FORUM

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SOCIAL IMPACT AND MISSION OF BRAZILIAN PUBLIC UNIVERSITIES: IS THERE ALIGNMENT?

Impacto social e missão das universidades públicas brasileiras: Há convergência?

Impacto social y misión de las universidades públicas brasileñas ¿Hay convergencia?

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ABSTRACT

In addition to their traditional teaching and research roles, universities have expanded their activities, taking on a third mission, in order to boost the social and economic development of the region they operate in. This study examines the alignment between the institutional mechanisms that enable third mission activities in Brazilian public universities and the dimensions of social impact proposed in the literature. As for its methods, a rapid systematic review of the literature, content analysis of public universities' mission statements, and a survey on the existence of Technological Innovation Centers (NIT) were carried out. The literature review indicates that the concepts of third mission and triple helix reflect a worldwide trend of redirectioning universities' mission, widening the possibilities of social impact. The mission statements of Brazilian public universities still do not fully incorporate third mission activities. However, there is evidence of their commitment to sustainable development and technological innovation, a fact that points to an adaptation by universities to contemporary demands to strengthen their social impact.

Key words: University impact, third mission, triple helix, technology transfer, engagement.

RESUMO

Além dos papéis tradicionais de ensino e pesquisa, as universidades ampliaram as suas atividades, assumindo uma terceira missão, a fim de impulsionar o desenvolvimento social e econômico da região em que estão inseridas. Esta pesquisa tem como objetivo verificar a convergência entre os mecanismos institucionais que viabilizam atividades da terceira missão nas universidades públicas brasileiras e as dimensões de impacto social propostas na literatura. Quanto ao método, foi realizada uma revisão sistemática rápida da literatura, análise de conteúdo das declarações de missões das universidades públicas e levantamento sobre a existência de Núcleos de Inovação Tecnológica (NIT). A revisão de literatura sinaliza que os conceitos de terceira missão e hélice tripla refletem uma tendência mundial de redirecionamento da missão da universidade, o que amplia as possibilidades de impacto social. As declarações de missão das universidades públicas brasileiras ainda não incorporam plenamente as atividades da terceira missão. No entanto, há evidências do compromisso com desenvolvimento sustentável e inovação tecnológica, fato que aponta para uma adaptação das universidades às demandas contemporâneas para fortalecer seu impacto social.

Palavras-chave: *impacto da universidade, terceira missão, hélice tripla, transferência de tecnologia, engajamento.*

RESUMEN

Además de las funciones tradicionales de docencia e investigación, las universidades han ampliado sus actividades, asumiendo una tercera misión, la de impulsar el desarrollo social y económico de la región en la que se ubican. Esta investigación tiene como objetivo verificar la convergencia entre los mecanismos institucionales que posibilitan las actividades de tercera misión en las universidades públicas brasileñas y las dimensiones de impacto social propuestas en la literatura. En cuanto al método, se realizó una revisión sistemática rápida de la literatura, análisis de contenido de las declaraciones de misión de las universidades públicas y un relevamiento de la existencia de centros de innovación tecnológica (NIT). La revisión de la literatura indica que los conceptos de tercera misión y triple hélice reflejan una tendencia global de redireccionar la misión de la universidad, ampliando las posibilidades de impacto social. Las declaraciones de misión de las universidades públicas brasileñas aún no incorporan plenamente las actividades de la tercera misión. Sin embargo, hay evidencia de compromiso con el desarrollo sostenible y la innovación tecnológica, hecho que apunta a que las universidades se adaptan a las demandas contemporáneas para fortalecer su impacto social.

Palabras clave: *impacto universitario, tercera misión, triple hélice, transferencia de tecnología, compromiso.*

INTRODUCTON

By integrating with its community, the university plays a key role in improving and raising the local standard of living (Curi & Wood, 2021; Etzkowitz & Zhou, 2017). The evolution and modernization of civil society, driven by technological advancement, increases the pressure for universities to have an impact that contributes to socioeconomic development (Amry et al., 2021), serving as a catalyst for this progress.

Combined with the traditional teaching and research roles, there is a growing interest in analyzing how universities can maximize their social impact (Sanchez-Barrioluengo & Benneworth, 2019). In this context, academia is entrusted with a third mission (Bortagaray, 2009; Compagnucci & Spigarelli, 2020), which goes beyond teaching and research, since it encompasses the application of the knowledge it generates to the direct benefit of society, establishing a link between academic efforts and emerging social and technological needs.

The university that embraces the third mission, invents and transfers intellectual property, takes on its role in the triple helix model by responding to the demands from innovation systems, and thus contributes to regional development, becoming known as "entrepreneurial university" (Etzkowitz et al., 2000). The third mission emerges as the university aggregates innovation and performance for economic and social development, which naturally leads to the concept of entrepreneurial university (Audy, 2023).

The concept of third mission manifests itself in different ways around the world, as it reflects the social, economic, and cultural reality of each country. In Europe, the third mission of universities focuses on collaboration between universities and companies to promote technology transfer and innovation (Secondo et al., 2017).

In Latin America and Brazil, the third mission emphasizes university outreach, the activity that seeks a transformative interaction between the university and society, and which is related to cultural diffusion and social services (Forproex, 2012; Secondo et al., 2017; Dassoler et al., 2023), being the mission that complements teaching and research.

Previous research shows that the dimensions of the results of activities carried out at the university, i.e., its social impact, are broad, including the social, economic, cultural, and political spheres, among others, depending on the university model (Curi & Wood, 2021; Trippl et al. 2015; Barbosa et al., 2020). By expanding activities into the third mission, universities tend to generate an even greater social impact (Sanchez-Barrioluengo & Benneworth, 2019; Amry et al., 2021; Audy, 2023). However, the empirical evidence on the institutional mechanisms that enable third mission activities in universities is still scarce (Audy, 2023; Feola et al., 2021), which highlights the need to deepen this discussion in the Brazilian public university scenario, in the light of the existing literature.

The theory of the third mission focuses on creating knowledge focused on the ecosystem, a concept that evolved into the triple helix model (Nakwa & Zawdie, 2016), which places the university in the central role of knowledge generation to drive innovation (Etzkowitz & Zhou, 2017). The bonds it creates with users tend to result in new technologies based on the university's accumulated knowledge, which can be transferred to the productive sector (Compagnucci & Spigarelli, 2020).

