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ARTICLE

(MIS)PATH OF UTFPR IN THE CONSTRUCTION OF THE BRAZILIAN TECHNOLOGICAL UNIVERSITY MODEL

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ABSTRACT: This study aimed to understand the technological university model supporting the structures, policies, and practices of the Federal Technological University of Paraná (UTFPR). The chosen method was a narrative review. Data collection occurred in two stages, using SciELO, BDTD, and Google Scholar databases, with the search term "Federal Technological University of Paraná," considering publications from 2005 onwards. Seventeen studies (articles, theses, and dissertations) directly related to the technological university model in Brazil were included. The analysis went through exploratory, selective, and critical reading stages, focusing on the relevance of the materials for the study purposes. The main results indicate that, although the institution has made progress in terms of expansion and internationalization, it still faces challenges in consolidating its identity as a technological university, especially regarding integration with the productive sector and innovation. A detachment from the idealized model of this specific type of university was observed, with a predominance of more traditional academic practices. It is concluded that the UTFPR needs structural and strategic adjustments to align its policies and practices with the technological university model, aiming to strengthen its function and its impact on regional development.

Keywords: Federal Technological University of Paraná (UTFPR), technological university, university model.

(DES)CAMINHO DA UTFPR NA CONSTRUÇÃO DO MODELO BRASILEIRO DE UNIVERSIDADE TECNOLÓGICA

RESUMO: O presente estudo teve como objetivo geral compreender o modelo de universidade tecnológica subjacente às estruturas, políticas e práticas da Universidade Tecnológica Federal do Paraná (UTFPR). O método utilizado foi uma revisão narrativa. A coleta de dados ocorreu em duas etapas,

utilizando as bases SciELO, BDTD e Google Scholar, com o termo de pesquisa "Universidade Tecnológica Federal do Paraná", considerando publicações a partir de 2005. Foram incluídos 17 estudos (artigos, teses e dissertações) diretamente relacionados ao modelo de universidade tecnológica no Brasil. A análise seguiu as etapas de leitura exploratória, seletiva e crítica, com foco na relevância dos materiais para os objetivos do estudo. Os principais resultados indicam que a instituição, embora tenha avançado em termos de expansão e internacionalização, ainda enfrenta desafios na consolidação de sua identidade como universidade tecnológica, especialmente no que se refere à integração com o setor produtivo e à inovação. Observou-se um distanciamento do modelo idealizado desse tipo específico de universidade, com uma predominância de práticas acadêmicas mais tradicionais. Conclui-se que a UTFPR necessita de ajustes estruturais e estratégicos para alinhar suas políticas e práticas ao modelo de universidade tecnológica, visando fortalecer sua função e seu impacto no desenvolvimento regional.

Palavras-chave: Universidade Tecnológica Federal do Paraná (UTFPR), universidade tecnológica, modelo de universidade.

(DES)CAMINO DE LA UTFPR EN LA CONSTRUCCIÓN DEL MODELO BRASILEÑO DE UNIVERSIDAD TECNOLÓGICA

RESUMEN: El presente estudio tuvo como objetivo general comprender el modelo de universidad tecnológica subyacente a las estructuras, políticas y prácticas de la Universidad Tecnológica Federal de Paraná (UTFPR). El método utilizado fue una revisión narrativa. La recolección de datos se realizó en dos etapas, utilizando las bases de datos SciELO, BDTD y Google Scholar, con el término de búsqueda "Universidade Tecnológica Federal do Paraná" y considerando publicaciones a partir de 2005. Se incluyeron diecisiete estudios (artículos, tesis y disertaciones) directamente relacionados con el modelo de universidad tecnológica en Brasil. El análisis siguió las etapas de lectura exploratoria, selectiva y crítica, centrándose en la relevancia de los materiales para los objetivos del estudio. Los principales resultados indican que, aunque la UTFPR haya avanzado en términos de expansión e internacionalización, aún enfrenta retos para consolidar su identidad como universidad tecnológica, especialmente en lo que se refiere a la integración con el sector productivo y la innovación. Se observó un alejamiento con el modelo idealizado de este tipo específico de universidad, con una predominancia de prácticas académicas más tradicionales. Se concluye que la UTFPR necesita ajustes estructurales y estratégicos para alinear sus políticas y prácticas al modelo de universidad tecnológica, con el fin de fortalecer su función y su impacto en el desarrollo regional.

Palabras clave: Universidad Tecnológica Federal de Paraná (UTFPR), universidad tecnológica, modelo de universidad.

INTRODUCTION

Technological universities (TUs) emerged as a response to global industry demands, particularly after the 1970s, with a strong focus on technology and innovation. These specialized institutions differ from traditional or classical universities (CUs) by prioritizing innovation, entrepreneurship, applied research, technology development, and transfer, as well as promoting technology parks, knowledge cities, and ideals linked to social and environmental responsibility and interaction with the productive sectors (Martin et al., 2023; Pilatti & Lievore, 2018a). In this sense, TUs represent a specialization in higher education, addressing contemporary demands for advanced technical skills and flexibility in an ever-changing world.

Despite the global diffusion of TUs, the exact definition of these institutions remains imprecise. While they share internationally recognized principles, TUs are shaped by legal and structural limitations specific to their geographic location. These variations directly impact how they operate and evolve, leading to diverse implementations and educational practices across different contexts.

On a global scale, vocational higher education institutions do not adhere to a single concept of UT. Various other designations are used to describe them, such as colleges, universities of applied sciences, institutes or polytechnic universities, and technical universities. This diversity reflects each region's cultural and educational particularities, shaping the richness and variety of specialized higher education worldwide.

Beyond legal, structural, and nomenclature characteristics, these technological institutions can be understood in two main ways: In a broad sense, as institutions where technology serves as a means within a multidisciplinary approach; In a strict sense, as institutions where technology and practical solutions are the central focus, particularly in engineering-related fields. This duality reflects distinct educational models adapted to different geographical contexts, increasing the complexity of establishing a unified model that aligns with the diverse realities of higher education.

Several studies have explored technological institutions, offering varied perspectives. Lewis (1992) examined British polytechnic schools and how these institutions balanced theoretical education with practical training, thus creating a graduate profile ready for the job market. McKenna and Sutherland (2006) discussed the necessary balance between academic knowledge and practical skills, a fundamental characteristic of TUs. Doern (2008) reviewed the role of polytechnic institutions in higher education in Ontario, Canada, analyzing the policy implications of integrating technical training with applied innovation development. Laya (2009), on the other hand, investigated the relevance of the TU model in Mexico, emphasizing the need for an educational system aligned with the industrial sector. Du Pré (2010) addressed the role of TUs in South Africa, highlighting their importance in training a specialized workforce. Naik (2012) proposed strategies to make India's TUs more globally competitive, focusing on technology transfer and industry collaboration. For instance, Harkin and Hazelkorn (2015) discussed institutional mergers in Ireland to improve efficiency and integration between academic and industrial sectors.

Regarding the dynamic interrelationship between technical education and specialized labor demands, Cunnane (2018) emphasized the need for TUs to integrate both sectors, stressing the obligation to connect education and research with the practical needs of the productive sector and industries. Ratnalikar and Patil (2018) highlighted the challenges faced by Indian TUs in achieving global excellence, suggesting reforms in teaching practices and university management. Pilatti and Lievore (2018a) analyzed university networks, focusing on the Red de Universidades Tecnológicas y Politécnicas de América Latina y el Caribe (RUTyP), which aimed to integrate technology, innovation, and socioeconomic development into higher education institutions in Latin America. Houghton (2020) addressed the imperative for TUs in Ireland to prepare professionals for an ever-evolving job market. Dada, Obamuyi, and Jesuleye (2021) discussed academic entrepreneurship in Nigerian TUs and its impact on sustainable development, emphasizing commercializing research and development (R&D) products. Stephens and Gallagher (2022) analyzed the impact of metrics on the creation of TUs in Ireland, highlighting how evaluation tools influence decision-making at the institutional level. Martin et al. (2023) reviewed the historical evolution of TUs, emphasizing the emerging responsibilities of these institutions, such as environmental sustainability and social justice. Peev et al. (2024) explored the concept of Circular Pedagogy to support cultural transformation in TUs, promoting inclusion, diversity, and sustainability. Finnegan and Murphy (2024) investigated how the digital identity of TU faculty in Ireland reflects institutional changes and new expectations in research and teaching.

