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Evaluation of the impact of universities on their communities

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Abstract

This article investigates the impact of universities on the communities in which they are located. Based on bibliographical research, three types of impacts were identified and systematized: socioeconomic, scientific and technological, and on the culture and image of the region. These three types of impact have been integrated into a conceptual model that can be used as a basis for a practical model to be employed to assess the impact of a university on the region in which it is located. In addition to the three types of impact, the article also suggests steps for implementing the impact assessment model. This research contributes to the advancement of studies on the universities' role and can help university managers evaluate its impact on the community.

Keywords: University's impact on the community. Socioeconomic impact. Scientific and technological impact. Culture and image of the region.

Avaliação do impacto das universidades em suas comunidades

Resumo

Este artigo explora a questão do impacto das universidades sobre as comunidades nas quais estão instaladas. A partir de uma pesquisa bibliográfica, foram identificados e sistematizados três tipos de impacto: socioeconômico; científico-tecnológico e na cultura e imagem da região. Esses três tipos de impacto foram integrados em um modelo conceitual que poderá ser utilizado como base para um modelo prático voltado para avaliar o impacto de uma universidade sobre a região na qual se encontra. Além deles, o artigo também sugere passos para a implantação do modelo de avaliação de impacto. O texto contribui para o avanço dos estudos sobre o papel das universidades e pode ser útil para os gestores universitários na organização de projetos de avaliação de impacto.

Palavras-chave: Impacto de uma universidade na comunidade. Impacto socioeconômico. Impacto científico-tecnológico. Impacto na cultura e imagem da região.

Evaluación del impacto de las universidades en sus comunidades

Resumen

Este artículo explora el tema del impacto de las universidades en las comunidades en las que se encuentran. A partir de una investigación bibliográfica, se identificaron y sistematizaron tres tipos de impacto: socioeconómico; científico-tecnológico y en la cultura y la imagen de la región. Estos tres tipos de impacto se han integrado en un modelo conceptual que se puede utilizar como base para un modelo práctico que se empleará para evaluar el impacto de una universidad en la región en la que se encuentra. Además de los tres tipos de impacto, el artículo también sugiere pasos para la implementación del modelo de evaluación de impacto. El texto contribuye al avance de los estudios sobre el papel de las universidades y puede ser útil para los administradores universitarios en la organización de proyectos prácticos de evaluación de impacto.

Palabras clave: Impacto de una universidad en la comunidad. Impacto socioeconómico. Impacto científico-tecnológico. Impacto en la cultura e imagen de la región.

Article submitted on April 22, 2020 and accepted for publication on October 20, 2020.
[Translated version] Note: All quotes in English translated by this article's translator.
DOI: http://dx.doi.org/10.1590/1679-395120200089

INTRODUCTION

Friedrich von Humboldt (1767-1835) believed that the basis and purpose of any educational system was the development of a country's citizens, and he argued that only autonomy would allow universities to achieve their principal objectives (Rohe, 2017). In his seminal text "Science, The Endless Frontier" (Bush, 1945), Vannevar Bush (1890-1974) argued that scientific progress results from the free play of free intellects: scientists working on subjects of their own choice, in the manner dictated by their own curiosity for exploring the unknown and for advancing the frontiers of science.

These two principles – university autonomy and creative freedom – were the foundation for the institutionalization of higher education systems in many countries and were validated by the substantial scientific progress made during the 20th century. At the end of the 20th century, science was an institutionalized, globalized, and superspecialized field, and its evolution continued (and still continues) in new areas of knowledge and transdisciplinary domains. As science developed, demands for investments and research budgets also grew.

However, expansion began to encounter budgetary limitations. Freedom to create started conflicting with social and economic needs, imperatives that Bush had already anticipated (1945). New state policies began to favor a strategic view of science to boost competitiveness (Gibbons, Limoges & Scott, 2011). As a result, the pendulum between the defense of academic autonomy and the imperative to serve society has been moving to a second basis (Rohe, 2017). This article focuses on the impact universities have on the communities in which they are located, a relevant aspect of this movement.

Universities do indeed contribute to the communities where they are based (Silva, 2006). They create jobs for professionals in the region and provide study opportunities for local young people (for example, Drucker & Goldstein, 2007; Johansen & Arano, 2016). University research projects can promote local development, and they can also foster culture and promote the image of the region where they are located (Arbo & Benneworth, 2007; Leten, Landoni & Looy, 2014).

