result, the raw database consists of 76 publications. The survey was conducted on October 3, 2019 and bibliographic data were managed in Endnote Online.

With the definition of the number of articles through the search in the databases, the last action to be taken is the keyword adherence test. For this, a sample of six random articles was chosen to verify the adherence to the proposed theme and the need or not to include new keywords in the research. With the test, no evidence was found that requires the inclusion of new keywords. Once this step is completed, we start filtering the article bank.

#### **FILTERING THE RAW ARTICLE BANK**

The second phase of BP selection begins with the filtering of articles from the raw article bank by checking the following aspects: presence of repeated or redundant articles; alignment of article titles with the

theme; scientific recognition of articles; alignment of the abstract with the theme; and finally, availability of the articles in full in the databases.

To verify the presence of repeated or redundant articles, the bibliographic manager *Endnote Online* was used, a system that identifies articles whose information is exactly the same. Thus, a result of 9 repeated articles was obtained. After this step, a visual inspection was carried out on the list of files in order to verify more duplicates, in which the data present subtle divergences, such as a DOI record, in which the system does not identify as a duplicate. As a result, another 11 duplicate articles were identified. Therefore, a total of 20 articles were eliminated and 56 articles remained.

With the definition of the 56 articles in the raw article database, we proceed to verify the alignment of the article titles with the theme, in which, after reading, 5 articles were eliminated, leaving 51 articles.

The degree of scientific recognition of the articles occurs through the use of representativeness criteria. For this study, two bases of representativeness criteria were used, the amount of citation of the article, measured by Google Scholar and the indicator of visibility of newspapers through the SCImago Journal Rank (SJR). The first criterion listed 90% of the articles with the highest citations, which totaled 18 articles and will be treated as repository A. Of the remaining 10%, the second criterion was applied, visibility of newspapers, in which it listed 80% of newspapers with greater visibility totaling 15 articles that will be classified as repository B.

To verify the alignment of the article with the theme, the abstract of all articles in the A repository was read. In reading, we sought to identify the purpose of the proposed study and the use of theories of internationalization of higher education with theories of systems of

measurement and evaluation of organizational performance in the context of the article. Of the 18 articles in repository A. For repository B, an analysis of the articles was also carried out in order to identify articles with potential to compose the bibliographic portfolio, in which 2 articles were chosen. In total, 10 articles were aligned with the theme.

The 10 articles chosen to be part of the BP present their complete versions on the internet to be accessed and downloaded. As a facilitator, the EndNote platform was used to organize the articles. Figure 3 presents the summary of the Bibliographic Portfolio selection stage.

### **BP REPRESENTATIVENESS TEST**

The BP representativeness test aims to verify the recognition of the references used in the BP articles. To carry out the test, all the references used in the 10 articles of the BP were collected through the Scopus database. After the survey, the cited articles were exported to an Excel spreadsheet to measure the number of citations made in Google Scholar. With this step completed, the citations were classified according to the adherence of the title of the publication to the research topic, as articles unrelated to the topic were highlighted by the number of citations. From the classification by adherence to the theme, the articles were arranged in descending order and, with the relative frequency accumulated, 80% of the articles from the BP references were selected to verify the representativeness within the BP articles. The test revealed that only 8 BP articles contain in their references 80% of the most cited articles on Google Scholar that are aligned to the theme. Table 1 presents the 10 articles in the Bibliographic Portfolio.

### **BILIOMETRIC ANALYSIS**

With the Bibliographic Portfolio defined with 10 articles that present the theories of



Objective: to identify and analyze publications that present the theories of internationalization of higher education and systems of measurement/evaluation of organizational performance