In addition, several authors have contributed to understanding and improving the educational model of the Federal University of Technology – Paraná (UTFPR). Amorim (2016) questioned the institution's engineering training, highlighting the need for a less technical approach. Pilatti (2017) explored the challenges of interdisciplinarity and internationalization at UTFPR. Costa (2019) and Costa, Pilatti, and Santos (2021) compared the university with UFABC, analyzing faculty profiles and technological innovation. Cechin (2019) and Helmann (2019) made international comparisons with technology

universities in France and Portugal, emphasizing the influence of public policies and regional contexts. Pazello (2019) criticized UTFPR's passive internationalization model, highlighting the need for greater faculty integration. Lima and Sartori (2020) investigated the relationship between universities and companies through the Technology Innovation Centers (NITs). Lievore, Pilatti, and Teixeira (2020) examined the internal territorial cohesion policies at UTFPR and the Polytechnic Institute of Bragança (IPB), focusing on regional development.

More recently, in another study, Lievore, Pilatti, and Teixeira (2021) compared the idealized education model with the one implemented in Brazil and Portugal, exploring how these institutions respond to regional demands. Pequito and Sartori (2021) analyzed innovation management and institutional fragmentation at UTFPR, emphasizing the role of the NITs. Cechin et al. (2021) also examined internationalization programs at institutions such as Brafitec and Engenheiro 3i. Lara, Santos, and Pilatti (2023) addressed academic production at UTFPR, while Lievore, Pilatti, and Teixeira (2021) investigated the relationship between universities and regional development. Lanzarin (2021) highlighted the institution's role in strengthening the regional economy through teaching and research activities. Recent studies by Schiefler Filho and Souza (2023) and Schneider, Machado, and Nunes (2023) discussed the pedagogical and institutional challenges at UTFPR, comparing its practices with those of other institutions in Brazil and abroad.

Based on the observation and analysis of the issues investigated in the cited studies, the overall objective of this article is situated within this discussion context, driven by the need to understand the TU model underlying the structures, policies, and practices of UTFPR. To achieve this objective, this narrative review sought to integrate various studies conducted within the scope of UTFPR that addressed different aspects of the institution against the backdrop of the global trajectories of TUs. Considering that UTFPR is still the only university of its kind in Brazil and its trajectory is strongly influenced by national legislation, it is feasible to consider this institution's model as a possible reference for consolidating a Brazilian TU model. The elements that shape its institutional identity and its role in the context of technological higher education were also examined.

METHOD

This study adopted a narrative review, which allows for analyzing and synthesizing multiple literary sources, integrating different theoretical and conceptual perspectives on the subject under examination. According to Grant and Booth (2009) and Rother (2007), this methodology is particularly suitable for exploring the development of a topic from various angles without the need for strict search and inclusion protocols, offering greater flexibility in analyzing complex issues.

This approach included studies with diverse methodologies, providing a comprehensive view of the current knowledge regarding UTFPR's university model. However, it is acknowledged that selection bias is a common characteristic of this type of review (Cordeiro et al., 2007).

Data collection was conducted non-systematic in two stages: the first occurred between February and March 2024, with an update in November 2024. Three databases were consulted—Scientific Electronic Library Online (SciELO), the Brazilian Digital Library of Theses and Dissertations (BDTD), and Google Scholar—selected after preliminary tests as the most relevant for gathering material related to the research topic. The search term used was "Universidade Tecnológica Federal do Paraná," and only studies published after 2005 were considered, as this was the year in which the Federal Center for Technological Education of Paraná (Cefet-PR) was transformed into UTFPR.

The inclusion criteria focused on articles, theses, and dissertations that addressed UTFPR and public policies influencing the institution. Studies were selected based on their thematic relevance, specifically those discussing the TU model in the Brazilian context, focusing on institutional characteristics, challenges, and related public policies, whether directly or indirectly.

The analysis followed the steps suggested by Rother (2007), which included exploratory reading of texts to identify those meeting the inclusion criteria; selective reading, focusing on materials that directly addressed the key topics discussed in this article; and critical analysis and synthesis, involving

data interpretation and cross-referencing information from various sources to identify patterns, challenges, and gaps in the TU model in Brazil.

Ultimately, 17 texts met the inclusion and exclusion criteria and were selected for this narrative review. Additional studies and materials were used to describe the global trajectories of TUs and to outline the historical development of UTFPR.

GLOBAL TRAJECTORIES OF TECHNOLOGICAL UNIVERSITIES

TUs, with their practical orientation, play an essential role in the contemporary global landscape. Unlike CUs, which take a more theoretical and comprehensive approach to knowledge, TUs emerge as a response to market and productive sector needs. By combining academic education with applied research and close collaboration with industry, TUs contribute to economic and social development, training professionals equipped to tackle the challenges of new technologies and the demands of the modern world.

While CUs have a history dating back nearly a thousand years, TUs have a more recent trajectory. The first TUs emerged in Europe during the 18th century, in the context of the Industrial Revolution. It was during this period that the first institutions dedicated to technology were founded: Czech Technical University in Prague (Czech Republic, 1707), Technical University of Berlin (Germany, 1770), Istanbul Technical University (Turkey, 1773), Budapest University of Technology and Economics (Hungary, 1782), Paris Polytechnic School (France, 1794), and the University of Strathclyde in Glasgow (Scotland, 1796). In the United States, many technological institutions were established in the second half of the 19th century and the early 20th century. In Asia, the adoption of this model occurred mainly after World War II (Pilatti & Lievore, 2018a).

Contrary to the idea that TUs emerged as a direct response to the Industrial Revolutions, Pilatti and Lievore (2018b) argue that these institutions were not necessarily an immediate demand of these historical events. A relevant fact is that even a century after the beginning of the First Industrial Revolution, there were only 25 universities specializing in technology across 19 European and Asian countries. This number took over two centuries to reach 50 TUs worldwide.

TUs emerged primarily through two distinct processes. Some were established with a specific focus on engineering and technology, while others evolved through transforming or merging institutions dedicated to technical and vocational education (Pilatti & Lievore, 2018a). Due to the diverse educational characteristics of the nations where these institutions are located, the term "UT" is used in various ways, reflecting the ambiguous nature of the concept (McKenna & Sutherland, 2006).

The concept of TU unites two seemingly opposing ideas: "university" and "technology." The term "university" originates from the Latin *universitas*, referring to the universality of knowledge and the pursuit of learning in all its forms. In contrast, "technology" has its roots in Greek, combining *tekne* (art, technique, craft) and *logos* (knowledge, study). This combination reflects a synthesis between broad understanding and practical application, a defining characteristic of TUs. What might initially seem paradoxical—the universality of academic knowledge versus the specificity of technical expertise—instead becomes a complementary integration, where scientific and technical knowledge coexist to meet the demands of the modern world.

This need to unite theoretical knowledge with technological practice became particularly evident during the Industrial Revolution when the labor market demanded professionals with technical skills and academic training. In this context, TUs emerged as a response to prepare professionals capable of addressing the challenges of a rapidly changing society.

