

Evaluating the Influence of Management Practices on the Performance of Brazilian Federal Universities under the Moderating Effect of Organizational Resources

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Abstract

This research aims to evaluate the influence of management practices on the performance of Brazilian federal universities under the moderating effect of organizational resources. To do so, it was designed a conceptual model extracted from the theoretical background. The verification of the conceptual model is structured as it follows: 1 - Identification of variables - independent: management practices; dependent: performance of Brazilian federal university; moderating: organizational resources. After that, the independent variables were organized in groups (clusters) for better understanding. Then, it was realized the evaluation procedure of the influence of independent variables on the dependent ones conditioned to the moderating variable. The research was addressed to the Brazilian federal universities (107). The data were collected through a survey with specialists selected by technical and scientific criteria, considering their proximity to the object of investigation - therefore, the managers of the institutions. For collecting data it was used a questionnaire of scalar type (Likert). After this procedure, the data were analysed through the application of statistical methods with the support of the Software R and SPSS Statistics. This research comes from a gap on the state of art. It is on this spectrum that this study gains emphasis, subsidizing managers on their decision making processes. It is expected that the results may contribute on making public policies towards elevated education.

Keywords: Evaluation; Influence of management practices; Performance; federal universities in Brazil

1. Introduction

Many countries are more and more concerned about understanding and improving the relation among social and economic development triggered by the expansion of the access and quality of higher education (JACOB *et. al.*, 2016; MARGINSON, 2016; ROBERTS, 2016; XING; YANG; LI, 2017; ZILKHA, 2016).

Promoting the expansion of the access to quality higher education is as important as developing its improvement (AMORIM; TOMAÉL, 2011) to answer to the growing demand of the society for the disclosure of knowledge. In this context, higher education institutions (HEI)/Universities are

considered main elements on this mission (KAPETANIOU; LEE, 2016). Although there is a large literature about the critical factors of success and failure, more aligned to projects, not many studies include the perception of management practices involved on this factores, aligned to the public context of public universities (FISCHMAN; OTT, 2016; LLONCH; CASABLANCAS-SEGURA; ALARCÓN-DEL-AMO, 2016; NAIDU; DERANI, 2016; TONGSAMSI; TONGSAMSI, 2017).

Than, this article aims to evaluate the influence of management practices on the performance of Brazilian Federal Public Universities, considering the moderating effect of organizational resources.

2. Theoretical Background

A practice can be understood as the process an enterprise applies to improve the way it manages its businesses (HANSON; VOSS, 1995). The basic subsides of a practices are the routines that are frequently standardized as institutional rules and operation procedures (WELLSTEIN; KIESER, 2011). The Best Practices represent a “higher development within an activity, independent of the industry, leadership, management or operational approaches, or methods which lead to an exceptional development” (LEMA; PRICE, 1995 *apud* CASTRO; FRAZZON, 2017).

Organizational resources may be defined as organizational features, capacity and processes, business attributes, information and knowledge which favor the development of strategies for creation value (LARENTIS *et al.*, 2011).

The performance is related to achieving results. It expresses the idea of action towards objectives, subject to evaluation on terms of adjustment, efficiency and effectiveness; it refers to the results achieved in a certain period, which may be evaluated through indicators (SONNENTAG; FRESE, 2002; ABBAD, 1999; FERNANDES; FLEURY; MILLS, 2006 *apud* BRANDÃO; BORGES-ANDRADE; GUIMARÃES, 2012).

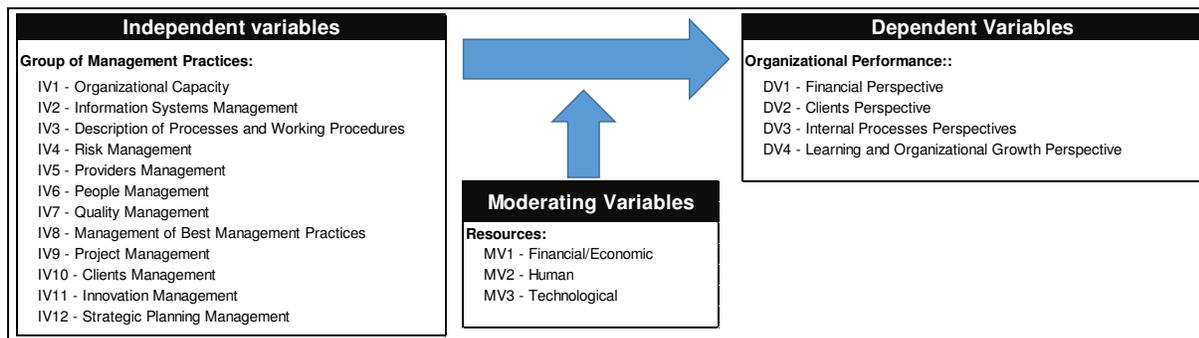
The Balanced Scorecard - BSC (Kaplan e Norton), understood as a tool which translates the missions and strategies of enterprises in a wide set of development measures was used as a performance parameter.