Questions about the role of universities in society, however, have been growing (Leten, Landoni & Looy, 2014; Musselin, 2013; Vieira, Bellen & Fialho, 2006; Weber, 2010), leading some of them to seek to better communicate the benefits they generate for their communities and for society in general (Lendel, 2015; Marcovitch, 2019; Martin, 2012; May & Perry, 2006).

In Brazil, this phenomenon is becoming especially interesting in the area of public higher education institutions. These institutions have undergone a notable expansion in recent decades; however, they are coming under pressure to increase and improve the services they provide in teaching, research, and extension courses while simultaneously suffering from budgetary pressures (Alves et al., 2015; Audy, 2017; Tarocco, Sesso, Esteves & Kureski, 2014; Wanzinack & Signorelli, 2014).

The role of university rankings in influencing institutions' behavior is worthy of special attention because they are used as instruments for analyzing the various possibilities a university has in terms of community impacts (Marcovitch, 2019).

This context led to the emergence of models for assessing the impact that teaching and research institutions have on their communities (European Foundation for Management Development [EFMD], 2015). However, most of these models seem to focus only on two aspects: economic impact and the ability to contribute to technological development (Kantor & Whalley, 2014; Scandura, 2016; Sen, 2011).

Given this and the probable nonexistence of integrated models for assessing the impact of universities, this article aims to contribute to developing a broad conceptual model, which can be used as the basis for building a practical model for assessing the impact a university has on its community. A bibliographic review was accordingly carried out that identified three types of impact: socioeconomic, scientific and technological, and cultural and attractiveness of the region. The means used for each type of impact were defined, and indicators were suggested.

This article contributes to both science and practice. It contributes to studies on the new role of universities (Huggins, Johnston & Steffenson, 2008; Mccowan, 2016; Sleutjes, 1999) and adds to the modeling employed in studying the social impact of universities. It does so by integrating the three dimensions found in the literature that have been individually explored in previous works (Guerrero, Cunningham & Urbano, 2015; Kantor & Whalley, 2014; Popescu & Corbos, 2012). University managers can use any models developed from those proposed here to assess their institutions' impact on the communities in which they are located by following adaptations to suit each university's and region's characteristics. It is important to stress that this work suggests a preliminary model that must be improved upon and tested before it is used to support the construction of a practical model for assessing a university's impact on its community.

In addition to this introduction, this work has four more sections. The second section presents the bibliographic research that was undertaken to support the development of the model. The third section systematized the three types of impacts identified in the literature and integrated them into the impact assessment model. The fourth section proposes a process for operationalizing the impact assessment model. The fifth section presents comments and indicates the direction of future developments of the model and further research.

METHODS

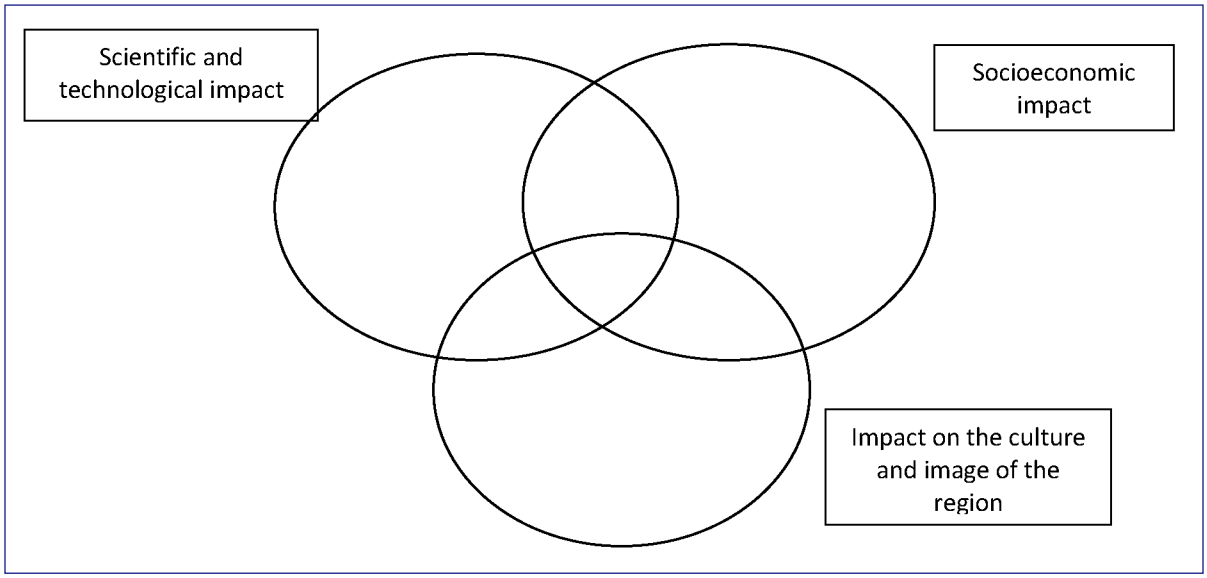
Given the objective of developing a conceptual model (Crossan, Lane & White, 1999) to assess a university's impact on the community, a bibliographic review was carried out (Mayring, 2004). An answer to the question of who the stakeholders of a university might be was initially sought in the work of Mainardes, Alves and Raposo (2010). The authors suggest a list of 21 different types of stakeholders, some specific, such as students and teachers, and others more generic, such as the university's region and community. Since universities can impact such a diversity of stakeholders, articles were sought about the impact that a university can generate in the local community.