From the 19th century onward, TUs began to expand globally. Although they share some common characteristics, their specificities are strongly influenced by their geographical location (Pilatti & Lievore, 2018a). At the core of the seemingly paradoxical nature of TUs lies the idea of specialization, which can be understood as an "ideal type" in the Weberian perspective. This specialization manifests two extremes: on one side, specialization as a means or broad specialization involving a more comprehensive and integrative application of knowledge; on the other, specialization as an end or narrow specialization

with a focus on a more specific and detailed application. In practice, it is rare for an institution to adopt exclusively one of these approaches. Generally, TUs position themselves somewhere between these two extremes, reflecting the complexity and dynamics of the technological education field (Lara et al., 2021).

Specialization in TUs is intrinsically linked to the concept of technology. When considered as a means, this connection influences institutional actions, ideally transcending traditional areas of knowledge. A TU that views technology as a means tends to align with the concept of *universitas*, integrating technology as a multidisciplinary curricular resource across all fields of knowledge. On the other hand, the view of technology as an end is associated with a transdisciplinary approach, where specialization is predominantly focused on engineering and technology fields.

In the Latin American context, RUTyP has adopted an approach that shapes a global model for TUs and similar institutions. Five strategic pillars have been identified to represent these institutions: innovation and entrepreneurship; research, development, and technology transfer; technology parks and knowledge cities; social and environmental responsibility; and interaction with the productive sectors (Pilatti & Lievore, 2018a).

Du Pré (2010), in his investigation of technological higher education institutions in South Africa, identified the global characteristics of the TU model. Among these characteristics stand out: excellence in teaching and learning, applied research, leadership development in technology, technology transfer and innovation, partnerships with industry, and internationalization.

In the United Kingdom, Lewis (1992) notes that, despite their differences, polytechnics share many similarities with universities. The author warns against seeking differences that may be more imaginary than real. According to Lewis (1992), everyday aspects of polytechnics include teaching as a primary function; access for disadvantaged groups; emphasis on preparation for higher education; strong ties with local communities and the productive sector; programs oriented toward the labor market; validation and monitoring of academic standards; a high proportion of part-time students; and a focus on undergraduate programs.

Lievore, Pilatti, and Teixeira (2020) argue that the global TU model has several distinctive characteristics, such as practical teaching, a predominance of engineering and technology programs, applied research focused on solving industrial problems, technology production and transfer; strong ties with the productive sector; emphasis on innovation and entrepreneurship; the use of technology to drive local and regional development; faculty with industrial sector experience; and the training of highly skilled professionals as knowledge workers. Although familiar to TUs globally, these characteristics are implemented differently, depending on educational policies and each country's political and social context.

In practical terms, the implementation of TUs is multidimensional, reflecting the diversity and complexity of educational systems and the social and economic needs in which they are embedded. A striking example of this phenomenon was the May 1968 movement centered in Paris, which transformed the French educational system and inspired global changes. Characterized by student and worker protests, this movement demanded improvements in university conditions and the expansion of the educational system. As a result, the French university system was restructured by Law No. 68-978 of 1968 (France, 1968), which later led to the creation of France's first university of technology, the Université de Technologie de Compiègne, in 1972 (Cechin, Pilatti, & Ramond, 2021).

Parallel to the French movement, the 1970s saw the creation of many new TUs worldwide, highlighting two main trends: the expansion and the redesign of TUs. The first trend was marked by a rapid increase in TUs, which expanded beyond Europe, Asia, and the United States to reach other continents. A notable example occurred in Mexico, where, in the early 1990s, the government established TUs focused on training higher technicians, offering two-year programs (Laya, 2009). The second trend, still ongoing, involves the redesign of TUs to bring their status closer to or unify them with traditional universities, particularly in terms of academic competencies. This process includes the accreditation of TUs to grant academic degrees and doctoral titles, a change already implemented in countries such as Germany, the Netherlands, Switzerland, Turkey, and Taiwan (Lievore, Pilatti, & Teixeira, 2021).

In Portugal, on February 24, 2023, Parliament approved a significant reform in the country's polytechnic higher education system. With this change, Portugal's Polytechnic Institutes were granted

authorization to award doctoral degrees. Additionally, these institutions will undergo a name change and be renamed Polytechnic Universities, with the option to use the English designation Polytechnic University. This transformation goes beyond a mere name change, reflecting a distinct methodological approach, as polytechnic education combines theoretical and practical aspects, differentiating itself from CUs (Portugal, 2023).

The binary higher education system in the United Kingdom, which separated research-focused universities from polytechnic institutes oriented toward professional practice, was restructured in 1992. Since then, polytechnics have been reclassified as universities, gaining the right to grant their degrees. A similar example can be observed in France, where, in 2018, the Université de Technologie de Compiègne was integrated into Sorbonne Université as part of an academic consolidation movement (Cechin, 2019).

The first TU, Technological University Dublin, was established in Ireland on January 1, 2019. This institution, the second largest in the country, was created by merging three institutes of technology: Dublin Institute of Technology, Institute of Technology Tallaght, and Institute of Technology Blanchardstown (Houghton, 2020). Similar mergers continued in the following years, including the creation of Munster Technological University in January 2021 and South East Technological University in May 2022. Houghton (2020) identified strong similarities between the transformations in the UK and Ireland.

These transformations are part of a broader strategy for Irish higher education. TUs are created by merging technological institutes to prepare professionals for careers in an ever-evolving technological world (Stephens & Gallagher, 2022). The focus is on training specialists capable of disseminating knowledge that meets society's needs and labor market demands, particularly in these universities' regions (Irish, 2012). From the faculty's perspective, these transformations were considered positive, mainly due to advancements in research activities (Finnegan & Murphy, 2024; Stack & Wallace, 2023). Pratt (1997) argues that this shift, in which polytechnics began referring to themselves as universities, ultimately concealed that these new universities retained their polytechnic essence. Doern (2008) classifies this transition as a vocational evolution.

Houghton (2020) highlights concern that polytechnic institutes may lose their original vocational focus when transitioning into universities. Cunnane (2018) shares this concern, fearing that these institutions might drift away from their initial mission of serving their communities in their pursuit of recognition in global rankings. The author criticizes the possibility that new universities may prioritize image (with a capital "U") over substance (with a lowercase "t"), aiming to achieve higher positions in international rankings. In the United Kingdom, transforming polytechnics into TUs significantly lost their original vocational orientation. According to Houghton (2020), these institutions began to emulate CUs in terms of discipline and academic direction, often becoming less distinctive versions without a coherent philosophy and purpose.

In contrast, Houghton (2020) highlights a key difference between the process in Ireland and that in the United Kingdom. While British polytechnics adopted the designation of "university" after their transformation, Ireland, following the example of other European countries such as the Netherlands and Finland, mandated the use of the "Technological University (TU)" designation for polytechnic institutes that evolved into universities. The Irish model established a distinct grouping of higher education institutions in terms of status, preserving, to some extent, the existing binary system.

Adopting the "university" designation is essential for overcoming the outdated second-class status often attributed to polytechnic institutes. Comparatively, these institutes serve more students from less advantaged socioeconomic backgrounds (Houghton, 2020; Irish, 2019). Houghton (2020) argues that these institutes can break free from subservient positions by achieving TU status.

The OECD (2023) prepared the document *Consideration of an Optimal Representation for the Technological Higher Education Sector in Ireland* as part of its efforts to guide transformed institutions in their adaptation to global and regional demands, recognizing the growing role of these universities in the country's economic and social development. The study underscores the importance of aligning TUs' innovation and entrepreneurship strategies with the specific needs of the regions, thereby strengthening their ability to respond to the labor market and emerging technological innovations. This alignment

involves not only training technically skilled professionals but also the creation of environments that foster knowledge exchange between academia and industry. This enables TUs to position themselves as drivers of growth and innovation in their regions.

Additionally, the report emphasizes the importance of enhancing international cooperation among TUs, facilitating the exchange of innovative practices, and strengthening applied research globally. Such cooperation amplifies the impact of these universities, ensuring that their original missions—to promote technological education and regional development—are preserved, even amid the increasing pressure for academic recognition. Therefore, these institutions' success lies in balancing their local vocation with global engagement, ensuring regional relevance without compromising educational quality and international competitiveness (OECD, 2023).