3. Methodology

3.1 Conceptual Model

This research starts from a conceptual model as shown in the figure

Figure 1: Conceptual Model of Research



- Independent Variables (IV): are management practices extracted from the literature. At the end, more than 2.800 management practices were cataloged and submitted to the clustering process to reduce this number without losing relevant information during the process.
- Dependent Variables (DV): was defined as being the performance of Brazilian HEI, measured through four (4) perspectives of the Balanced Scorecard (BSC): Financial, Clients, Internal Process and Organizational Learning.
- Moderating Variables (MV): are the organizational resources extracted from the literature: Financial/Economic, Human and Technological resources.
- Hypothesis: The management practices influence the performance of Brazilian HEI under the moderating effect of organizational resources in a greater or lesser extent.

3.2 Data Collection and Sample

The selection of specialists followed technical and scientific criteria, choosing the professionals with knowledge about the object and with direct relation to the management of higher education at the public sector in Brazil. We considered the managers who work directly with this area and especially the ones who have acted at the highest (or immediate lower) position of a federal HEI. The highest management position was considered the Rector and Vice-rector and the immediate lower position was the pro-rector, in a total of 912 participants on the research. Approximately 6% of this total answered to the full questionnaire. At the first part of the questionnaire we tried to qualify the specialist's profile and, at the second part, investigate the object proposed relative to the influence of management practices on the performance of HEI, under each perspective of the BSC, measured by the Likert scale from 1 to 5, where 1 represents a very low degree of influence and 5, a very high one. Pre-tests were realized to optimize the tool and avoid redundancies. The external validation was made by specialists, and the internal validation through the Cronbach's alpha. The specialists were identified through the transparency portal of the federal government and, based on the payroll of April 2018, all the occupants of the positions of rector, vice-rector and pro-rector of a Brazilian federal university were selected, and their emails were searched one by one on Google or similar tools, and also on the social network LinkedIn and the platform Lattes. The research occurred between the months of April to June 2018.

4. Verification of the Conceptual Model: Results and Underlying Analysis

The results and analysis of this study are structured according to the following phases:

First Phase: Identification, to the light of literature, of the Management practices applied at the HEI (Independent Variables), of the Organizational resources (Moderating Variables) and indicators to measure the performance of the HEI (Dependent Variables).

Second Phase: Identification and analysis of the impact of Management practices on the performance of Brazilian HEI under the moderating effect of organizational resources.

The first phase is related to the comprehension of the problem and deepening on the subject. It was divided into two stages, which are:

Stage 1 - Identification, to the light of literature, of independent, dependent and moderating variables. We conducted a bibliographic research aiming to understand the main concepts about management practices in HEI. During this stage, more than 230 articles were researched. They were taken from basis like ScienceDirect, IEEE, Emerald and Google. At this point, we selected articles that could contribute to the systematic review about the subject. Specific keywords like: "Higher Education", "Universities", "Management", "Practices" and "Performance" were combined to systematize the search. As a result we obtained a list with 2845 management practices, three types of resources to consider as moderating variables, as well as 4 perspectives of the Balanced scorecard as dependent variables.

Stage 2 - Grouping of Variables of the conceptual model. Before the great number of practices found and aiming to make the research feasible, the practices were grouped based on the similarity of

their radicals in a way to preserve the coherence amongst the terms. To calculate the similarity among the practices we used the Euclidean distance, a resource that is usually applied in situations like this study (HAIR et al., 2009). Along with the calculation of the distance and focused on the grouping of practices we conducted tests with some agglomerative methods. After a series of tests with the provided methods, we obtained - with the Ward method - the most consistent result of grouping. It happened by scripts on the software R. The results can be observed on the Word Clouds on Figure 2, which can be considered a simple resource but with great visual appeal (Heimerl et al.; 2014), once it offers a general view of a set of texts which more frequently present specific terms. The word cloud elaborated for this study is presented on Figure 2.