Data were collected from databases, such as EBSCO, Scielo, and Google Scholar, using the following keywords (in Portuguese and English): *universidade*, *impacto*, and *ambiente,* and university, impact, and environment. This resulted in 676 articles being located that were published between 1998 and 2018.

A filter was then applied to these data to select those texts that dealt with more general impacts, such as the impact on industries, the economy, or the region's sustainability. The selection was made following a reading of the abstracts, and when this proved insufficient, the full articles were read, resulting in 66 articles being chosen.

These articles were then thoroughly analyzed. In assessing these articles' objectives, three types of impacts emerged, on the basis of which the texts were then organized. Figure 1 shows the types of impact found. In addition to the objectives, the variables used for measuring the university's impact were identified for each article that had been thoroughly analyzed. When preparing the proposed model structure, the variables identified in the articles were considered to develop a fully integrative model.

Figure 1
Types of impact



Source: Elaborated by the authors.

The first group of articles analyzed comprises 26 texts that deal with the socioeconomic impacts, whether as the result of university demands (inputs) or the effects of the university's presence (outputs). The second group comprises 29 articles detailing the scientific and technological impacts, with texts that deal with: the relationship between university, company, and government; the development of marketable technologies; and studies that address the role of universities in promoting new business. The third group comprises 11 texts dealing with the impact on the region's culture and image. The works in this group discuss the university's relationship with the cultural aspects of the place or analyze how it helps shape the region's image.

The three types of impact that were identified contain aspects that overlap. For example, some research projects may have scientific and technological impacts, socioeconomic impacts, and, additionally, impact the region's image. Therefore, some of the indicators can be analyzed as either part of one type of impact or another. However, to facilitate identification and analysis, those indicators that result in more than one type of impact were included in the conceptual model only regarding the type of impact considered to be its primary impact.

The bibliographic review also made it possible to identify the respective means for each type of impact; in other words, the different channels or ways the university generates that particular type of impact.

DEVELOPMENT OF THE CONCEPTUAL MODEL

Socioeconomic impact

Analysis of the theoretical framework relating to socioeconomic impact revealed two subgroups of articles. The first subgroup focuses on a university's outputs (Cox & Taylor, 2006; Goldstein & Drucker, 2006; Kureski & Rolim, 2009; Lendel, 2015; Steinaker, 2005), which include job creation, financial expenditure, and extension course projects, among other activities.