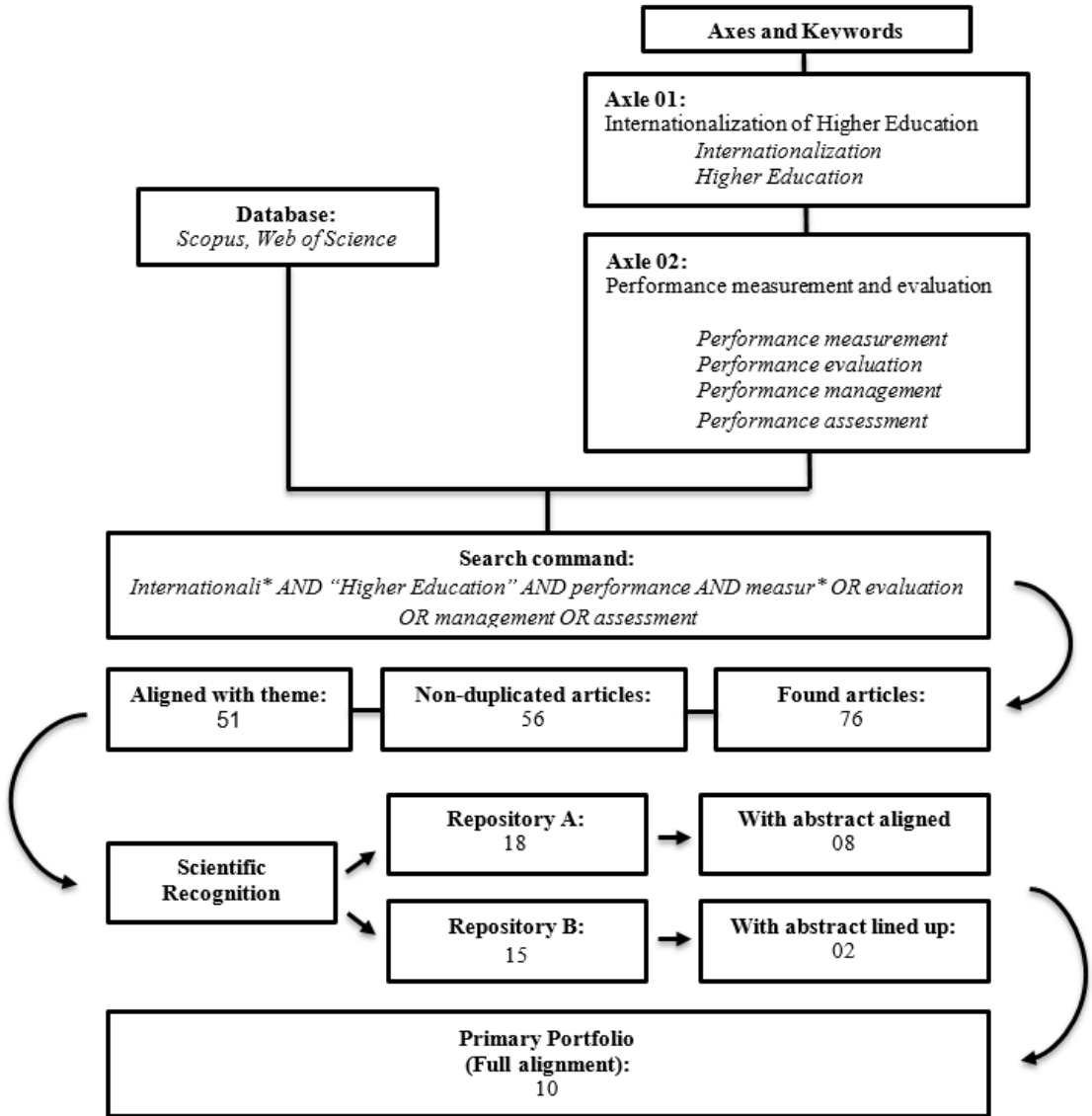


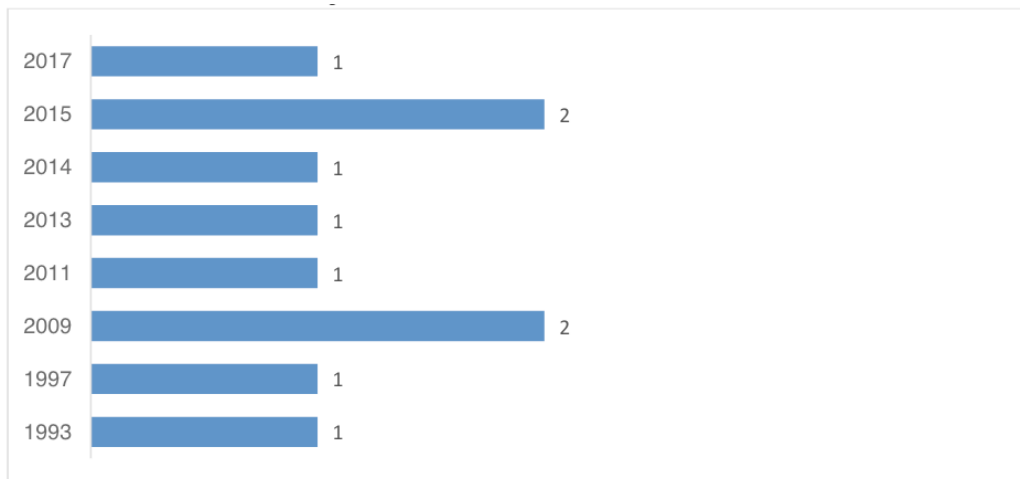
Figure 3 - Summary of the Bibliographic Portfolio Selection Stage