Figure 2: Word Clouds with the Most Evident Terms of the Clusters



Based on the description of the practices of each group and with the help of the word clouds, the grouping of practices could be characterized. We now present the groups and their respective names:

- *Group 1*– of the six hundred and forty-seven (647) practices grouped we identified the strongest terms by the words: product, practice, capacity. After contextualizing, this group was named as “Organizational Capacity”;
- *Group 2* – this is the biggest group with one thousand four hundred and one (1.401) associated practices. The most frequent terms were: system, work, report, information. We could observe that the practices related pointed to the use of information systems in different levels of the organization. Then, this group was named as “Information System Management”;

- *Group 3* – With ninety-two management practices associated, the word which highlights in this group is “Process”. By observing the associated practices, this group was named as “Description of Processes and Working Procedures”;
- *Group 4* – This group reunited eighty (90) practices. The most notable word was “Risks”. By observing the practices associated, we could verify that they referred to risk management. Then, this group was named as “Risk Management”;
- *Group 5* – With fifty (50) management practices, this group presented the word “provider” as the most important one. We could observe that the related practices pointed to management practices which, somehow, involved providers (adoption of criteria for selecting providers, feedback to providers). Thus, the group was named as “Providers Management”;
- *Group 6* – This group presented one hundred and seventeen (117) management practices, and the most important words were “employee” and “training”. By observing the associated practices, it was possible to realize many practices (periodical training, career management) which related to people management. Then, this group was named “People Management”;
- *Group 7* – With fifty-six (56) management practices, the word “quality” stands out. The practices of this group are related to the adoption of quality criteria, ways of measuring criteria, quality action plans, amongst others. The group was then named as “Quality Management”;
- *Group 8* – This group presented one hundred and sixty-eight (168) management practices associated. The most important term was “practice”. By observing the group it was possible to see practices which pointed to the search for management practices itself (use of benchmarking, adaptation of practices internally and externally realized). Then, the group received the name “Management of Best Management Practices”;
- *Group 9* – With sixty-three (63) management practices associated, the most frequent term was “project”. The practices in this group embody project management (grouping projects, redistribute teams in function of projects, amongst others). Then, the group was named as “Project Management”;
- *Group 10* – This group presented eighty-seven (87) management practices associated to it and had as its most frequent term the word “client”. It was possible to observe that the practices within this group were linked to the client, since the perception of its needs to the follow up of its demands. Then, the group was called “Clients Management”;
- *Group 11* – With forty-six (46) management practices associated, the second smallest group presented as most frequent terms the words: “new”, “product”, “development” and “process”. By observing this group it was possible to realize that the practices associated were related to the creative processes and even disruptive ones - in some measure - in the organization. Practices as involvement of providers and clients on the development of process and products in the organization could be noticed. Thus, the group was named “Innovation Management”;
- *Group 12* – This was the smallest group, with forty-four (44) management practices and the terms “plan” and “strategic” as the most important ones. The practices of this group were somehow related to strategic planning (realization of periodical strategic sectoral plans, elaboration of institutional development plans, amongst others). Thus, the group was named as “Strategic Planning Management”.

Second phase - Identification and analysis of the impact of management practices on the performance of Brazilian HEI, under the moderating effect of resources.

At this phase we tried to present and analyze the results obtained through the application of a survey which was answered by specialists. The research was organized in judgment matrix (Likert) with answers which varied from one (1) to five (5), being one (1) considered a very low degree of influence on the performance of HEI and five (5) considered a very high degree of influence of the

management practice on the different perspectives on the performance of the HEI. The internal consistency of the questionnaire was measured by the Cronbach’s alpha and presented satisfactory values to each practice in each perspective observed ($\alpha= 0,75$ with $p <0,05$), which characterizes the questionnaire as acceptable (TAVAKOL, DENNICK, 2011). At this phase, aiming to a better understanding of the problem and deepening on the subject, we shared the results into five stages, which are:

Stage 3: Direct Impact of management practices on the performance of HEI

Management practices		Impact of Management Practices:				
		Financial (DV1)	Clients (DV2)	Processes (DV3)	Learning (DV4)	Avarage
Strategic Planning Management	IV12	3.79	3.63	3.90	4.04	3.84
People Management	IV6	3.31	4.02	3.85	4.02	3.80
Information Systems Management	IV2	3.44	3.81	4.02	3.90	3.79
Project Management	IV9	3.65	3.40	3.83	3.77	3.66
Quality Management	IV7	3.40	3.69	3.75	3.69	3.63
Organizational Capacity	IV1	3.29	3.67	3.65	3.75	3.59
Innovation Management	IV11	3.58	3.42	3.54	3.73	3.57
Clients Management	IV10	3.19	3.75	3.52	3.52	3.49
Description of Processes and Working Procedures	IV3	3.23	3.23	3.71	3.71	3.47
Providers Management	IV5	3.77	3.38	3.48	3.23	3.46
Management of Best Management Practices	IV8	3.35	3.25	3.52	3.71	3.46
Risk Management	IV4	3.42	2.96	3.67	3.63	3.42

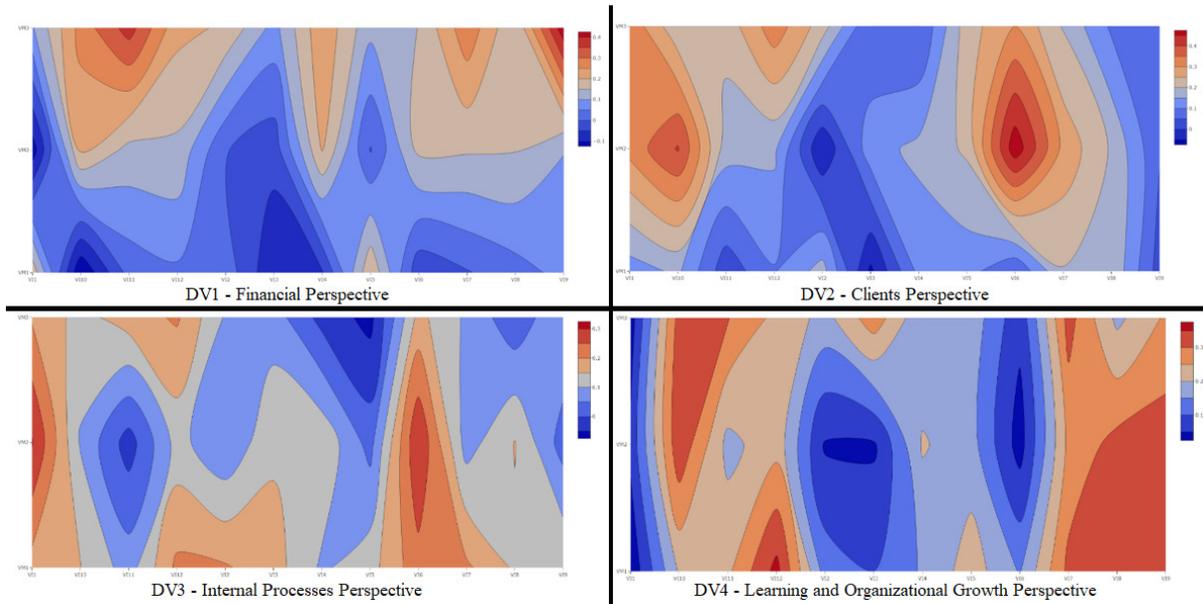
Strategic Planning Management (IV12) was considered by specialists the practice which most influences the global performance of HEI. Besides, it was considered the one which most influences the performance on the financial (DV1), learning and organizational growth (DV4) perspectives. The literature makes reference to the great importance of strategic planning in organizations (BASKIN; BASKIN, 2011), especially the public ones (GOMES; YASIN; LISBOA, 2008) and also on HEI in a general way (HARRIS, 2000; MARIA; FIBRIANI; SINATRA, 2012). According to the authors mentioned, Strategic Planning is determinant to the future of organizations as its able to provide the alignment among objectives and resources.