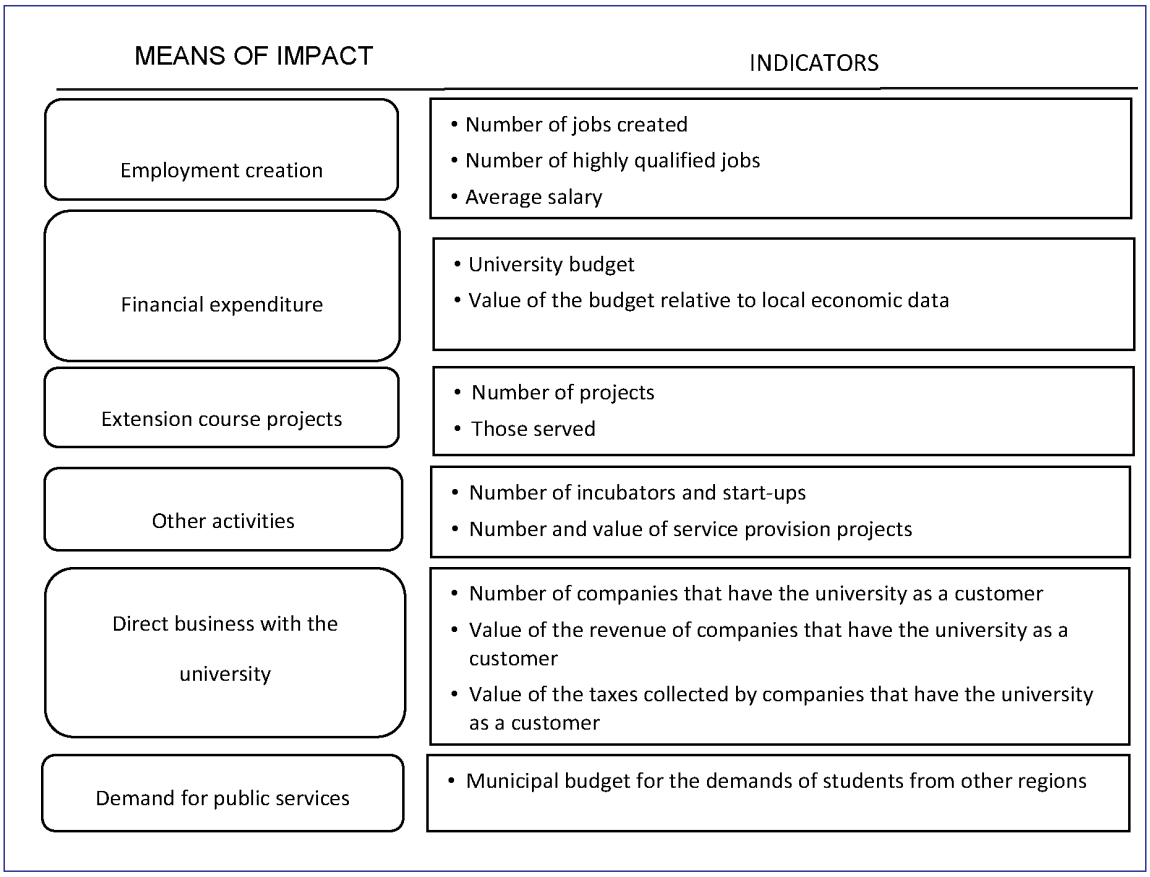
Various articles were found in this subgroup that use the input-output methodology to compare the university's proportional expenditure in relation to the economy of the region studied (Pastor, Pérez & Guevara, 2012; Tarocco et al., 2014). The aim is to identify the interdependencies between different economic sectors (Miller & Blair, 2009). Some universities, such as the University of Vancouver (Roslyn, 2013), the University of Athens (Payne, 2016), and the University of the Pacific (Pogue, 2010), have used this methodology to assess their respective impacts.

The second group of articles focuses on university inputs (Cox & Taylor, 2006; Kureski & Rolim, 2009; Lendel, 2015), which include direct business with a university, demands for public services, and demands arising from public policies (Verger, Curran & Parcerisa, 2015).

The institutional context must be taken into consideration when assessing the socioeconomic impact of a university, since a university's capacity for influence depends on the characteristics of the region in which it is located (Huggins & Johnston, 2009; Lazzeroni & Piccaluga, 2015; Martin, 1998; Pastor et al., 2012). For example, the socioeconomic impact of those universities located in large urban centers may be diluted, while that of universities located in small cities may be locally significant.

Figure 2 systematizes the possible means of the socioeconomic impact of a university and any respective indicators. Each institution interested in assessing its impact can place greater or lesser emphasis on each means of impact, depending on the assessment's desired outcome.

Figure 2
The socioeconomic impact of a university



Source: Elaborated by the authors.

Scientific and technological impact

Analysis of the theoretical framework relating to the scientific and technological impact revealed a theoretical body of work that deals with relations between universities and industry. This theoretical body of work can be classified into three subgroups. The first subgroup contains works that focus on the relationship between university, company, and government (called the triple helix). The authors of these works argue that the impact of the university is based on promoting innovation through the integrated actions of these three agents (Doin & Rosa, 2019; Etzkowitz & Leydesdorff, 2000; Gomes & Pereira, 2015; Ipiranga, Freitas & Paiva, 2010; Johnson, 2008; Leydesdorff & Meyer, 2003; Sutz, 2000).