Regarding Ireland, Houghton (2020) identifies several challenges in the ongoing transformation process, including Conflicts arising from complex merger processes, Geographical distance between merged institutions, which threatens regionalism policies in Irish higher education, The need to develop a research culture within new TUs, which have historically focused on teaching; Difficulties in streamlining the educational system through mergers; The construction of a new organizational culture and identity, incorporating new members; Political disputes over leadership positions.

Within this complex context, Houghton (2020) expresses concern about what may be lost in the transition to TU status, highlighting the importance of focusing on local and regional needs while preserving the distinct mission of these institutions. This concern echoes Cunnane's (2018) warnings about the risk of polytechnics becoming "universities" in name only, losing their essence and original objectives. Both reflections converge in the fear that TUs may ultimately abandon their vocational orientation to pursue academic and global recognition, which could undermine their mission to prioritize professional practice and technological innovation.

THE FIRST TECHNOLOGICAL UNIVERSITY IN BRAZIL

UTFPR remains Brazil's only TU, with a unique trajectory that sets it apart from other national universities. Its origins date back to the School of Apprentice Craftsmen, founded in 1909 (Leite, 2010). Over the years, the institution underwent several transformations, culminating in 2005, when Cefet-PR was elevated to TU status (Brazil, 2005).

This transformation was deeply influenced by Law No. 9,394/96, the National Education Guidelines and Framework Law (LDB) (Brazil, 1996), which allowed for the creation of specialized universities. The publication of Decree No. 2,208 (Brazil, 1997) also had a significant impact, particularly on the Federal Centers for Technological Education (Cefets), altering the provision of technical education. The opportunities opened by the LDB enabled a transition toward higher education programs initiated by Cefet-PR and later adopted by other Cefets. This movement began a gradual shift in focus from secondary education to higher education, particularly emphasizing technology-oriented programs (Romano, Candido, & Silva, 2009).

The initial proposal to elevate Cefet-PR to university status—a decision justified by its consolidated role in higher education and its compliance with the academic indicators required by law—was rejected during the Fernando Henrique Cardoso administration (Cechin & Pilatti, 2023; Lara et al., 2021). However, it was revived following the change in government in 2002. Formalized as a legislative bill, the proposal successfully advanced through the various stages of the legislative process, ultimately being sanctioned by President Lula in 2005 (Basso, 2023; Beltrão, 2023).

After the transformation of Cefet-PR into UTFPR, conflicts arose due to its continued affiliation with the Secretariat for Technological Education (Setec), the same entity that managed the other Cefets. Two key issues primarily drove these conflicts. The first involved political pressure from many legislators to convert the Cefets in their states into universities, even when these institutions did not meet the academic indicators required for such a transition. The government's policy of transforming Cefets into Federal Institutes of Education, Science, and Technology (IFs) emerged as a partial solution to curb the individual demands of various Cefets seeking TU status. However, Cefet Celso Suckow da Fonseca

(Cefet-RJ) and Cefet-MG, which already met the legally required academic indicators for the transition, chose not to adhere to the IF transformation, maintaining their goal of becoming TUs. This objective has persisted for nearly two decades (Cechin & Pilatti, 2023). In 2023, the process of transforming Cefet-MG and Cefet-RJ regained momentum with Bill No. 5,102/2023, currently under review in the National Congress, proposing to elevate these institutions to TU status (Brazil, 2023). The second issue centered on UTFPR, which came to be considered an outsider within Setec upon acquiring university status and gaining autonomy. The incompatibility between its affiliation with Setec and its university status led to its transfer to the Secretariat for Higher Education (Sesu), as some of Setec's government policies—such as the prioritization of technical courses—did not align with UTFPR's new institutional reality (Pilatti, 2017).

With its transformation into a university, UTFPR joined the Program for Supporting Restructuring and Expansion Plans of Federal Universities (Reuni) in 2008. This participation significantly increased all indicators, including faculty renewal and expanding academic programs, particularly in engineering and graduate studies. As a result, the university became the largest provider of engineering seats among Brazilian public universities (Basso, 2023; Beltrão, 2023). Currently, the institution operates 13 campuses distributed across all regions of Paraná (UTFPR, 2023).

Before transforming into a TU, while still a Cefet, the institution designed a model emphasizing integration with the productive sector and society. This integration was conceived as a necessary response to bridge the persistent gap between universities and businesses in Brazil. The strong connection with industry and the labor market, from the conception of ideas to the delivery of products or services, aimed to meet productive and social needs, surpassing the limitations of traditional academic research. This focus was reflected in the Institutional Pedagogical Project (PPI), which emphasized technological extension and applied research at both undergraduate and graduate levels (UTFPR, 2007; 2019). The university's project also highlighted the practical training of highly qualified professionals, a core characteristic of its trajectory. These elements shaped the TU project, which originated within the institution rather than being a government- or state-driven initiative (Pilatti & Lievore, 2018b).

UTFPR AND THE "MODEL" OF A TECHNOLOGICAL UNIVERSITY IN BRAZIL

The TU status grants UTFPR a unique position within the landscape of Brazilian universities, distinguishing it from other institutions. The legislation establishing UTFPR (Brazil, 2005) is the only normative reference in the country for an institution with this profile, unofficially positioning it as a model TU in Brazil. This singularity sets it apart legally and creates fertile ground for academic and institutional analyses exploring the characteristics that shape its identity. Such studies highlight the particularities of the adopted technological model, often pointing out both the similarities and divergences between UTFPR and traditional universities, especially regarding its relationship with the productive sector.

In the field of academic training, the challenges faced by UTFPR have been widely discussed. The study by Amorim (2016) examined the political-pedagogical projects of the institution's engineering programs, emphasizing that UTFPR fosters an education-oriented toward practice and the productive sector, one of the pillars of TUs. However, the author argues that the traditional approach, which focuses purely on technical aspects, must be overcome. The training of engineers should incorporate a critical perspective on the relationships between science, technology, and society (STS), enabling students to develop technological solutions that meet market demands and address broader social needs. In this sense, innovation and the social relevance of education would become more central, promoting a break from the current curricular uniformity.

Pilatti (2017) discussed how internalizing new educational models, such as interdisciplinarity, represents a complex yet necessary process for internationalization to become a reality in Brazilian universities. The author observed that, although UTFPR has made significant progress in integrating with the productive sector, it still faces barriers to fully adopting an interdisciplinary approach. The consolidation of the TU model also depends on the institution's ability to promote a more integrated education that transcends traditional disciplinary divisions. According to Pilatti (2017), this process

requires state policies, consistent investments, and faculty training to make internationalization and interdisciplinarity intrinsic elements of UTFPR's institutional culture.

Internationalization was the focus of the analysis conducted by Pazello (2019) on UTFPR. In this study, the author criticized the university's passive internationalization model, which is primarily centered on student mobility without deeper integration into pedagogical practices. The study highlighted that although UTFPR has progressed, significant challenges remain. One of the main obstacles identified was the hegemony of English as the instruction language, which limits faculty and students' broader participation in internationalization programs. Additionally, the study emphasized the need to integrate internationalization into the core of pedagogical practices, with greater faculty involvement and the development of linguistic and pedagogical competencies—both essential for UTFPR to enhance its competitiveness and relevance on the global stage.

Complementing the discussion on internationalization, Cechin et al. (2021) analyzed the Brafitec and Engenheiro 3i programs, highlighting their limitations and distinguishing features. Brafitec, a government program, focuses on international cooperation in engineering education. Engenheiro 3i was created by UTFPR as a distinctive program for its graduates, offering international experience in the productive sector. Although Engenheiro 3i faces financial challenges, it provides a complementary educational pathway focused on developing intercultural competencies and proficiency in three languages. Moreover, it integrates teamwork and partnerships with companies, making it an effective tool for UTFPR's internationalization by going beyond mere student mobility and aligning more closely with the institution's mission.