The Brazilian government has established policies for modernizing and improving both technological capacity and the innovation therefrom, placing the university as a central actor in the debate. The Law of Technological Innovation (LIT), Law No. 10,973 2004/13,243, amended by Law 16/2004, is an example of the policies that propose new forms of relationship between universities and the members of the innovation system, reorienting the mission of institutions towards local, regional, and national development (Brazil, 2004).

The LIT also establishes the creation of Technological Innovation Centers (NIT) in Scientific, Technological, and Innovation Institutions (ICT) to manage the institutions' innovation policy. In its reformulation, it introduced article 15-A, which defines the guidelines for implementing and defining strategic objectives for the ICT innovation policy, in line with the institution's mission. Following this orientation, the university defines the guidelines and organizes the governance and coordination framework, besides structuring the managerial and normative instruments, so as to integrate in a coordinated way the knowledge generation and innovation processes in partnership with the productive sector (Pedro, 2021).

With the knowledge production and use being conducted in a systemic, dynamic, and interactive way in the triple helix system (Nakwa & Zawdie, 2016), the university needs to harmonize its strategic priorities with the expectations of the various stakeholders involved (Compagnucci & Spigarelli, 2020; Nakwa & Zawdie, 2016). To that end, the the study examines the convergence between the institutional mechanisms that enable the third mission activities in the mission statements of Brazilian public universities and the social impact dimensions proposed in the literature.

The preliminary study by Fedato et al. (2023) provided relevant insights into universities' social impact dimensions at the study's embryonic stage. The findings of the study were submitted to a review, debate, and some deepening in this article.

Universities have been recognized as development agents in their communities (Audy, 2017; Etzkowitz & Leydesdorff, 2000; Etzkowitz & Zhou, 2017), with a tendency to guide their missions toward deeper social involvement with knowledge transfer to generate innovations (Fedato et al., 2013). However, knowledge about third mission activities and alignment with the strategic priorities of Brazilian public universities is still limited (Audy, 2023; Feola et al., 2021). In addition to the limited knowledge, the third mission of public universities is the object of criticism in the literature, both because of the difficulty conceptualizing terms such as innovation, development, and entrepreneurship, and due to the generation of products and services that meet the demands of society, involving the search and use of external financial resources (Ésther, 2015).

The results of this study contribute to bridging the theoretical gap concerning the limited understanding about the institutional mechanisms that enable third mission activities. It provides insights into how universities can improve their practices to maximize their social impact through activities related to the third mission, which is a practical contribution to university management, as well as to public policymaking.

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LITERATURE REVIEW

In societies increasingly based on knowledge, the university, which has always played an active role in the academic missions of teaching and research, seeks to convert research into economic development by facilitating technology transfer, thus reinterpreting its role (Etzkowitz et al., 2000; Etzkowitz & Zhou, 2017; Sanchez-Barrioluengo & Benneworth, 2019). The appropriation and use of knowledge by society are recognized as a social impact of knowledge (Lima & Wood, 2014).

For Zamora-Sanchez et al. (2022), "impact" refers to the effect produced by a specific event or intervention in a particular context, i.e., it demonstrates the positive or negative consequences of an action on a given population. The same authors point out that one of the challenges faced by universities is the need to evaluate the impacts achieved in the actions developed with the community.

For Lima and Wood (2014), the impact of university studies is related to their contributions and benefits for the scientific community and society, which demonstrates the studies' ability to promote advances in knowledge and present solutions to social problems.

The impact and contribution to society can be analyzed from the perspective of university outreach or universities' third mission, a Latin American and a European concept, respectively (Secondo et al., 2017; Dassoler et al., 2023; Audy, 2023). Both concepts are linked to the interaction between academia and the community, and demonstrate how the knowledge produced in universities can be applied in a practical way to solve social, economic, and cultural challenges.

The presence of a university in a given region provides relevant contributions to development in its surroundings, such as: qualification of the workforce and increased productivity as results of optimized solutions from research; solving local problems with an increase in the general level of knowledge and culture in the region, which contributes as a locus of innovation and citizenship building (Rolim & Serra, 2015).

The dimensions of the direct and indirect impacts of university activities on regional development, as presented in the studies by Hoff et al. (2011), are: an influence on aggregate demand, job and income generation, regional economy boosting, and the cultural and business environment, as well as modification in the local infrastructure due to the relations generated with the university's surroundings, generating a centripetal form that attracts culture and leisure diversity, among others. Hoff et al. (2017) compared these dimensions with the international literature and concluded that there is alignment which, however, differs by its focus on relations with the environment outside the university, especially with the business sector, which is less evident in the national literature.

Curi and Wood (2021) developed a conceptual model for assessing the impact of universities on their communities, and considered three main areas to classify the impact: socioeconomic, scientific-technological, and for the regional culture and image. It is a comprehensive evaluation model that not only incorporates the perspectives of previous studies, but also integrates the interactions between the university and the business sector, including collaborative projects with local companies, thereby representing an advancement in relation to previous models.

The international literature highlights the importance of knowledge transfer and marketing (Lendel & Qian, 2017; Trippl et al., 2015; Stachowiak et al., 2013). In this context, Stachowiak et al. (2013) point out that universities can have an impact on the local community in four main ways: i) the provision of social services to the community; ii) the development of cities through services and assistance in public policymaking; iii) culture promotion, offering cultural services and improving the quality of life; and iv) business development through technology transfer, academic spin-offs, and contracted research.

The increasing relevance of knowledge and research for economic development paved the way for the third mission, which translates into the university's role in economic development (Etzkowitz & Leydesdorff, 2000; Etzkowitz & Zhou, 2017), leading the university to an ever-greater involvement with contemporary social demands (Audy, 2023).

To operate with new demands, the university broadens its role and configuration to optimize its contributions to regional and social development. In a context where the university complements its traditional teaching and research missions with a third mission focused on economic development, the institution adopts an entrepreneurial nature by commercializing its knowledge through patents, spin-offs and other initiatives (Etzkowitz & Leydesdorff, 2000; Etzkowitz & Zhou, 2017; Trippl et al., 2015).