The second subgroup contains works that defend a research agenda aimed at developing marketable technologies. It focuses on the direct relationship between universities and industry (Bramwell & Wolfe, 2008; Curi, Daraio & Llerena, 2012; Fernandes et al., 2010; Fisher, Atkinson-Grosjean & House, 2001; Scandura, 2016) and indicates areas of cooperation for making the relationship between universities and industry more effective (Anderson, Daim & Lavoie, 2007; Barnes & Erkut, 2002).

The third subgroup contains works that deal with the role of universities in promoting innovation and developing new businesses. These works focus on the ability of universities to foster innovation in their regions (Cowan & Zinovyeva, 2013) and to engage academics in developing new ventures (Muscio, Quaglione & Ramaciotti, 2016; Rasmussen & Borch, 2010). Some authors focus specifically on the contributions that universities make toward forming clusters (Gerolamo et al., 2008; May & Perry, 2006).

Figure 3 systematizes the possible means of impact of a university for the scientific and technological impact dimension, with regard to the respective indicators. As in the previous case, each institution can place a greater or lesser emphasis on each means of impact, depending on the assessment's desired outcome.

Figure 3
The scientific and technological impact of a university

MEANS OF IMPACT	INDICATORS
Intellectual capital	• Number of interns and graduates • Number of service provision projects • Number of extension course projects aimed at production organizations • Number of research projects aimed at production organizations • Clusters under the influence of the university
Public policies	• Participation of the university in public and social bodies that help prepare public policies
Research projects	• Number of research projects for meeting local demands • Research products (number of patents or number of publications)
Demand for public policies	• Number of local production organizations that undertake projects with the university
Projects with local companies	• Number of laws and public policies that encourage research projects for the community

Source: Elaborated by the authors.

Impact on the region's culture and image

Analysis of the theoretical framework concerning the impact on the region's culture and image revealed a theoretical body of work that can be classified into two subgroups. The first subgroup of articles addresses the university's impact on the arts and its participation in local cultural events. These works analyze the possibility of arranging artistic and cultural events for promoting economic development (Guetzkow, 2002; Wyk, Saayman & Rossouw, 2013). For example, from an individual point of view, an artistic event can generate jobs and encourage self-knowledge (Guetzkow, 2002), and from a community's point of view, it can help the economy and contribute to the community's image. Popescu and Corbos (2012) present an analysis of how communities can be structured on the basis of the artistic and cultural events that are supported by universities.

The second subgroup of articles is characterized by the debate about the role of universities in promoting cultural policies and manifestations. Arbo and Benneworth (2007) comment on the integrating role these institutions can have concerning local policies. Alshuwaikhat and Abubakar (2008), Hubbard (2008), Jain and Pant (2010), and Salmeron (2001) also highlight the influence that a university can have on certain cultural and image characteristics of a community.

Concerning the impact that a university can have on culture and image, Figure 4 systematizes the possible means employed and the respective indicators. As in the previous cases, each institution may place more or less emphasis on each means of impact, depending on the assessment's desired outcome.