Source: Adapted from (ENSSLIN; ENSSLIN; PINTO, 2013)

Year	Authors	Title	Scientific Newspaper
2009	Chin, J. M. C.	<i>Trends and indicators of Taiwan's higher education internationalization</i>	<i>Asia-Pacific Education Researcher</i>
2015	Gao, Y.	<i>Toward a Set of Internationally Applicable Indicators for Measuring University Internationalization Performance</i>	<i>Journal of Studies in International Education</i>
2017	Kim, J.	<i>Nonnative English-Speaking Professors' Experiences of English-Medium Instruction and Their Perceived Roles of the Local Language</i>	<i>Journal of Language, Identity and Education</i>
2009	Kondakci, Y.	<i>Institutional imperatives versus emergent dynamics: a case study on continuous change in higher education</i>	<i>Higher Education</i>
2011	López, D. A.	<i>Functional patterns in international organizations for university cooperation in Latin America and the Caribbean</i>	<i>Journal of Studies in International Education</i>
2015	O'Connell, C.	<i>An examination of global university rankings as a new mechanism influencing mission differentiation: the UK context</i>	<i>Tertiary Education and Management</i>
1993	Vinke, A. A.	<i>English proficiency and academic success in international postgraduate education</i>	<i>Higher Education</i>
1997	Welch, A. R.	<i>The peripatetic professor: The internationalisation of the academic profession</i>	<i>Higher Education</i>
2013	Decramer, A.	<i>The impact of internationalization on volume and quality of scholarly publication performance</i>	<i>Public Money and Management</i>
2014	Jalaliyoon, N.	<i>Marketization of higher education institute; Identifying a set of performance measurements based on analytic hierarchy process</i>	<i>Research Journal of Applied Sciences, Engineering and Technology</i>

Table 1 – Bibliographic Portfolio Articles

Source: Author data



Graphic 1 – Year of Publication of BP articles

Source: Author data

Newspaper name	Frequency	JCR
Higher Education	3	80
Journal of Studies in International Education	2	49
Asia-Pacific Education Researcher	1	20
Journal of Language, Identity and Education	1	17
Tertiary Education and Management	1	29
Public Money and Management	1	43
Research Journal of Applied Sciences, Engineering and Technology	1	21

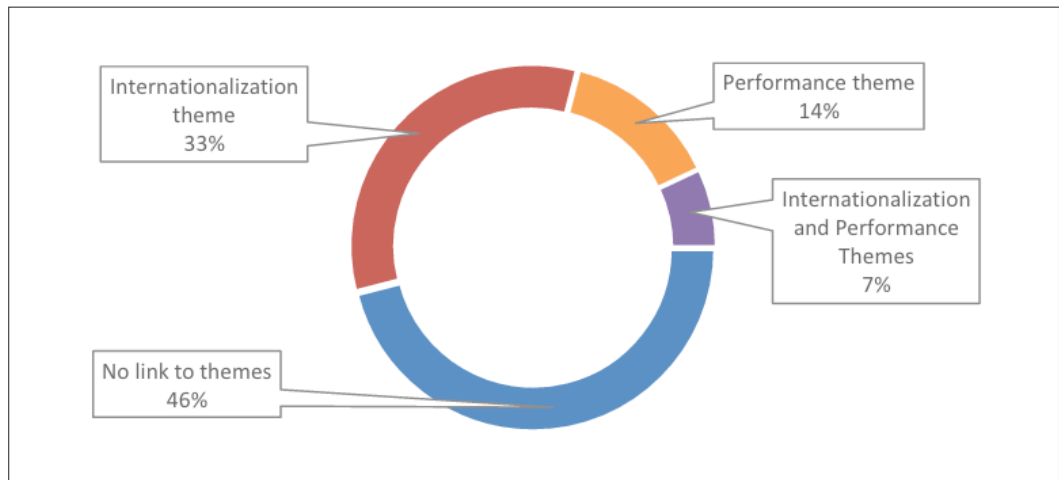
Table 2 – Scientific Newspapers of PB Articles