Based on experiences from universities such as the MIT, Stanford, and Harvard, the concept of entrepreneurial university emerges, incorporating the third mission, focused on economic and social development, also known as the innovation mission (Audy, 2023).

The activities associated with the third mission of universities involve the creation, use, application, and exploitation of knowledge with stakeholders (Secondo et al., 2017). By engaging in third mission activities, universities become engines of social, economic, and cultural development in the regions they operate in. To this end, the activities of this mission include: transferring technology to industry and society, promoting entrepreneurial activities, continuing learning/training, and involvement in social and cultural life (Compagnucci & Spigarelli, 2020).

The triple helix model represents an evolution of the third mission concept (Nakwa & Zawdie, 2016). It is evident that, in this concept, the production and use of knowledge happen in a systemic way, within a dynamic and interactive network, between the government-academia-company actors who build relationships that not only strengthen, but transform the institutions involved (Etzkowitz & Leydesdorff, 2000), focusing on the university as a source of entrepreneurship, technology, and innovation (Etzkowitz& Zhou, 2017).

The comprehensive role of universities, from the perspective of the third mission, reflects on the expansion of social impact, and goes beyond the traditional outputs related to teaching and research. This transforms research into economic development, through technology transfer, based on the engagement of university with society (Audy, 2023).

In a literature review, Compagnucci and Spigarelli (2020) explored the different ways in which universities contribute to society, in addition to teaching and research, by addressing the potential and constraints of the third mission. The dimensions of the third mission presented by these authors include: the transfer of technology and innovation, continuing education, and social and cultural engagement. The authors highlight that third mission activities

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include collaborations aimed at contributing collectively to the social, cultural, and economic development of communities.

By connecting academic knowledge with its practical applications, the third mission strengthens the social impact of universities through the promotion of innovation (Compagnucci & Spigarelli, 2020). Thus, the academic literature emphasizes the "third mission" as a way to boost socioeconomic, cultural and technological development through collaboration between universities, government, and industry in the triple helix model, stimulating the innovation process. Thus, the dimensions of social impact related to the third mission reveal an ability to convert scientific knowledge into economic advances through technology transfer.

METHOD

The approach adopted in this research was the rapid systematic review of literature, characterized by being a rigorous and methodical method to identify, evaluate, and synthesize the available evidence on a specific topic (Thorpe et al., 2009). In the field of health sciences, this review process has been improved to synthesize knowledge in order to elucidate and inform about the evidence to support practices and policies. Khangura et al. (2012) explain that rapid review is an emerging approach in the field of knowledge synthesis, addressing specific issues to provide evidence to decision makers within a short period.

Denyer and Tranfield (2009) warn about the recklessness of uncritically adopting what has proved useful in other domains. Likewise, Tranfield et al. (2003) address the challenges inherent in conducting systematic reviews in the management field, considering the vast amount of materials available and the heterogeneity in terms of methods and results.

To consistently adapt the systematic review method for management, Denyer and Tranfield (2009) suggest that rapid systematic reviewing be carried out in five steps: I) formulating the research question; ii) locating the studies; iii) selecting and evaluating the studies; iv) analyzing and synthesizing the studies; and v) reporting the results.

The goal of the study was defined as: examining the convergence between the institutional mechanisms that enable third mission activities in Brazilian public universities and the dimensions of social impact as presented in the literature. For the literature review, the Context, Interventions, Mechanisms, Outcomes (CIMO) technique (Denyer & Tranfield, 2009) was used to determine the search string.

The elements that justify the search string are: i) Context: Universities; ii) Intervention mechanisms: the different forms of social impact; iii) Result: Social impact of academia. In addition to the term "social impact," "third mission" and "triple helix" were also used due to the evolution of the traditional concept of social impact, which expanded the use of academic knowledge in a dynamic and interactive way (Nakwa & Zawdie, 2016) and as a synonym of contributing to society (Compagnucci & Spigarelli, 2020).

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To locate studies, the Scopus database was chosen as a source of consultation. The terms were defined, forming the search *string*, using the following Boolean operators: "*social impact*" OR "third mission" OR "triple helix" AND *universit* OR "higher education*" in the title, abstract or keywords. Thus, 3185 publications were found in Scopus.

In order to select the studies, analysis tools available in the Scopus database were initially used. Papers concentrate between 2019 and 2023 (approximately 43% of the total), which reduces the sample to 1375 documents. The other filters used were: I) document type: article; ii) language: English, Portuguese, and Spanish; iii) keywords: triple helix, social impact, third mission, higher education, university sector, and university; iv) source type: journal; and v) open access. By using these filters, the number of publications was reduced to 290 articles.

The criterion for the inclusion of articles in the study was being an empirical text whose goal was to present the impact of the university. Subsequently, articles were excluded: i) that had no relation with the research topic (264 articles); or ii) that had done a systematic or bibliometric review of the literature or presented theoretical models (5 articles). Thus, 21 articles remained which make up the research sample.

To analyze and synthesize the results, the research field was initially mapped using VosViewer® software. This procedure contributed to grouping the data for thematic analysis, through categories derived from the literature and keywords.

In the second stage, the missions of Brazilian public universities as listed in the Platform of the National Register of Higher Education Courses and Institutions (Cadastro e-MEC) were analyzed. On the platform, the following filters were used: Search for: "Higher Education Institution;" Administrative Category: "Municipal Public," "Federal Public," and "State Public", Academic Organization: "University," and status: "active." Thus, 111 (one hundred and eleven) public universities were listed.

The selected public universities were analyzed through a search for institutional mechanisms that enable third mission activities: NIT constitution (Brasil, 2004) and mission statement (Audy, 2023). Procedures for analyzing mission statements to study the universities' third mission operations were also used in the studies by Berghaeuser and Hoelscher (2020) and Kesten (2019). However, both studies found limitations in the use of university missions to analyze the practices that were developed. Berghaeuser and Hoelscher (2020) point out a possible mismatch between what is declared in the missions and what is actually implemented. Kesten (2019) points out that the mission statement is only a written document, and its effective implementation remains uncertain. The analysis of the constitution of NITs in universities can complement these findings, providing additional evidence to evaluate the alignment between university practices and their respective mission statements.