A similar outcome was found in a study examining the internal policies developed by UTFPR and IPB to promote territorial cohesion, national and international recognition, and regional development (Lievore, Pilatti, & Teixeira, 2020). This investigation revealed that UTFPR provides little incentive for technological extension activities and lacks internal policies to assess faculty engagement with the community. In contrast, IPB has demonstrated the ability to develop its strategies and redefine its mission, focusing on regional development and showing greater alignment with its extension role and technology transfer.

In another study, Lievore, Pilatti, and Teixeira (2021) analyzed the idealized model and the responses of UTFPR and IPB to policies related to the third mission in specialized educational institutions. Using official documents and semi-structured interviews with Brazilian and Portuguese policymakers and administrators, the study found that UTFPR, initially conceived as a vocational university, deviated from its projected model due to changes in the political landscape. In contrast, IPB remained faithful to its original model, maintaining teaching and research closely linked to the region and its economic impact.

Focusing on faculty profiles, Costa (2019) compared UTFPR and UFABC by analyzing faculty curricula from 2005 to 2017. The expectation was to find significant differences between a TU and a more conventional university. Still, the results indicated that indicators such as scientific production, participation in research groups, and other academic activities did not differ substantially between the two institutions. This finding was unexpected, as it was believed that UTFPR, a technological institution, would exhibit a stronger orientation toward innovation and technology transfer. The study highlights a possible divergence between the idealized TU model and UTFPR's institutional reality. It suggests that the university may be drifting away from its intended role—or perhaps never fully aligned with it.

Regarding innovation and technology transfer, Costa, Pilatti, and Santos (2021) extended Costa's (2019) analysis, exploring the role of both institutions—UTFPR and UFABC—in technological innovation development. The study revealed that despite their potential, both institutions carried out limited technology transfers to the productive sector. In the case of UTFPR, this reflects a misalignment with the traditional role of TU, which is expected to maintain a strong connection with the market. The study underscores the need for a more assertive institutional policy that fosters the transfer of innovations to the productive sector, thereby strengthening UTFPR's competitiveness and impact.

Pequito and Sartori (2021) analyze the relationship between the university and the productive sector, mediated by UTFPR's NITs. The study highlights that, despite 13 NITs, institutional fragmentation has hindered innovation management and strengthened this relationship. The authors suggest that UTFPR

should operate in a more integrated manner to overcome the barriers faced by researchers and companies, fostering closer collaboration between these actors. The study also emphasizes the need to establish the university as a key link in the innovation process, in alignment with the triple helix theory.

Lievore and Pilatti (2018) explored how, after a decade of operating as a TU, UTFPR had not yet consolidated its institutional identity. In an investigation that included document analysis and interviews with administrators, the authors found that technological extension—an expected differentiator of TUs - remains a weak point for the institution. Likewise, research findings still face challenges when being transferred to society. The study highlights that without more effective internal policies and a clear strategic direction, UTFPR risks moving toward the model of a conventional university, losing its technological identity.

The study conducted by Pilatti and Lievore (2018) examined the creation of UTFPR within the context of industrial revolutions and the factors that led to the acceptance of the TU model in Brazil. The findings showed that UTFPR was a pioneering model in the country, not as a direct response to industrial revolutions but as a national initiative to promote technological education. However, the authors point out that while the TU model in Europe evolved in parallel with industrialization demands, in Brazil, UTFPR was established out of an internal need, without the support of specific state policies to foster this type of institution. The research suggests that the absence of such policies may, to some extent, explain Brazil's lag in economic development and technological competitiveness compared to other industrialized nations.

The international landscape provides an essential counterpoint for understanding the challenges faced by UTFPR. Cechin (2019) conducted a comparative analysis of TUs in Brazil and France, based on the writings of Drèze and Debelle, to identify common and divergent conceptions among these institutions. One of the main findings was the predominance of the concept of the university as a "Core of Progress," deeply rooted in the North American higher education model. This model exemplifies a synergy between teaching, research, and innovation, fostering faculty and students' practical application of knowledge. The study revealed that while French technology universities have consolidated this concept, UTFPR still struggles to build and solidify its identity as a UT. Unlike the French institutions, UTFPR continues to seek ways to balance its activities between teaching and research while also facing challenges in developing a distinct and recognized technological identity.

In the comparative investigation that Helmann (2019) conducted between UTFPR and IPB, the impact of public policies and the different responses of each institution were highlighted. While UTFPR has drifted away from the characteristics initially planned for a TU- constrained by existing legislation - IPB in Portugal has remained true to its idealized model. This contrast illustrates how political demands and the socioeconomic context can directly influence the institutional model, its identity, and its mission, ultimately affecting its relationship with regional development and technological innovation. The study suggests that specific policies are needed to materialize UTFPR's educational proposals, including hiring professionals with experience in the productive sector, fostering systematic relationships with companies and society, and focusing on applied research and technological extension.

The analysis of UTFPR's impact on regional development was the focus of Lanzarin's (2021) investigation, highlighting the institution's strategic role in fostering local development through teaching, research, and extension activities. The author identified that while the institution has the potential to strengthen the regional economy, improving relationships between the university, industry, and government is essential. According to her, UTFPR could have an even more significant impact if its policies were directed toward a stronger integration between regional demands and its technological potential.

In academic production, Lara, Santos, and Pilatti (2023) conducted a comparative analysis between the classical and technological university models, focusing on faculty members' scholarly output in teaching degree programs at UFPR and UTFPR. Using data from 1,017 curricula available on the Lattes Platform, the authors found that although academic production at UFPR is more consolidated and higher in quality, the research model at both institutions is quite similar. The study suggests that despite differences in institutional maturity, UFPR and UTFPR share a research model oriented toward academic

excellence. However, no more substantial alignment of UTFPR with applied research was identified, which would be expected in a UT.

In the pedagogical field, Schneider, Machado, and Nunes (2023) analyzed the syllabi of the Biological Sciences teaching degree program at UTFPR, identifying the presence of active methodologies in the courses. However, despite the variety of proposed methodologies, traditional teaching still predominates. The analysis reinforces the need for curricular updates that enhance teacher training and promote pedagogical innovations aligned with UTFPR's technological vocation, strengthening its identity as a leading university in developing dynamic educational practices.

In the article by Schiefler Filho and Souza (2023), the duality of UTFPR is highlighted, as the university seeks to balance the need to train professionals for the productive sector with the mission of developing critical and emancipated citizens. The institution aims to stand out for its connection with the productive sector and its educational approach. It seeks beyond productivism to promote a comprehensive education encompassing technical skills and reflective and critical capacities.

Although UTFPR holds a unique position within the landscape of Brazilian universities, it faces several challenges that hinder the complete consolidation of its TU model. The interaction between TUs and the productive sector should not be viewed solely from a right-wing utilitarian perspective. It values research only for its direct contribution to industry or resolving social issues such as inequality and poverty. According to Brito Cruz (2010), there is a risk of limiting academic knowledge to an instrumental function, whether through an approach that prioritizes economic growth or focuses on social issues (left-wing utilitarianism). The need for integration with the productive sector within the context of TUs must go beyond this reductionist view. It is about fostering a dialectical relationship between knowledge production and its practical application, allowing the university to fulfill its role in promoting technological innovation and economic development and its commitment to providing critical education to build a more equitable society. Thus, the partnership with the productive sector should be understood as a two-way street, where the knowledge generated benefits the industry while enabling the university to remain connected to broader societal demands.

The studies that discuss the institution's identity-related challenges reveal multidimensional issues marked by high complexity. The aspects that outline the institutional challenges and are connected to the future trajectory of the TU model are presented below.