Figure 4
Impact of a university on the culture and image of a region

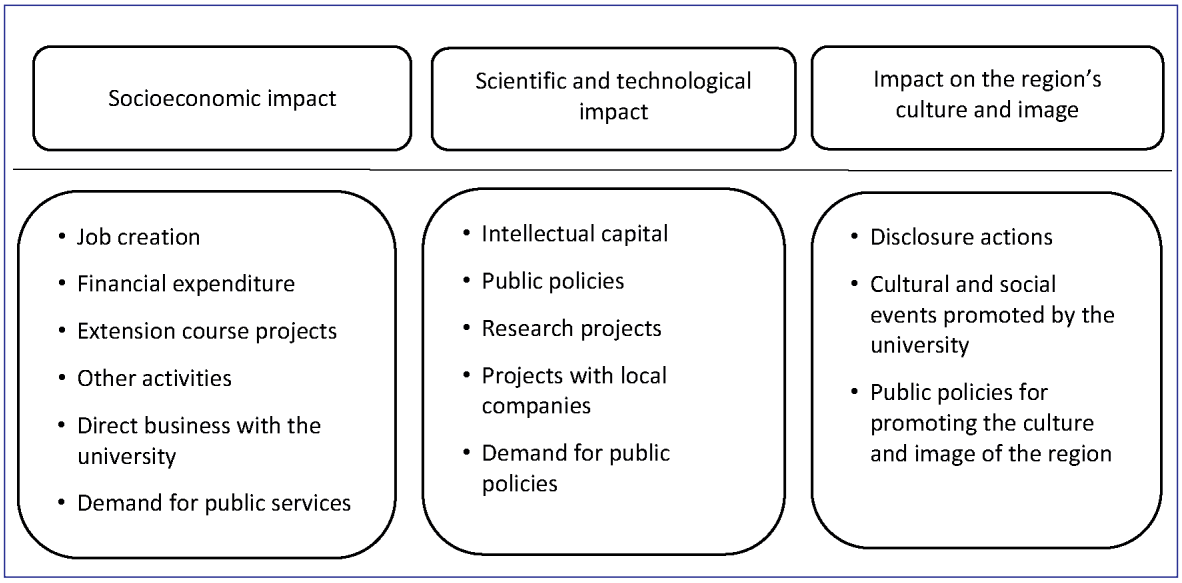
MEANS OF IMPACT	INDICATORS
Disclosure actions	• Number of audio tags, images, and texts generated by the university that mention the region • Number of audio tags, images, and texts about the university that mention the region
Cultural and social events promoted by the university	• Number of cultural and social events • Number of local participants at cultural and social events • Number of participants from outside at cultural and social events
Public policies for promoting the culture and image of the region	• Participation of the university in improving public policies aimed at the region's culture and image • Number of university projects that involve public sectors and the preparation of public policies

Source: Elaborated by the authors.

Integrated conceptual model for assessing impact

Integration of the three previous models results in the university's conceptual model for assessing its impact on the region where it is located. Figure 5 shows this model. The model must be seen as a general matrix, which can be used to develop a model for practical application and adapted to fit the peculiarities of each university and community. The indicators used in each case can also be adapted accordingly.

Figure 5
Conceptual model for assessing impact: impact types and means



Source: Elaborated by the authors.

Brazil's contributions to the debate

It is appropriate to highlight some of Brazil's contributions to the topic of universities' impact on their communities. The social impact of universities in Brazil can be related to discussions about 1) academic performance indicators, 2) evaluation systems, and 3) university rankings. More broadly speaking, it can also be related to reflections on university autonomy and the relationship between university and society. Without intending to summarize the rich debate on these issues in Brazil's context, some of the authors and works that are more directly related to this study are highlighted below.

A first issue, which characterizes Brazilian reflections and is directly related to this article, is that of outputs, in other words, the effects the university has on the community. Identifying outputs can be found in works that focus on the debate about the indicators used in preparing university rankings and those whose target is evaluating postgraduate programs. For example, Marcovitch and Axel-Berg (2019) observe the need to use quantitative and qualitative indicators and warn that institutions should be concerned with the possible misuse of indicators when "*creating policies, evaluations, and rankings, and taking decisions about promoting and hiring teachers*" (Marcovitch & Axel-Berg, 2019, p. 128).