In the search for the missions of universities, their institutional websites were accessed, followed by their Institutional Development Plans (PDI) and strategic planning document. The documents were then read, and the mission was identified. After collecting the missions, NVivo® software (Figure 2) was used to analyze the occurrence of words.

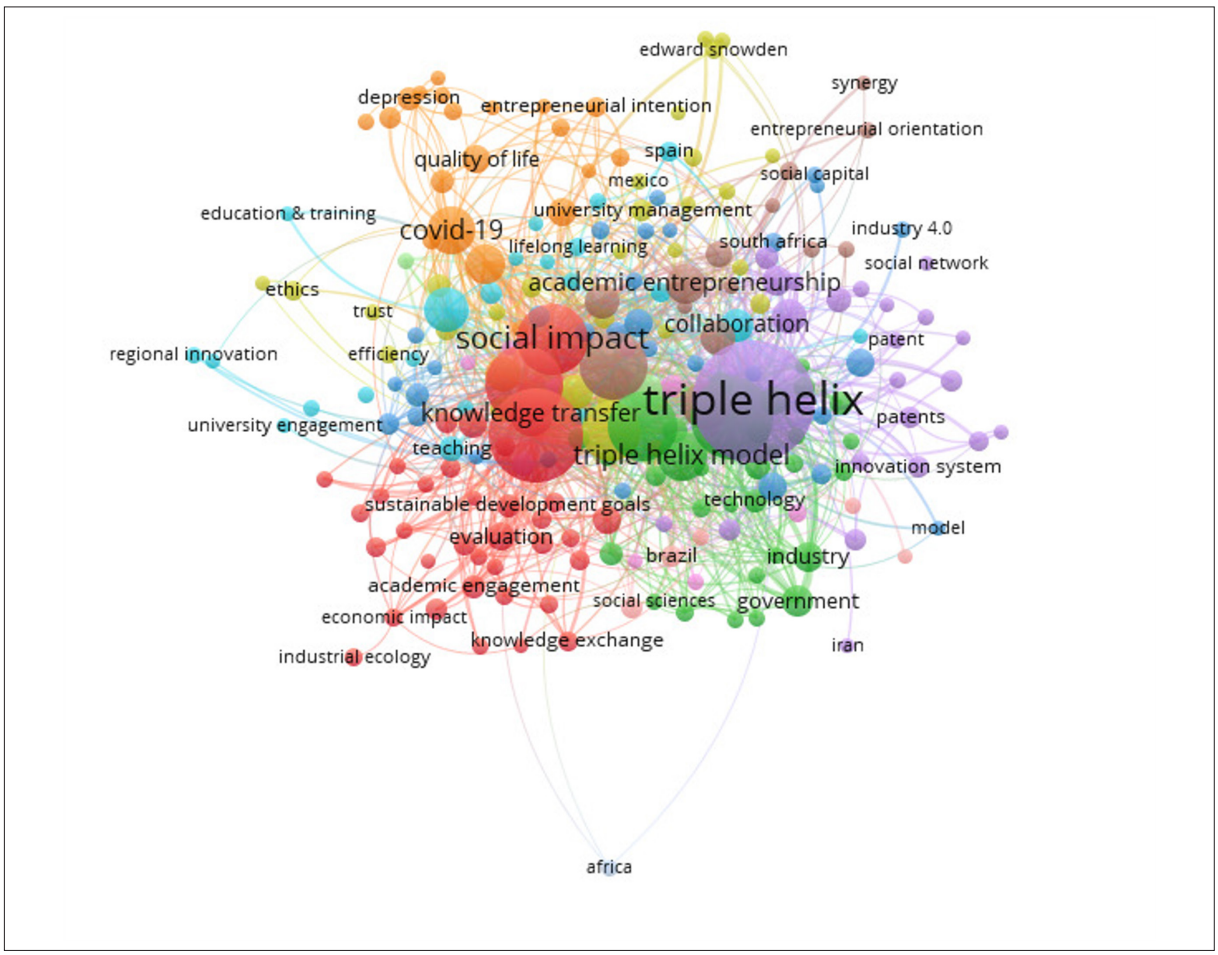
The websites of the public institutions listed were searched for institutionalized NITs. To take on a third mission and engage in the path of innovation, it is necessary to consolidate an

innovation policy, which must be managed by an NIT, as advocated by the LIT. In addition, the NIT constitutes an ICT instrument in structuring the governance of activities related to the third mission.

RESULTS PRESENTATION AND DISCUSSION

For an initial survey of the field of study, the keywords of the sample publications were analyzed using VOSviewer® software.

Figure 1. Analysis of the articles' keywords



Source: the authors, using VosViewer® (2024).

Figure 1 shows the co-occurrence of the keywords in the analyzed articles. It is worth highlighting the occurrence of six prominent clusters, represented by the terms: *triple helix*, *knowledge transfer*, *social impact*, *university engagement*, *academic entrepreneurship* and *covid-19*. Triple helix, knowledge transfer, social impact, university engagement, academic entrepreneurship, and covid-19 The first words refer to important concepts in the studied subject

and were related to the dimensions of impact; therefore, they were selected to compose the initial categories of for analyzing articles. However, the term covid-19 does not have a direct relation to the subjects, but it seems to be related to the period of the selected articles, because it is a pandemic disease that affected all sectors, including the university.

After analyzing the papers' keywords, which provided a comprehensive knowledge of the field, the studies that compose the sample were analyzed. Table 1 presents twenty-one different contexts of social impact of the surveys forming the sample.