- TU Model in Brazil

UTFPR is the only university in Brazil that has been established under specific legislation for the TU model. Its institutional documents, such as the PPI and the PDI, prioritize training focused on the productive sector, which requires close alignment with the market. However, the institution faces challenges in implementing this model. While faculty members demonstrate strong academic output, many have little or no practical experience in the industry, making it difficult to connect with the demands of the productive sector. Additionally, in external evaluations - such as those conducted by the National Higher Education Evaluation System (Sinaes) and the Coordination for the Improvement of Higher Education Personnel (Capes) - UTFPR is often assessed using the same criteria applied to conventional universities, which limits recognition of its specific characteristics as UT. Legal constraints also restrict its ability to align with an idealized TU model. In practice, aside from its focus on engineering programs, the differences between UTFPR and conventional universities are, at most, subtle.

- Challenges in Academic Training

Despite its mission to provide practice-oriented education aligned with market demands, UTFPR still follows an academic model centered on predominantly technical aspects and traditional curricula. The significant growth of research, often disconnected from practical applications, results in a more theoretical education, bringing the institution closer to CUs. The close relationship with the productive sector, a defining characteristic of the former Cefet-

PR, has weakened considerably since it transitioned into a university. This detachment can be partially attributed to the more theoretical academic profile of newly hired faculty, selected based on legal requirements prioritizing doctoral degrees - often without practical industry experience.

- Interdisciplinary and Internationalization

UTFPR still faces challenges in adopting more integrated and humanized curricula. Its academic programs continue to prioritize technical skills ("hard skills") over more flexible approaches that foster interpersonal and critical competencies ("soft skills"). In the field of internationalization, the process remains limited by an excessive reliance on student mobility and the predominant use of English as the language of instruction, which restricts broader participation within the academic community. While expanding international cooperation and integrating these experiences more deeply into academic training is essential, dual-degree programs have been regarded as successful, providing students with a distinctive and internationally recognized education.

- Extension and Technology Transfer

UTFPR has yet to stand out significantly in technological extension and the transfer of innovations to the productive sector, which are fundamental to a university with a technological focus. To fully embrace this role, the institution must implement more assertive and targeted internal policies that strengthen ties with the market and promote the practical application of research outcomes and technological innovations. This alignment is crucial for enhancing UTFPR's impact on economic and technological development, reinforcing its role as a transformative agent in industry and society, and bringing it closer to the objectives outlined in its PPI.

- Institutional Identity and Regional Development

UTFPR still faces challenges in fully consolidating its technological identity while striving to align with the original TU model. The absence of specific public policies and Brazil's socioeconomic context have hindered this consolidation process. Despite these difficulties, the university plays a significant role in regional development, mainly due to its extensive presence in Paraná, with 13 campuses across different regions. This presence enables the institution to maintain a close relationship with local demands, especially in inland cities, where it serves as a key differentiator, contributing to these communities' economic and social growth.

- Faculty Profile

UTFPR's faculty profile must be more effectively aligned with the institution's technological mission, which requires stronger integration between practical experience in the productive sector and a focus on applied innovation. While many professors have a solid academic background, their training is often predominantly theoretical, with limited market experience. To bring UTFPR closer to the TU model as an ideal type, it is essential to encourage faculty engagement in innovation and technological extension projects and to provide training for interdisciplinary and international collaboration. Adopting new pedagogical methodologies that combine theory and practice and a critical education that integrates technological and social dimensions will enhance student training and reinforce the university's relevance in the productive sector.

UTFPR, as a TU, finds itself at a critical juncture when reflecting on its institutional identity and role in Brazil's educational and productive landscape. The challenges discussed throughout this analysis - including academic training, relations with the productive sector, internationalization, and

technological extension - highlight the need for more targeted and structured actions to bring the institution closer to the ideal TU model. Overcoming these limitations requires implementing more effective internal policies and continuously adapting to market and societal demands, including revisions to existing legislation. More than that, UTFPR must consolidate itself as a TU, with a capital "T," prioritizing substance over image. Only then will it be possible to establish a TU model in the way Brazil truly needs - one that integrates innovation, applied research, and social and regional development, generating a tangible impact on the country's productive reality.

FINAL CONSIDERATIONS

The analysis of studies on UTFPR reveals a divergence between the institution and the idealized TU model, as outlined in its PPI. The university faces significant challenges in key areas such as practical teaching, applied research, technology transfer, and technological extension. These aspects, which internationally characterize a TU, are currently misaligned with the expected model, reflecting a shift toward a structure more akin to traditional universities.

This detachment is evident in UTFPR's difficulty in establishing a solid relationship with the productive sector, one of the pillars of the TU model. Additionally, the predominantly theoretical profile of the faculty and the lack of more assertive policies to strengthen innovation and technological extension further exacerbate this disconnection. Although the institution has made progress in internationalization, this process needs to be more integrated into academic and pedagogical practices for UTFPR to fully realize its potential as a global institution focused on technological development.

Given this scenario, it is impossible to determine whether UTFPR has reached an irreversible turning point, where its technological identity gives way to the CU model, or whether there is still time to resume its original path. What is clear is that the institution is at a critical crossroads. Reversing this deviation from the TU model will require a profound strategic reassessment capable of realigning its practices with the demands of the productive sector and society. Without decisive action, there is a risk of consolidating an evolution that distances UTFPR from its original mission and what Brazil needs regarding innovation and technological development.

REFERENCES

AMORIM, Mário Lopes. Qual engenheiro? – uma análise dos projetos político-pedagógicos dos cursos de engenharia da Universidade Tecnológica Federal do Paraná (UTFPR). *Revista de Ensino de Engenharia*, *35* (1), p. 23-33, 2016. Available at: <http://revista.educacao.ws/revista/index.php/abenge/article/view/370/517>. Accessed on: 15/10/2024.

BASSO, Cion Cassiano. UTFPR: não foi concebida como uma universidade, foi transformada. In: CECHIN, Marizete Righi; PILATTI, Luiz Alberto; RAMOND, Bruno (org.). *Histórias da UTFPR contadas em entrevistas*. Curitiba: EDUTFPR, 2023. p. 128-136. Available at: <https://repositorio.utfpr.edu.br/jspui/bitstream/1/32341/1/historiasutfprcontadas.pdf>. Accessed on: 15/10/2024.

BELTRÃO, Paulo André de Camargo. UTFPR: específica por área de conhecimento do campo do saber. In: CECHIN, Marizete Righi; PILATTI, Luiz Alberto; RAMOND, Bruno (org.). *Histórias da UTFPR contadas em entrevistas*. Curitiba: EDUTFPR, 2023. p. 61-76. Available at: <https://repositorio.utfpr.edu.br/jspui/bitstream/1/32341/1/historiasutfprcontadas.pdf>. Accessed on: 15/10/2024.

BRAZIL. *Decreto n.º 2.208, de 17 de abril de 1997*. Regulamenta o § 22 do art. 36 e os arts. 39 a 42 da Lei no 9.394, de 20 de dezembro de 1996, que estabelece as diretrizes e bases da educação nacional. Brasília,

1997. Available at: <http://portal.mec.gov.br/setec/arquivos/pdf/DF2208_97.pdf>. Accessed on: 15/10/2024.

BRAZIL. *Lei n.º 9.394, de 20 de dezembro de 1996*. Estabelece as diretrizes e bases da educação nacional. Brasília, 1996. Available at: <https://www.planalto.gov.br/ccivil_03/Leis/L9394.htm>. Accessed on: 15/10/2024.

BRAZIL. *Lei n.º 11.184, de 7 de outubro de 2005*. Dispõe sobre a transformação do Centro Federal de Educação Tecnológica do Paraná em Universidade Tecnológica Federal do Paraná e dá outras providências. Brasília, 2005. Available at: <https://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?jornal=1&pagina=1&data=10/10/200. Accessed on: 15/10/2024.