People Management (IV6), in global terms, was considered the second practice which most influences the performance of HEI. The biggest influence of this practice was on the performance of clients (DV2). Many studies detail the importance of people management in organizations (BRANNICK *et al.*, 2002; LOBANOVA; OZOLINA-OZOLA, 2014; LOO, 2002), specially in institutions related to the educational area (NICULESCU, 2006; SHIN, 2009). The effective application of some people management practices allows to increase the commitment of the university employees to their jobs, which also increases the performance of universities (Chen *et al.*, 2009; Shahzad *et al.*, 2008 *apud* AMIN *et al.*, 2014), besides being seen as a great ally on the promotion of the competitive capacity of the organization (VIVARES-VERGARA; SARACHE-CASTRO; NARANJO-VALENCIA, 2016).

Information Systems Management (IV12) occupied the third position in the ranking of global influence on the performance. Under the perspective of internal processes (DV3) it was considered the practice which most influences this performance. The results of this work converge to the studies of Boas and Santos (2014), when they make evident the impacts promoted by Information Systems Management in many areas of an organization, amongst them we can highlight the measurement of results and control of organization processes.

Stage 4–Impact of Management Practices on the performance of HEI under the moderating effects of resources

After verifying the direct influence, we must present the influence of practices (Independent Variables) on the Performance (Dependent Variables) considering the moderating effect of resources (Moderating Variables). Then, we realized a correlation test, through the statistical technique called Spearman's correlation (ρ). This choice is justified by the characteristics of the data, which are ordinal and non-parametric. Then, to each of the correlations established among the variables (independent, moderating and dependent) and their degrees of direct influence we made the calculation of the correlation coefficient (ρ). The results of the evaluation of the performance of HEI are represented according to the BSC perspectives.



The results illustrated above reinforce the characteristics of differentiation of the effects of management practices on the different perspectives of the BSC. On the financial performance (DV1), the practices are more dependent of technological resources (MV3) in comparison to the others. On this perspective, the practices of “Innovation Management” (IV11) and the “Project Management” (IV9) presented the biggest values, reinforcing the moderating effects of this resource on the perspective.

On the Clients Perspective (DV2), there is a greater intensity on People Management Practices (IV6), Clients Management (IV10) with the Human Resources (MV2). It means that, even though the other types of resources have their own relevance, the practices depend in a lesser extent on the financial and technological resources than they do in relation to human resources to be implemented and executed.

By observing the performance on the perspective of the internal processes (DV3), we realized a greater intensity of the practices “Organizational Capacity” (IV1) and “People Management” (IV6) to the human resources (MV2). It reinforces the specialists’ view about the degree of dependence of these practices in relation to this resource.

To the light of the Learning and Organizational Growth Perspective (DV4), the Quality Management Practices (IV7), Management of Best Management Practices (IV8), Project Management (IV9), Strategic Planning Management (IV12) presented a greater degree of intensity on their correlation to financial resources (MV1). We can also point out the high degree of intensity on the correlation among the technological resources and the practices of Quality Management (IV7), Clients Management (IV10) and Innovation Management (IV11). It implies that in this perspective there is a high dependence of the resources for obtaining the practices mentioned.

5. Implications to Management Practices on HEI

In a general way, the practices mentioned in this study present more dependency of the technological resources (MV3), followed by human resources (MV2) and financial (MV1). However, it is important to point out that all resources were relevant for the achievement of these practices. This can be better understood when we verify the World University Ranking. United States and United Kingdom concentrate nine out of the ten best universities in the world, maybe because of the levels of diversity and competitiveness they present (WAHEEDUZZAMAN, 2007), propelled by the promotion of organizational capacity (BOBE; KOBER, 2015; KAGAARI, 2011; KARUHANGA, 2015), contributing to the development and maintenance of the best students and professionals, aggregating value to the HEI by the increase of intellectual capital (HO; DEY; HIGSON, 2006; RAMÍREZ; LORDUY; ROJAS, 2007). This intellectual capital, when appropriately managed, prompts many areas of the organization, allowing HEI to “produce” quality results, ensuring high education (DATOR, 2005; PARHIZGAR, S. S.; PARHIZGAR, K. D., 2015; PARHIZGARI; GILBERT, 2004) and contributing to the economical enhancement as the enterprises can benefit of this product (KITSON, 2004), practicing what the theoretical background showed us. It is also right to state that management practices must always be analysed and decided always in a combined and integrate way, once the implementation of one may depend on other. This may optimize resources, making the practice feasible and plausible by the perspective of the resources. Finally, the dynamics in the environment of contemporary universities show these institutions are focused on the expectations and needs of the parties, especially the students, without forgetting the particularly important role of Information and Communication Technologies (ICTs). The emphasis is towards a competitive higher education, adjusting marketing needs and their applications.