Table 1. Context of relevant social impact in each study

Author(s) (year)	Context of social impact
1- Bosanac et al. (2023)	The survey analyzed the perception of 1,048 respondents, 582 students, and 466 teachers from the University of Novi Sad, Serbia, about the different university missions. The perceptions of students and teachers are similar about the missions of universities, which include: teaching, research, and the civic and economic dimension of the third mission.
2 - Johnston et al. (2023)	The study used university revenue data obtained from a survey by the Higher Education Business & Community Interaction (HE-BCI), in the United Kingdom. It highlights that engagement activities (collaborative interactions between university and external partners) contribute to knowledge generation in priority technologies defined by the country's industrial strategy, such as medicine, clean energy, battery technology, autonomous cars, space technology, and artificial intelligence.
3 - Thomas et al. (2023)	The study involves a European and a Brazilian university: Lancaster and Unisinos. The two institutions were involved in different ways in teaching, research, and economic development activities in their regions. The context of each region presented different challenges and needs.
4 - McCann et al. (2023)	A case study was conducted in four UK City Deals: Newcastle, Aberdeen, Belfast, and Stirling. The results highlight the importance of universities as local economic engines.
5 - Louwrens et al. (2023)	A single case study in a university with intensive research activity, a pioneer in the field of academic entrepreneurship in South Africa. The focus of the study is on the university's ability to convert knowledge into value, supported by technology transfer offices (TTOs) and incubators established to support the transfer of knowledge generated at the university to the productive sector.
6- Marrocu et al. (2022)	It analyzed the direct and indirect impacts on the regional economy through secondary data on the activities of universities in 28 European countries (between 2000 and 2016). The impacts were i) direct impact: activities such as knowledge and technology transfer, and entrepreneurship promotion; ii) indirect impact: creation of human and technological capital, essential for productivity growth.
7- Marrocu et al. (2022)	With data from the African Union Commission (AUC), it addressed initiatives related to the third mission of African universities. Activities include: sustainable socio-economic transformation with universities' engagement with social needs, anchored in traditional teaching and research functions.
8 - Borda-Rivera & Ortega-Paredes (2021)	A study with Peruvian universities through interviews with directors at graduate schools. A survey conducted with 265 graduate students enrolled between 2017 and 2018.

Continue

Table 1. Context of relevant social impact in each study

Author(s) (year)	Context of social impact
9 - Pugh et al. (2022)	A case study in the England, UK, which analyzed university involvement in a regional economic development program. Entrepreneurial universities operate in three roles for economic development: supporters (traditional teaching and research role, but they expand activities to supporting local companies); guidance (they organize regional growth) and as an engine to drive development (they coordinate and manage regional growth).
10 - Benković et al. (2022)	A research instrument used with five public universities in Serbia, involving teachers and assistants. The population consists of 10,874 people and the sample totals 552. The study identified that individual entrepreneurial orientation plays an important role in entrepreneurial results (joint research agreements, spin-offs, and patenting).
11 – Nguyen Quoc et al. (2021)	A study with 245 Vietnamese academics to analyze the relationships between the third mission (academic and public engagement and marketing) and performance in relation to the traditional teaching and research missions. The findings revealed that the third mission can be divided into two distinct factors: (i) academic engagement and commercialization; and (ii) public engagement and extra work (consultancy, participation in projects with external partners, among others).
12 - Odei & Anderson (2021).	Using secondary data from 164 UK universities, it evaluated the ways in which institutions have developed the third mission. Among the activities, we highlight: attraction of investments, collaboration in R&D, facilitation of networks, and knowledge exchange with regional actors, support through incubators.
13 - Knudsen et al. (2021)	The authors explore new ways of involving universities in their third mission activities by investigating two universities in Denmark. Based on six models, they demonstrate how universities engage in collaborative efforts with a range of public and private actors.
14 - Feola et al. (2021)	By analyzing the entrepreneurial orientation of Italian universities, the authors examined how these are implementing an entrepreneurial role, exploring how internal and external dynamics and dynamic factors affect universities' entrepreneurial orientation. In the first stage of the study, they established a entrepreneurial attitude index for universities, whose activities correspond to those of the third mission: patent development, spin-offs, incubator activities, consulting contracts, and technology transfer-oriented associations.
15 - Bezanilla et al. (2020)	In this study, 567 educational institutions belonging to 44 universities (both public and private) from six autonomous regions, identified in the literature as examples of academic entrepreneurship in Spain, were invited to answer a questionnaire. A total of 84 subjects responded to the participation request and presented valid responses.
16 - Berghaeuser & Hoelscher (2020).	The authors developed a framework for defining the third mission and studied 75 public German universities, examining how universities responded to the concept through their description of institutional mission. Most universities mentioned the third mission in their mission statements; however, the focus is limited to economic impact and (technical) knowledge transfer, with much less emphasis on issues of civic engagement or continuing education.

Continue

Table 1. Context of relevant social impact in each study — Concludes

Author(s) (year)	Context of social impact
17 - Salomaa (2019)	A study at the University of Lincoln (UK), located in a rural area. It suggests that the particular context of a rural region significantly shapes the orientation and institutional responses of universities to third mission activities, and influence the way universities can contribute efficiently to regional development in different environments.
18 - Gaisch et al. (2019)	A study involving 14 experts from 13 Austrian universities examines the extent to which institutions also engage in third mission activities predominantly for non-economic reasons (Engaged University, Regional Innovation Systems, Sustainable University). The activities identified are: continuing education and knowledge transfer, social and regional engagement.
19 - Frondizi et al. (2019)	A case study on how Italy evaluates third mission activities through unstructured interviews with employees at ANVUR (the country's National Agency for the Evaluation of Universities and Research Systems). The third mission activities considered in the evaluation are divided into two main groups of indicators: 1) Activities to improve the third mission: patents, spin-offs, contracts and conventions, intermediaries; 2) production of public, social and cultural goods: public engagement, cultural goods, continuing education, and clinical experiments.
20- Agasisti et al. (2019)	The authors used an econometric analysis with a dynamic panel model for the period 2006-2012. The data covers 53 public universities, grouped into 46 fields of the Italian labor market. They found that there is a relationship between the performance of universities and the economic development of the region in which universities are established, that is, efficient universities promote local economic development with knowledge transfer. It highlights the relevance of universities in regional human and economic development.
21 - Kesten (2019)	The authors used content analysis with the missions of 193 universities established in Turkey, 120 of which were public and 73 were private. Social and economic impact; scientific and technological impact. The authors found that few universities (about 5%) included technology transfer for innovation, continuing education, and social involvement in their mission statements simultaneously.

Source: Adapted and expanded from Fedato et al. (2023).

It should be noted that the contexts of analysis of third mission activities are primarily European universities (15 studies, or 70% of the total). The American, Asian and African continents are represented, respectively, with two research contexts each. This scenario is aligned with the results of previous research, which indicate that the concept of third mission is traditionally more used in the European continent (Secondo et al., 2017; Dassoler et al., 2023; Audy, 2023; Compagnucci & Spigarelli, 2020).