Source: Author data

Axle	Research area	Newspapers
Axle 1	<ul style="list-style-type: none"> <li>Education</li> </ul>	<ul style="list-style-type: none"> <li>Higher Education</li> <li>Journal of Studies in International Education</li> <li>Asia-Pacific Education Researcher</li> </ul>
Axle 2	<ul style="list-style-type: none"> <li>Education</li> <li>Language and Linguistics;</li> <li>Organizational behavior, Human resource Management</li> </ul>	<ul style="list-style-type: none"> <li>Journal of Language, Identity and Education</li> <li>Tertiary Education and Management</li> </ul>
Axle 3	<ul style="list-style-type: none"> <li>Administration, Management, Accounting, Public Administration, Sociology and Political Science</li> <li>Computer Science and Engineering</li> </ul>	<ul style="list-style-type: none"> <li>Public Money and Management</li> <li>Research Journal of Applied Sciences, Engineering and Technology</li> </ul>

Table 3 – Axles of the Research Areas of the BP articles

Source: Author data



Graphic 2 – Percentage of topics in BP article references

Source: Author data

internationalization of higher education and systems of measurement and evaluation of organizational performance, the bibliometric analysis takes into account the data obtained from the BP articles and from the references used in the BP articles.

### GROSS ARTICLE BANK FILTERING

The temporality of the newspapers was not limited in the bibliographic research in order to know the period in which the research began, addressing the two themes simultaneously. Thus, graph 1 presents the timeline of BP articles.

The oldest article was published in 1993. When comparing publications by decades, the 1990s and 2000s have 2 articles, while the 2010s have 6 articles released. It is possible to infer that, despite the studies pointing to the initial milestone in the 1990s, the themes began to be developed together in the 2010s.

Regarding the scientific newspapers in which the BP articles were published, Table 3 shows that the newspaper: *Higher Education* presents a higher frequency of publication with the theme proposed in this research, followed by the *Journal of Studies in International Education*. In addition to standing out for their frequency, the two newspapers are the most relevant, as they are configured with the highest indices.: JCR of *SCImago Journal Rank*, with 80 and 49 points, respectively. In third place appears *Public Money and Management* with 43 points.

The research areas of PB newspapers can be classified into 3 distinct Axles. The first and most comprehensive is the Axle in which the research areas are exclusively focused on education and the newspapers that focus on this Axle are *Higher Education*, *Journal of Studies in International Education* and *Asia-Pacific Education Researcher*. The second Axle covers the area of education along with other areas of research such as language and

linguistics. - *Journal of Language, Identity and Education*, and organizational behavior, human resources management - *Tertiary Education and Management*. Finally, the last Axle presents areas of research not related to education.

These are the newspapers: *Public Money and Management* and *Research Journal of Applied Sciences, Engineering and Technology*. While the first journal researches administration, management, accounting, public administration, sociology and political science, the second researches computer science and engineering in general.

### REFERENCES USED IN THE BP ARTICLES

The references of the BP articles provide valuable data to better understand the relationship of the themes proposed in this study. The articles chosen in the BP generated a total of 524 references. By reading the titles of the articles, it was possible to verify that 7% addressed the two proposed themes, 33% addressed the topic of internationalization of higher education and 14% addressed the topic of measurement and evaluation of organizational performance, as illustrated in Graph 2.

Regarding the year of publication of the articles, Graph 3 shows the frequency of years of publication of the articles referenced by decade and segmented by theme. The first publications date back to the 1970s and grew timidly until the 1990s in all segments. After the 1990s, while the performance theme has a decline in its curve, the internationalization theme has a significant jump, pushing the line of themes together until the 2000s. After that, they all show a significant decline. It must be noted that the most recent article dates from 2014 and that, despite not having enough data from the 2010s, there is a trend of inversion of the line that represents the performance

theme and that is in decline with the line that represents the two themes and which is on the rise.

In the newspapers of the referenced articles, the newspaper: *Higher Education* presents the largest number of articles, followed by the newspaper: *Journal of Studies in International Education and Asia Pacific Education Review*. Compared to BP articles, journals *Higher Education e Journal of Studies in International Education* repeat in the first places.