BRAZIL. *Projeto de Lei n.° 5.102, de 2023*. Dispõe sobre a transformação dos Centros Federais de Educação Tecnológica de Minas Gerais e do Rio de Janeiro em Universidade Tecnológica Federal de Minas Gerais e Universidade Tecnológica Federal do Rio de Janeiro, e dá outras providências. Brasília, 2023. Available at: <https://www.camara.leg.br/proposicoesWeb/prop_mostrarintegra?codteor=2372985>. Accessed on: 15/10/2024.

BRITO CRUZ, Carlos Henrique de. Ciência, tecnologia e inovação no Brasil: desafios para o período 2011 a 2015. *Interesse Nacional*, p. 1-22, 2010. Available at: <https://www.ifi.unicamp.br/~brito/artigos/CTI-desafios-InteresseNacional-07082010-FINAL.pdf>. Accessed on: 15/10/2024.

CECHIN, Marizete Righi. *Estudo comparativo entre a Universidade Tecnológica Federal do Paraná e as Universidades de Tecnologia da França*. Tese (Doutorado em Ensino de Ciência e Tecnologia). Ponta Grossa: Universidade Tecnológica Federal do Paraná, 2019. Available at: <https://repositorio.utfpr.edu.br/jspui/bitstream/1/4041/10/PG_PPGECT_D_Cechin%2C%20Marizete%20Righi_2019.pdf>. Accessed on: 15/10/2024.

CECHIN, Marizete Righi *et al.* A contribuição dos programas Brafitec e Engenheiro 3i para o aperfeiçoamento da internacionalização da universidade. *Educação em Revista*, v. 37, e26101, 2021. <http://dx.doi.org/10.1590/0102-469826101>.

CECHIN, Marizete Righi; PILATTI, Luiz Alberto. Da formação de artífices à Rede Federal de Educação Profissional, Científica e Tecnológica. *Pro-Posições*, v. 34, e20210113, 2023. <http://dx.doi.org/10.1590/1980-6248-2021-0113>

CECHIN, Marizete Righi; PILATTI, Luiz Alberto; RAMOND, Bruno. Maio de 68: contribuições para nascer a primeira universidade de tecnologia na França. *Cadernos de História da Educação*, v. 20, e013, 2021. <https://doi.org/10.14393/che-v20-2021-13>

CORDEIRO, Alexander Magno *et al.* Revisão sistemática: uma revisão narrativa. *Revista do Colégio Brasileiro de Cirurgiões*, *34*, (6), p. 428-431, 2007. <https://doi.org/10.1590/S0100-69912007000600012>

COSTA, Agnaldo da. *Análise da produção técnico-científica dos docentes de duas jovens universidades de modelos distintos*: comparativo entre a Universidade Tecnológica Federal do Paraná (UTFPR) e a Universidade Federal do ABC (UFABC). Tese (Doutorado em Ensino de Ciência e Tecnologia). Ponta Grossa: Universidade Tecnológica Federal do Paraná, 2019. Available at:

<https://repositorio.utfpr.edu.br/jspui/bitstream/1/4720/1/analiseproducaotecnicocientificadocentes.pdf>. Accessed on: 15/10/2024.

COSTA, Agnaldo da; PILATTI, Luiz Alberto; SANTOS, Celso Bilynkievycz dos. Inovação, desenvolvimento e transferência de tecnologia em universidade clássica e tecnológica: comparação entre UFABC e UTFPR. *Avaliação: Revista da Avaliação da Educação Superior*, *26* (2), p. 347-376, 2021. <https://doi.org/10.1590/S1414-40772021000200002>

CUNNANE, Vicent. Technological universities should bring out the best of both sectors. *The University Times*, Dublin, 15 set. 2018. Available at: <http://www.universitytimes.ie/2018/09/technological-universities-should-bring-out-the-best-of-both-sectors/>. Accessed on: 15/10/2024.

DADA, Abolaji D.; OBAMUYI, Tomola M.; JESULEYE, Olalekan A. Academic entrepreneurship of technological universities and sustainable development in Nigeria. *Advances in Research*, *22* (1), p. 49-65, 2021. <https://doi.org/10.9734/AIR/2021/v22i130287>

DOERN, Bruce. *Polytechnics in higher education systems*: A comparative review and policy implications for Ontario. Toronto: The Higher Education Quality Council of Ontario, 2008.

DU PRÉ, Roy. Universities of technology in the context of the South African higher education landscape. In: TOWNSEND, Rosemary (ed.). *Universities of technology* – Deepening the debate. Pretoria: Council on Higher Education, 2010, p. 1–41. Available at: <https://www.che.ac.za/sites/default/files/publications/Kagisano_No_7_February2010.pdf>. Accessed on: 15/10/2024.

FINNEGAN, Clare; MURPHY, Regina. Refracting lecturers' digital identity through the lens of policy reform of technological universities in Ireland. *European Journal of Education*, *59* (1), p. 1–14, 2024. <https://doi.org/10.1111/ejed.12733>

FRANCE. *Loi n.° 68-978 du 12 novembre 1968 d'orientation de l'enseignement supérieur.* Paris: République Française, 1968. Available at: <https://www.legifrance.gouv.fr/loda/id/JORFTEXT000000693185/2000-06-21/?isSuggest=true>. Accessed on: 15/10/2024.

GRANT, Maria J.; BOOTH, Andrew. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal*, *26* (2), p. 91-108, 2009. <https://doi.org/10.1111/j.1471-1842.2009.00848.x>

HARKIN, Siobhan; HAZELKORN, Ellen. Institutional mergers in Ireland. In: CURAJ, Adrian *et al.* (ed.). *Mergers and alliances in higher education*: International practice and emerging opportunities. Dordrecht, Netherlands: Springer, 2015, p. 105-121.

HELMANN, Caroline Lievore. A territorialização da política educacional em perspectiva comparada: estudo de caso da UTFPR e IPB. Tese (Doutorado em Ensino de Ciência e Tecnologia). Ponta Grossa: Universidade Tecnológica Federal do Paraná, 2019. Available at: <https://repositorio.utfpr.edu.br/jspui/bitstream/1/4148/2/PG_PPGECT_D_Helmann%2c%20Caroline%20Lievore_2019.pdf>. Accessed on: 15/10/2024.

HOUGHTON, Frank. Technological universities in Ireland: The new imperative. *Irish Journal of Academic Practice*, *8* (1), art. 12, p. 1–20, 2020. Available at: <https://arrow.tudublin.ie/ijap/vol8/iss1/12/>. Accessed on: 15/10/2024.

IRISH. Department of Education. Higher Education Authority (HEA). *A spatial & socio-economic profile of higher education institutions in Ireland*. Dublin: Higher Education Authority, 2019. Available at: <https://hea.ie/assets/uploads/2019/10/Higher-Education-Spatial-Socio-Economic-Profile-Oct-2019.pdf>. Accessed on: 15/10/2024.

IRISH. Department of Education. Higher Education Authority (HEA). *Towards a future higher education Landscape*. Dublin: Higher Education Authority, 2012. Available at: <https://hea.ie/assets/uploads/2017/04/Towards-a-Higher-Education-Landscape.pdf>. Accessed on: 15/10/2024.

LANZARIN, Marisa Olicéia da Rosa. *Análise das relações da Universidade Tecnológica Federal do Paraná e suas influências no desenvolvimento regional*. Dissertação (Mestrado em Desenvolvimento Regional). Pato Branco: Universidade Tecnológica Federal do Paraná, 2021. Available at: <https://repositorio.utfpr.edu.br/jspui/bitstream/1/25781/1/relacoesuniversidadedesenvolvimentoregional.pdf>. Accessed on: 15/10/2024.