Table 2 shows the categories for analyzing the third mission activities conducted, as well as the respective social impact. It is important to mention that a study may have addressed the social impact of universities in more than one category.

Table 2. Universities' third mission activities

Author (year)	Knowledge technology transfer/ innovation	Continuing education	Social engagement/ regional development	Innovation/social innovation	R&D collaboration network	Entrepreneurship promotion	Sustainability and social responsibility
1- Bosanac et al. (2023)	X	X	X				X
2 - Johnston et al. (2023).	X			X			
3 - Thomas et al. (2023)			X	X		X	
4 - McCann et al. (2023)			X	X			
5 - Louwrens et al. (2023)	X						
6 - Marrocu et al. (2022)	X					X	
7 - Nabaho et al. (2022)	X		X				
8 - Borda-Rivera & Ortega-Paredes (2021)	X						
9 - Pugh et al. (2022)			X				
10 - Benković et al. (2022)	X						
11 - Nguyen Quoc et al. (2021)	X		X				
12 - Odei & Anderson (2021)					X		
13 - Knudsen et al. (2021)	X				X		
14 - Feola et al. (2021)	X						
15 - Bezanilla et al. (2020)						X	
16 - Berghaeuser & Hoelscher (2020)	X	X	X				
17 - Salomaa (2019)	X	X	X			X	
18 - Gaisch et al. (2019)	X		X		X		X
19 - Frondizi et al. (2019)	X	X	X		X		X
20 - Agasisti et al. (2019)	X						
21 - Kesten (2019)	X	X	X	X			

Source: the authors (2024)

The research findings indicate the existence of several dimensions for analyzing the impact generated by a university. Table 2 presents the main third mission activities explored in the research, whose main contributions are described below.

Knowledge/technology transfer

The third mission expands the social role of the university, allowing direct action with industry and government, which facilitates innovation through technology transfer. In this context, the engagement and technology transfer categories emerge as significant dimensions. The third mission activities reported by the authors in the technology transfer dimension are intended to explain how the process is made possible in universities.

Knudsen et al. (2021) explain that invention commercialization, the joint use of laboratories, collaboration between academics and companies (knowledge spillovers), the creation of companies from technologies developed at the university, and business incubation for business support are recurrent technology transfer activities that promote the integration between society and university.

Entrepreneurial universities, through activities such as technology transfer, startup creation, and collaboration with industries, are fundamental for generating knowledge in priority technologies (Johnston et al., 2023).

To support such activities, Louwrens et al. (2023) present technology transfer offices and incubators. These mechanisms can help academics transform their research results into marketable products and services, aligning with an entrepreneurial mission and contributing to regional development.

Most of the experiences reported are European. However, Borda-Rivera and Ortega-Paredes (2021) deal with incipient and uncoordinated efforts in technology transfer in Arequipa, Peru. The authors highlight that although the activities developed in the context of university-government-company cooperation have provided an increase in scientific production, research network training, change in the economic model that seeks research and innovation according to the demand, quality, and quantity of researchers, there are significant challenges, such as the lack of a culture of innovation and insufficient collaboration between universities and the business sector.

Continuing education

Continuing education strengthens the bond between the university and society, and allows the knowledge generated in academic institutions to be disseminated, so as to contribute to local economic development. It is an activity that accompanies third mission activities and includes training provision for specific groups and senior citizens, as well as vocational training courses with certificates or informal education (Berghaeuser & Hoelscher, 2020; Gaisch et al., 2019).

Social Engagement/Regional Development

The third mission activities, in which universities engage directly with society, can vary according to the context and institutional goals. Pugh et al. (2022) note that entrepreneurial universities play roles in regional development, as supporters, mentors, or drivers of local economic growth.

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Bosanac et al. (2023) and Frondizi et al. (2019) emphasize that, in Europe, third mission activities strengthen the impact of science on society through technology transfer, continuing education and civic engagement, promoting a more cohesive and inclusive society. Nguyen Quoc et al. (2021) add that academic and commercial engagement, coupled with public engagement, not only benefits teaching and research, but also extends the social impact of universities, especially when encouraged by appropriate policies.

Emphasizing the role of universities in contributing to social and economic development, Nabaho et al. (2022) explain that, in the African context, the third mission is seen as a social role of universities, since it covers from promoting partnerships with the community for activities that benefit both university and society.

The third mission of universities represents a continuous commitment to social and economic development, shaping their activities to maximize their positive impact on society. Marrocu et al. (2022) emphasize that technology transfer generates direct effects on the local ecosystem and expands to neighboring regions, increasing its impact. Agasisti et al. (2019) reinforce this idea by showing that the knowledge generated by universities has a spillover effect that contributes significantly to the development of regional innovation systems, especially in areas close to universities. Thus, third mission activities not only directly benefit local communities, but also have broad and lasting effects on neighboring regions, and strengthen regional innovation systems.

Entrepreneurship promotion

Promoting entrepreneurship in universities is increasingly relevant, especially as educational institutions take on a more active role in transferring knowledge and innovation to society.

Research such as that of Benković et al. (2022) show that the entrepreneurial orientation of faculty in Serbian public universities significantly influences entrepreneurial results. Bezanilla et al. (2020) emphasize that policies to encourage spin-offs, the protection of intellectual property, and collaboration with the business sector, management team support, and faculty training foster entrepreneurship in universities.