Whatever the model of management practices - based or not on resources - from the theoretical background and results presented at this study we may state that high education is a result of investments on knowledge generation, with gains of competitive advantage. One of the many ways to achieve competitive advantages is to think about the cooperation university-industry (Balascoetal .; 2008: 1285), which represents a substantial performance on the increase of efficiency on higher education students. Besides training students and generate theoretical knowledge, the universities may be able to transfer this knowledge to the relevant economic sectors. This method may improve the efficiency on higher education training and on the use of knowledge by the industry.

The application of the data mining technique for analysing the clusters allowed us to interpret the results in a more consistent way. When comparing the specialists’ answers about the direct effect of management practices on the performance of HEI we verify that management practices (independent variables) influence in a moderate to elevate degree the different performances using the four perspectives of the Balanced Scorecard (BSC) (dependent variables). When considering the direct effects of the influence of resource moderation (moderating variables) on the same results, there is a high influence on the performance of Brazilian HEI. When considered the influence of management practices on the performance of HEI under the moderate effect of resources, it is possible to say that the correlations are mostly positive.

Based on the discussions presented on this chapter, we hope the methodological procedures and the results obtained may enable researchers to understand the complex relationship among the variables. Thus, with the results shown at the section 4.2 of this chapter, we achieved one of the specific objectives, which consists on “Evaluating, through a survey applied to specialists, the influence of the main management practices on the performance of Brazilian HEI, in particular federal ones, under the moderating effect of organizational resources”.

The theoretical background show that Brazilian HEI, especially the public ones, are highly dependent on public resources to support their organizational development (ENDERS, 2015; POWELL; REY, 2015; STRAUSSMAN, 2001). We must also highlight that higher education represents an investments on human resources and increases the knowledge required by the

organizations (Sharifi 2012 *apud* ŽIVKOVIĆ *et al.*, 2017), reflecting an important role for the contemporary mundialization, under the conditions of globalization and the fast technological changes which demand newsworthiness and people training. Therefore, this study brought more comprehension and provoked reflections about how Brazilian HEI can reach high educational performance, contributing to the country's economic and social development, particularly when it refers to decisions of which practice(s) is(are) more efficient from the perspective of resources.

6. Conclusions

This research aimed to “Evaluate the influence of management practices on the performance of Brazilian Federal Universities under the moderating effect of organizational resources”. The research showed there is a gap on literature about the object: the relation between “university management practices” x “performance (results) on HEI”. Thus, this investigation has many conclusions, as:

- The experience period of managers have a substantial effect on the evaluation of HEI performance under the moderating effect of resources.
- Management practices influence in a greater or lesser extent the performance of HEI (BSC perspective), under the moderating effect of organizational resources.
- When deciding to implement any practice, it is essential to consider that when practices are implemented combinally and integrately, the result can be more effective.
- It is plausible and feasible to recognize that in conditions of limited resources, the goals of high education can become vulnerable.
- There is no priority of resources for achieving the results / high educational performance, but a combination of resources which can improve these results, which means the resources must be addressed to those practices which can really contribute to this effect. Consequently, all specific objectives presented in this study could be achieved.
- No matter how, management practices oriented to strategic planning and combined to people management is the most appropriate combination for achieving more effective results.

Therefore, this study presents significant implications for educators and managers, because it can contribute on decision making processes linked to the implementation of new practices aiming to improve educational performance, as well as reference indicators of new practices which stand out in different perspectives.

For some authors it is also possible to say that the road to high educational performance of Brazilian federal public HEI seems to pass by the appropriate use of better and more effective management practices, promoting integration of academic and practical knowledge, aligning organizational objectives, structures and processes (AREND, 2004; PUGAS; CALEGARIO; ANTONIALLI, 2013; STRAUSSMAN, 2001).

Some recommendations for future works are:

- Replicate the research, enlarging the sample and including specialists of other public and private scopes, and from other countries;
- Adopting new metrics for measuring performance of HEI;
- Using new statistical methodology for treating data and confirming results.
- Permanently and repeatedly reproduce and replicate this research aiming to follow up and increase management practices, as well as resources, establishing priorities according to the demands presented.

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