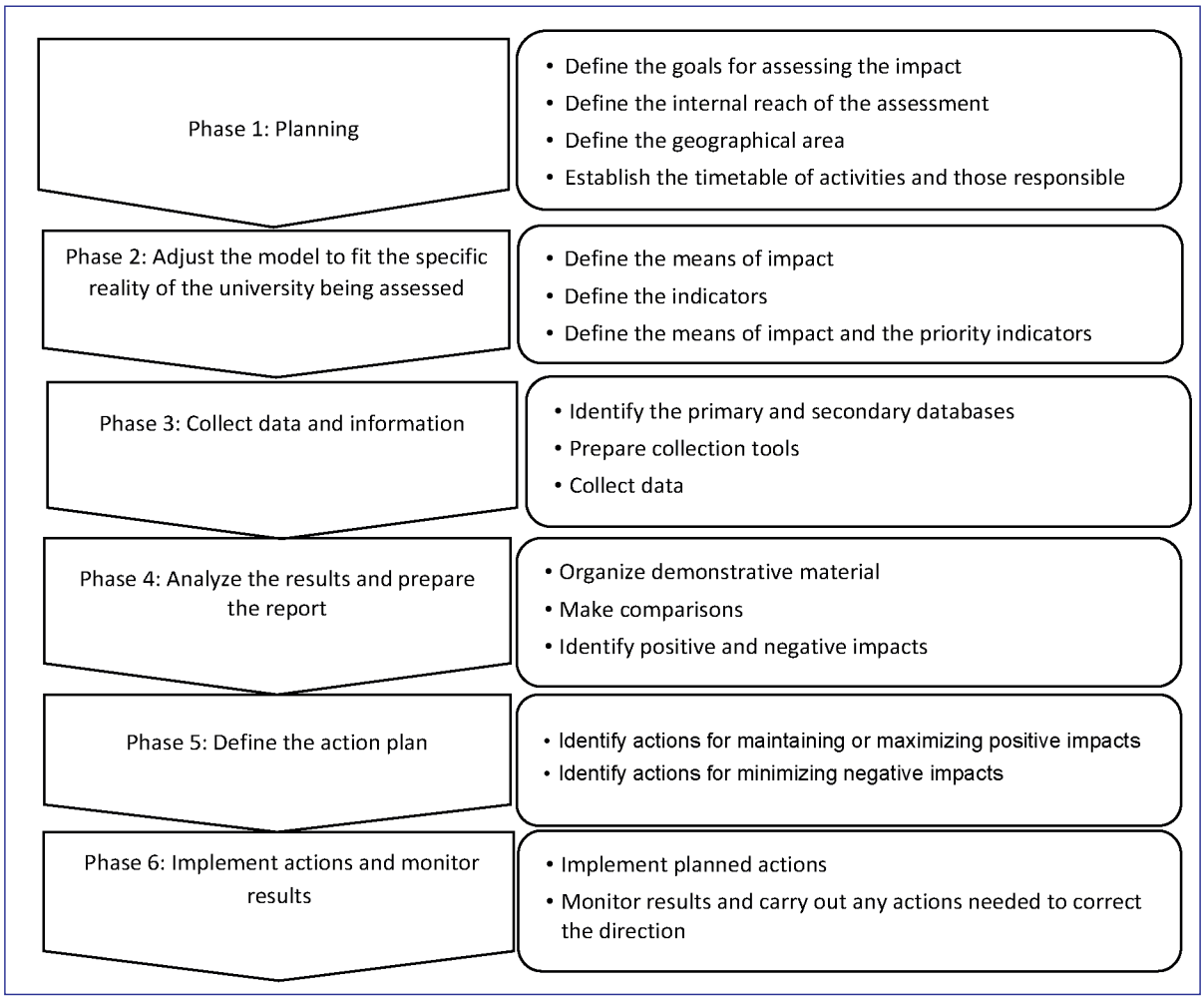
Ranieri (2019) specifically indicates the subjects that should be considered when looking for the outputs of a university: research and academic production; the social impact of academic production; the impact of extension activities; and the professional impact of graduates. Planeta et al. (2019) similarly indicated the following dimensions for measuring social impact: economic/financial; socio-educational; innovation and entrepreneurship; intellectual, cultural, and well-being; and reputation. In fact, the model these authors propose is close to that proposed in this study. The trend toward valuing social impact can also be found by observing the evolution of Brazil's Coordinating Office for Training Personnel with Higher Education (*CAPES*) system (Barata, 2019; Gheno et al., 2019; Ministério da Educação, 2018).

Finally, it is worth highlighting the debate about transforming the concept of university autonomy found in Muzy and Drugowich (2018) and Balbachevsky and Kohtamäki (2019). Despite an increase in external controls, universities have the autonomy to make decisions about many aspects of academic life. What is produced at the university, however, must respond to social demands. Therefore, external and internal assessment mechanisms must be mutually coherent. Universities must use external and internal mechanisms as management tools to expand their positive impact on the community.

PROCESS FOR MAKING IMPACT ASSESSMENT OPERATIONAL

In addition to the impact assessment model, a process is also suggested for making impact assessment operational. The process's objective is to facilitate implementation to maximize positive impacts and minimize any negative impacts of the university in its local community. This model should be implemented in six phases, as shown in Figure 6.

Figure 6
Operationalization model for impact assessment: phases and main actions



Source: Elaborated by the authors.