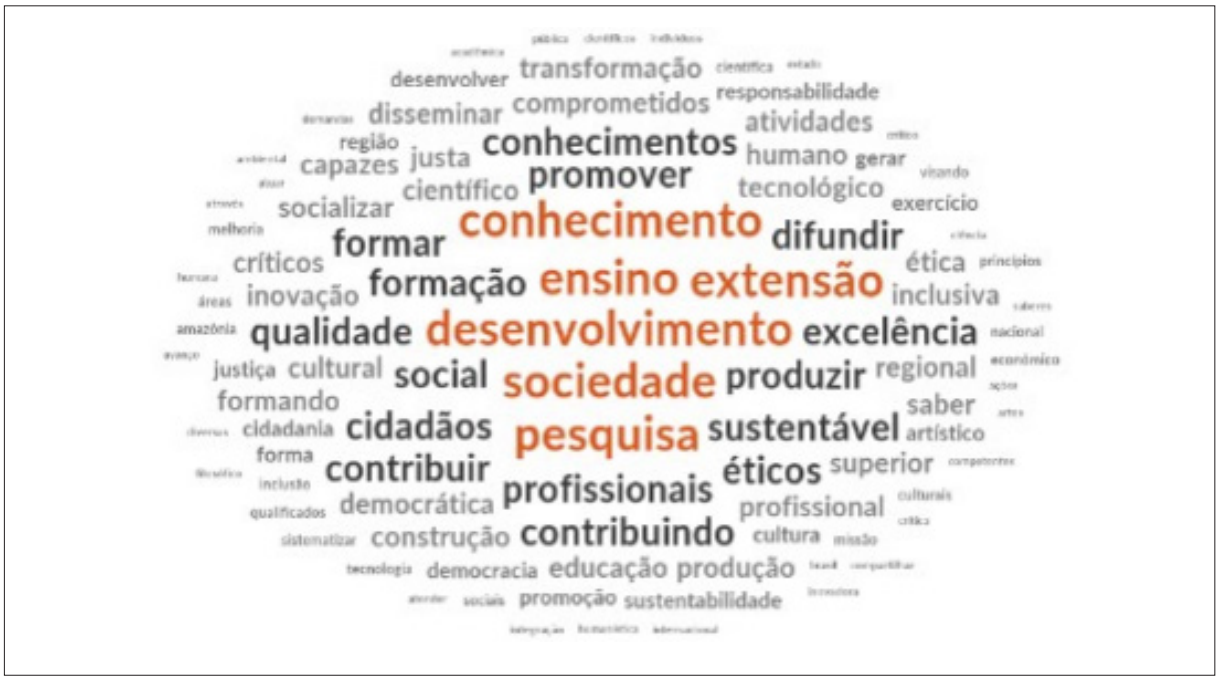
The results of this stage of the study are in line with the conclusions of Compagnucci and Spigarelli (2020), which highlight the role of universities, through third mission activities, in actions such as technology transfer, continuing education, and social and cultural engagement. They demonstrate the potential of universities to generate social impact.

Analysis of university missions and the presence of a NIT

The missions presented in universities' PDIs were entered into the NVivo® 14 software. It should be noted that of the 111 universities surveyed, only three did not have an active website for searching the PDI document and collecting the mission. Figure 2 brings the cloud of the most frequent thousand words (longer than five letters).

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Figure 2. Frequent terms in mission statements



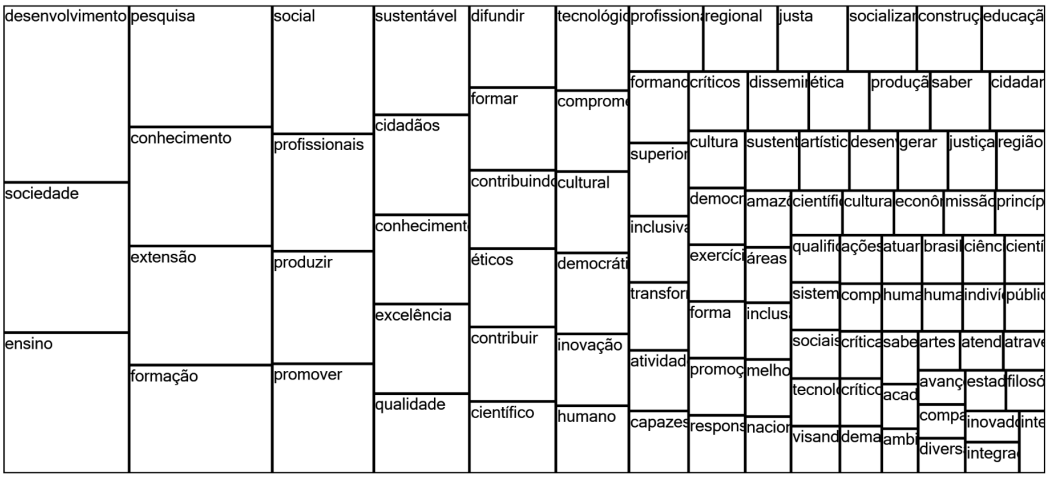
Source: the authors, using NVivo® 14, (2024).

Note: The 15 most prominent terms in the cloud are: conhecimento (knowledge), ensino (teaching), extensão (outreach), desenvolvimento (development), sociedade (society), pesquisa (research), conhecimentos (knowledges), promover (promote), formar (train), difundir (spread), formação (training), qualidade (quality), excelência (excellence), social (social), produzir (produce). The other terms and translations: cidadãos (citizens), sustentável (sustainable), contribuir (contribute), éticos (ethical), contribuindo (contributing), transformação (transformation), comprometidos (committed), disseminar (disseminate), atividades (activities), capazes (capable), justa (just), humano (human), científico (scientific), tecnológico (technological), socializar (socialize), críticos (critical), ética (ethics), inovação (innovation), inclusiva (inclusive), cultural (cultural), regional (regional), formando (forming), saber (knowledge), democrática (democratic), profissional (professional), construção (construction), educação (education), produção (production), desenvolver (develop), responsabilidades (responsibilities), região (region), gerar (generate), exercício (practice), justiça (justice), cidadania (citizenship), artístico (artistic), forma (form), cultura (culture), democracia (democracy), promoção (promotion), sustentabilidade (sustainability), pública (public), científicos (scientific), indivíduos (individuals), acadêmica (academic), estado (state), demandas (demands), crítico (critical), ambiental (environmental), atuar (act), visando (aiming), através (through), melhoria (improvement), ciência (science), humana (human), áreas (areas), princípios (principles), saberes (know-how), Amazônia (Amazon), avanço (advancement), nacional (national), econômico (economic), ações (actions), artes (arts), diversas (diverse), filosófico (philosophical), inclusão (inclusion), qualificados (qualified), sistematizar (systematize), crítica (critique), missão (mission), tecnologia (technology), atender (meet), Brasil (Brazil), compartilhar (share), inovadora (innovative), integração (integration), humanística (humanistic), internacional (international).