Table 4 presents the top 5 journals most frequently along with their JCR index of *SCImago Journal Rank*. The newspaper: *Research Policy* is highlighted with an index of 206, followed by *Scientometrics* with 95. By classifying them into different Axes, as shown in Table 5, journals focused on education continue to be the main channel for propagating articles focused on the topics under study. However, other areas are beginning to explore the subject, such as the areas of social sciences, information, engineering and management.

After the bibliometric analysis of the 10 articles of the BP that present the theories of internationalization of higher education and systems of measurement and evaluation of organizational performance, we move on to the final considerations.

## FINAL CONSIDERATIONS

This article carried out a bibliographic analysis of articles that address the theories of performance measurement/evaluation systems and internationalization of higher education, in which 10 articles were identified.

The Applied Methodology proved to be useful to choose among several articles what was in the scope of the research. The bibliometric analysis carried out shows that, given the small number of articles found in the researched databases and the small percentage of articles from the references that address the

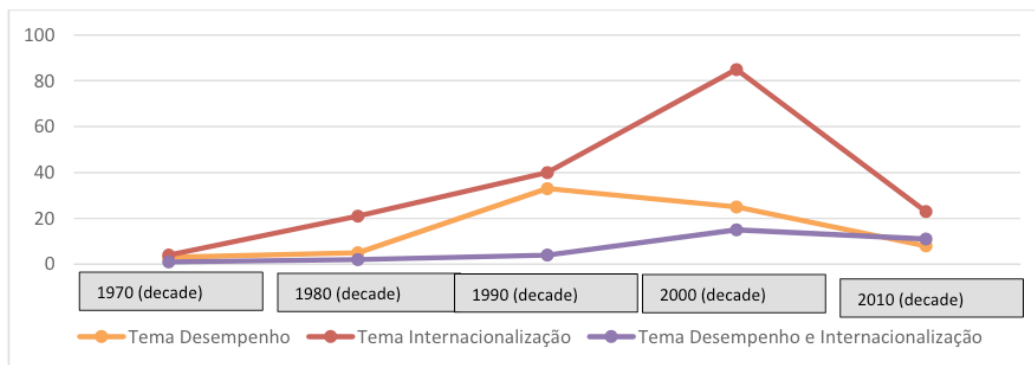
two theories, there is a gap for research to be developed on the theories under study.

It was also possible to verify that the articles are not limited to journals focused on the study area of education, as occurs with the theory of internationalization of higher education. As the theory of performance measurement and evaluation has its roots in areas focused on organizational management, the environment becomes fertile for exploring other areas of knowledge, such as those presented in Tables 3 and 5.

The titles of the articles in the bibliographic portfolio show that the performance measurement systems within the internationalization of higher education are focused on indicators and rankings, which is similar to the Organizational Performance Measurement System (SMDO) proposed by Sobreira Netto (2007).

By analyzing the referenced articles, it was possible to find more articles that address the theories of the study and it is suggested to use them in future research. From Graph 3, it was possible to identify that, despite the decline of research on theories in the 2010s, the environment is still conducive to new research on performance evaluation and internationalization of higher education.

It is recommended to expand the research databases and carry out a more in-depth study of the theories addressed in the articles on each topic, in order to list what theoretical foundations are currently being worked on.



Graphic 3 – Year of publication of references of BP articles

Source: Author data

Newspaper name	Frequency	JCR
Higher Education	20	80
Journal of Studies in International Education	11	49
Asia Pacific Education Review	4	23
Scientometrics	4	95
Research Policy	3	206

Table 4 –5 First Scientific Journals of the referenced articles

Source: Author data

Axle	Research area	Newspapers
Axle 1	• Education	<ul style="list-style-type: none"> <li>• Higher Education</li> <li>• Journal of Studies in International Education</li> <li>• Asia Pacific Education Review</li> </ul>
Axle 2	<ul style="list-style-type: none"> <li>• Education</li> <li>• Language and Linguistics;</li> <li>• Organizational Behavior, Human Resource Management</li> </ul>	<ul style="list-style-type: none"> <li>• No newspaper</li> </ul>
Axle 3	<ul style="list-style-type: none"> <li>• Applied Computer Science; Librarianship and Information Sciences; Social Sciences;</li> <li>• Engineering, Technology and Innovation Management, Management Science and Operations Research, Strategy and Management</li> </ul>	<ul style="list-style-type: none"> <li>• Scientometrics</li> <li>• Research Policy</li> </ul>

Table 5 – Axles of the Research Areas of the referenced articles

Source: Author data

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