The first phase is mainly aimed at defining the objectives and scope of the project. The objectives can vary significantly depending on the context and the university. For example, the main objective of a traditional and already established institution may be to increase its cultural impact on the community, thus strengthening the region's image. Additionally, a young institution that is expanding may define its target as increasing its scientific and technological impact, thereby contributing to consolidating the nascent industrial park in the region. A third institution, facing funding difficulties, may focus on demonstrating its impact vis-à-vis its stakeholders in all dimensions to improve relationships and facilitate obtaining resources for research and other activities.

The first phase is also intended to define the assessment's internal scope, which may be restricted to a single unit (for example, a faculty), a group of faculties, or the entire university.

Finally, the first phase is to define the area that will be the object of the assessment. Some institutions may restrict their focus to the city where they are located, while others may expand their focus to include groups of cities, a state, or an entire region.

The second phase is intended for constructing the model according to the definitions of the first phase. It is recommended that the model be built "from top to bottom," that is: first, the types of impact to be assessed must be defined (either socioeconomic, scientific and technological, or both); and second, whether they relate to the culture and image of the region. The means of impact must then be defined, eventually eliminating some of those listed in Figure 5 and possibly adding others. Finally, the indicators for the chosen means of impact should be reviewed, eliminating some of those listed in Figures 2, 3, and 4, while others may be added. It is also recommended that the means of impact and the priority indicators should be chosen at this stage, which are those considered to be most directly aligned with the assessment's objectives.

The third phase is technical and operational. It is intended to define how data will be collected, a process that could combine primary and secondary data collection, and how it is carried out. It should be noted that part of the data and information to be collected may be easily accessible and found in existing documents. At the same time, a specific effort may be required to obtain other parts. It can also be assumed that both quantitative data and qualitative information will be collected.

The fourth phase comprises the compilation and analysis of the data and information obtained in the previous phase. In addition to preparing tables that demonstrate the impacts, this is the stage at which the results should be compared (for example, with external references, between units, with previous results, or a combination of these). The positive and negative impacts of the university on the local community must also be identified.

The fifth phase builds on the previous phase. Actions should be identified for conserving and, ideally, maximizing positive impacts and minimizing (and ideally suppressing) negative impacts.

The sixth phase is the implementation of the actions defined in the fifth phase. In addition to their execution, the results must be continuously monitored to ensure they align with the plan, with corrective actions being carried out when necessary.

CONCLUSION

This article presented a conceptual model for assessing the impact of a university on its local community. This model was based on existing literature, which indicated three types of impacts. These are socioeconomic impacts, scientific and technological impacts, and impacts on the region's culture and image. In addition to the impact assessment model, this work presented a second model for making the impact assessment model operational.

Considering the Brazilian context, the article draws attention to dimensions found in the scientific literature but are not considered in national assessment systems. These systems favor three dimensions of university activities (teaching, research, and extension courses) (Weber, 2010; Pinto, Mello & Melo, 2016). Local systems use extensive lists of criteria and parameters for evaluating institutions and programs. They differ from the system discussed herein in at least two aspects. The first is their purpose. Brazilian systems are intended to guarantee and boost the quality of the country's institutions and its teaching and research programs, while the aim of the system proposed in this article is to evaluate and boost the positive impact of institutions in their respective communities or regions. The second aspect is how these systems are applied. Local systems employ unique standards for evaluating institutions with different characteristics. In contrast, although it can use common dimensions and criteria, the proposed system presupposes an application customized to fit each specific context. Thus, the impact assessment model presented here can be seen as a complement to existing systems, not a substitute for them.

Finally, it should be noted that this work is an initial effort, the product of which can be further enriched. The proposed conceptual model is not a ready-to-use system. It must be empirically validated to be used as an administrative tool by the managers of teaching and research institutions. Future developments should also focus on making the assessment operational, which poses complex methodological challenges.

Regarding future research, a first possibility would be to carry out case studies, applying the model to different universities to critically assess its potential and improve upon it. A second possibility would be to carry out comparative case studies between different units or different universities to assess how different contexts can be dealt with. A third possibility would be to carry out longitudinal studies, observing how a university, or a unit within a university, evolves.

AKNOWLEDGMENTS

This article originated from Wagner Curi's dissertation. The author thanks CAPES for supporting his doctorate (Dinter). The authors thank the anonymous referees for their useful suggestions.

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