The most cited words and their respective repetitions are: Development (68), society (58), teaching (54), research (53), knowledge, (52) and outreach (52). By drawing an analogy with the social impact dimensions discussed in the light of the literature, it is possible to infer that the most frequent terms relate to the traditional roles of the university, especially teaching, research, and outreach.

The word tree presented in Figure 3 reveals that the term "development" (the most cited) is associated with social, sustainable, and technological issues, and reflects the university's commitment to its role in society. This finding aligns with Audy's reflection (2023), which states that the third mission emerges when universities integrate innovation and action toward economic and social development.

Figure 3. Tree of the terms from mission statements



Source: the authors, using NVivo® 14, (2024).

Note: The 20 most prominent terms in the tree are: desenvolvimento (development), sociedade (society), ensino (teaching), pesquisa (research), conhecimento (knowledge), extensão (outreach), formação (training), social (social), profissionais (professionals), produzir (produce), promover (promote), sustentável (sustainable), cidadãos (citizens), conhecimentos (knowledges), excelência (excellence), qualidade (quality),difundir (spread), formar (train), contribuindo (contributing),éticos (ethical). The other terms and translations: contribuir (contribute), científico (scientific),tecnológico (technological), comprometidos (committed), cultural (cultural), democrática (democratic), inovação (innovation), humano (human), profissional (professional), regional (regional),justa (just), socializar (socialize), construção (construction), educação (education), formando (forming), superior (higher), inclusiva (inclusive), transformação (transformation), atividades (activities), capazes (capable), críticos (critical), disseminar (disseminate), produção (production), saber (knowledge), ética (ethics), cidadania (citizenship), cultura (culture), democracia (democracy), exercício (practice), forma (form), promoção (promotion), responsabilidade (responsibility), sustentabilidade (sustainability), artístico (artistic), desenvolver (develop), gerar (generate), justiça (justice), região (region), amazônia (Amazon), inclusão (inclusion), melhoria (improvement), nacional (national), áreas (areas), científica (scientific), culturais (cultural), econômico (economic), missão (mission), princípios (principles), qualificados (qualified), sistematizar (systematize), sociais (social), tecnologia (technology), visando (aiming), atuar (act), ações (actions), Brasil (Brazil), científicos (scientists), ciência (science), competentes (competent), crítica (critique), crítico (critic), demandas (demands), humana (human), humanística (humanistic), indivíduos (individuals), pública (public), saberes (know-how), acadêmica (academic), ambiental (environmental), artes (arts), atender (meet), através (through), avanço (advancement), compartilhar (share), diversas (diverse), estado (state), filosófico (philosophical), inovadora (innovative), integração (integration), internacional (international).

Although less frequent, there are relevant terms such as technological, innovation, and sustainability, which indicate ways of expanding university activities that can enhance the impact of its actions toward the third mission. However, the results reveal that few institutions included terms such as "technology transfer" or "social engagement" in an isolated or simultaneous way in their mission statements, similarly to the results presented by Kesten (2019).

For greater robustness of the analysis and reliability of the findings, the websites of the 111 universities were consulted for information regarding the institutionalization of the NIT. It was found that fourteen institutions (12%) do not have a website address available, which may indicate a lack of institutionalization of the sector/body.

The results of the analysis of institutional missions and the implementation of NITs indicate that the researched universities are advancing towards an alignment between their mission statements and the activities related to the third mission. It should be noted that universities'

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adaptation to the third mission takes time, because it is necessary to balance the maintenance of their core values of teaching and research with society's new demands for innovation. This change involves a review of institutions' vision for the future and organizational structure, which may result in updates to their mission statements (Audy, 2023).

By analyzing the data related to the institutional mechanisms that enable the third mission—NIT implementation and mission statements—it can be inferred that universities' activities are going through a change process towards greater alignment with third mission activities, even if it is a coercive movement or a form of compliance with the requirements imposed by the LIT.

Considering that government policies, particularly LIT, presuppose joint action by the university and the productive sector to promote innovation, this fact involves reordering the Brazilian university's mission, as its third mission involves the participation and engagement of non-academic stakeholders (Compagnucci and Spigarelli, 2020). Thus, transferring knowledge only becomes possible with the active involvement of universities in local activities, acting as an engine for their regions' economic development.

This study provides insights into how universities can improve their practices to maximize their social impact through third mission-related activities. This involves the reorganization of university management, with the creation of structures conducive to engagement, such as legal instruments that support partnerships with the productive sector, offices/laboratories capable of knowledge transfer, which facilitates cooperation between researchers and companies. To characterize the expansion of universities' social impact, technologies must benefit society.

FINAL CONSIDERATIONS

This study examines the alignment between the institutional mechanisms that enable third mission activities in Brazilian public universities and the dimensions of social impact presented in the literature.

The systematic review revealed the expansion of the university's roles beyond its teaching and research roles, with the incorporation of the third mission, that is, the connection of the university with society and the economy. Thus, it was found that the third mission has been developed towards the triple helix, in the connection between university, entrepreneurs, and government, in order to redefine the role and purpose of the university in society, expanding its impact on, and engagement with the public and private sectors.

The analysis of the articles' keywords showed that the triple helix, determined by the connection between university, industries, and government, presents a higher frequency in word clusters, followed by technology transfer and social development.

Among the third mission activities developed by universities and cited by the authors are: knowledge/technology transfer, continuing education, social engagement/regional development, and entrepreneurship promotion. Among these, the transfer of knowledge/technology stands out, evidencing and supporting the conclusions of studies that investigated the third mission of

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universities, and demonstrating that the concepts of third mission and triple helix expanded the traditional missions, fostering the construction of relationships between university and community.

The analysis of Brazilian universities' missions demonstrated that development, society, teaching, research, knowledge, and outreach are the most frequent terms in their institutional development project texts, which revealed the predominance of terms related to traditional university roles. However, the analysis of the term "development" and its associations with social, sustainable, and technological aspects in the word tree denotes the researched universities' commitment to an active role in society's transformation.

The research has limitations, particularly related to the terms selected for the search. The theoretical approaches to the studied subject consider that the third mission of the university has turned into the concept of entrepreneurial university, which was not included in this review. Therefore, future research could broaden the search to incorporate this term. Finally, a longitudinal analysis comprehending the missions and performance of NITs could be used in order to observe the evolution of Brazilian public universities in developing the third mission.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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