LARA, Luiz Marcelo de *et al*. Technological university in Brazil: Examining the development and (de)construction of the model. *International Journal of Scientific Research and Management*, *9* (12), EL-2021-2060, 2021. <http://dx.doi.org/10.18535/ijsrm/v9i12.el05>

LARA, Luiz Marcelo de; SANTOS, Celso Bilynkievycz dos; PILATTI, Luiz Alberto. Produção acadêmica em cursos de licenciatura: comparação entre uma universidade tecnológica e uma clássica. *Revista Brasileira da Educação Profissional e Tecnológica*, *2* (23), e14409, 2023. <https://doi.org/10.15628/rbept.2023.14409>

LAYA, Marisol Silva. Technological universities: A relevant educational model for Mexico? In: RABY, Rosalind Latiner; VALEAU, Edward J. (ed.). *Community College Models*. Dordrecht: Springer, 2009. p. 219-233. <https://doi.org/10.1007/978-1-4020-9477-4_13>

LEITE, José Carlos Corrêa. *UTFPR*: uma história de 100 anos. Curitiba: EDUTFPR, 2010.

LEWIS, Michael S. The polytechnics: A peculiarly British phenomenon. *Metropolitan Universities*, *2* (4), p. 24-34, 1992. Available at: <https://journals.iupui.edu/index.php/muj/article/view/19224/19049>. Accessed on: 15/10/2024.

LIEVORE, Caroline; PILATTI, Luiz Alberto. Entre o tecnológico e o clássico: o modelo de universidade da UTFPR. *Trabalho & Educação (UFMG)*, v. 27, p. 135-159, 2018. Available at: <https://periodicos.ufmg.br/index.php/trabedu/article/view/9725/6871>. Accessed on: 15/10/2024.

LIEVORE, Caroline; PILATTI, Luiz Alberto; TEIXEIRA, João Alberto Sobrinho. Respostas às demandas políticas na pesquisa científica e na terceira missão em instituições de Ensino Superior especializadas: estudo comparado entre a Universidade Tecnológica Federal do Paraná, Brasil, e o Instituto Politécnico de Bragança, Portugal. *Ensaio: Avaliação e Políticas Públicas em Educação*, *29* (113), p. 1092-1114, 2021. <https://doi.org/10.1590/S0104-40362021002902446>

LIEVORE, Caroline; PILATTI, Luiz Alberto; TEIXEIRA, João Alberto Sobrinho. Universidade Tecnológica Federal do Paraná e Instituto Politécnico de Bragança: uma perspectiva de coesão territorial. *Revista Lusófona de Educação*, *47* (47), p. 11-25, 2020. <http://dx.doi.org/10.24140/issn.1645-7250.rle47.01>

LIMA, Rafael Fernando Pequito; SARTORI, Rejane. A relação entre universidade e empresa mediada pelo Núcleos de Inovação Tecnológica: um estudo na UTFPR. *Navus*, v. 10, p. 1-15, 2020. <https://doi.org/10.22279/navus.2020.v10.p01-15.1433>

MARTIN, Diana Adela *et al*. Pedagogical orientations and evolving responsibilities of technological universities: A literature review of the history of engineering education. *Science and Engineering Ethics*, *29* (40), p. 1-29, 2023. <https://doi.org/10.1007/s11948-023-00460-2>

MCKENNA, Sioux; SUTHERLAND, Lee. Balancing knowledge construction and skills training in universities of technology. *Perspectives in Education*, *24* (3), p. 15-24, 2006. Available at: <https://journals.co.za/doi/10.10520/EJC87394>. Accessed on: 15/10/2024.

NAIK, B. M. Strategies to make technological universities globally competitive. *Journal of Engineering Education Transformations*, *25* (3), p. 11-18, 2012. <https://doi.org/10.16920/jeet/2012/v25i3/114994>

OECD – Organization for Economic Cooperation and Development. *Consideration of an Optimal Representation for the Technological Higher Education Sector in Ireland*. OECD Publishing, 2023. Available at: <https://www.oecd.org/en/publications/consideration-of-an-optimal-representation-for-the-technological-higher-education-sector-in-ireland_5ea4eded-en.html>. Accessed on: 15/10/2024.

PAZELLO, Elizabeth. *Internacionalização na UTFPR*: da cereja do bolo às duas pontas do iceberg. Tese (Doutorado em Letras). Curitiba: Universidade Federal do Paraná, 2019. Available at: <https://acervodigital.ufpr.br/xmlui/bitstream/handle/1884/65612/R%20-%20T%20-%20ELIZABETH%20PAZELLO.pdf?sequence=1&isAllowed=y>. Accessed on: 15/10/2024.

PEEV, Ivaylo *et al*. Circular pedagogy to support technological universities cultural transformation. *Irish Journal of Academic Practice*, *11* (2), p. 1–21, 2024. Available at: <https://arrow.tudublin.ie/ijap/vol11/iss2/4>. Accessed on: 15/10/2024.

PILATTI, Luiz Alberto. Internalização da interdisciplinaridade como condição para a internacionalização da Universidade Tecnológica Federal do Paraná – UTFPR. In: PHILIPPI JR, Arlindo; FERNANDES, Valdir; PACHECO, Roberto C. S. (org.). *Ensino, pesquisa e inovação*: desenvolvendo a interdisciplinaridade. Barueri: Manole, 2017. p. 102-119.

PILATTI, Luiz Alberto; LIEVORE, Caroline. Redes de universidades: o caso da RUTyP. *Educación Superior y Sociedad*, *28* (28), p. 127-154, 2018a. Available at: <https://www.iesalc.unesco.org/ess/index.php/ess3/article/view/87>. Accessed on: 15/10/2024.

PILATTI, Luiz Alberto; LIEVORE, Caroline. Universidades tecnológicas: o que induziu esse modelo universitário no Brasil. *Revista Brasileira de Ensino de Ciência e Tecnologia*, *11* (2), p. 582-613, 2018b. <http://dx.doi.org/10.3895/rbect.v11n2.8471>

PORTUGAL. *Lei n.º 16/2023, de 10 de abril*. Valoriza o ensino politécnico, alterando a Lei de Bases do Sistema Educativo e o regime jurídico das instituições de ensino superior. Diário da República n.º 70/2023, Série I de 2023-04-10. Available at: <https://dre.tretas.org/dre/5313857/lei-16-2023-de-10-de-abril>. Accessed on: 15/10/2024.

PRATT, John. *The polytechnic experiment*: 1965-1992. Buckingham: Open University Press, 1997.

RATNALIKAR, N. V.; PATIL, Sunil. Technological universities of India to achieve global quality and excellence. *Journal of Engineering Education Transformations*, *32* (1), p. 57-59, 2018. Available at:

<https://journaleet.in/articles/technological-universities-of-india-to-achieve-global-quality-and-excellence>. Accessed on: 15/10/2024.

ROMANO, Cezar Augusto; CANDIDO, Roberto; SILVA, José Reinaldo. Organização, estrutura e gestão de uma universidade especializada no campo do saber da tecnologia: a consolidação da Universidade Tecnológica Federal do Paraná (UTFPR). *Tecnologia & Humanismo*, *23* (36), p. 121-141, 2009. Available at: <https://periodicos.utfpr.edu.br/rth/article/viewFile/6251/3902>. Accessed on: 15/10/2024.

ROTHER, Edna Terezinha. Revisão sistemática x revisão narrativa. *Acta Paulista de Enfermagem*, São Paulo, *20* (2), p. v-vi, 2007. <http://dx.doi.org/10.1590/S0103-21002007000200001>

SCHIEFLER FILHO, Marcos Flávio de Oliveira; SOUZA, Maurini. Universidade Tecnológica (UT) brasileira: virtudes, desafios e contradições. *Universidades*, n. 95, p. 11-26, 2023. <http://dx.doi.org/10.36888/udual.universidades.2023.95.676>

SCHNEIDER, Eduarda Maria; MACHADO, Jeniffer Sabrina; NUNES, Silvana Aguero. Inovação metodológica da prática pedagógica: um olhar para as disciplinas curriculares de um curso de licenciatura em ciências biológicas (UTFPR). *Revista Contexto & Educação*, *38* (120), e12693, 2023. <https://doi.org/10.21527/2179-1309.2023.120.12693>

STACK, Gary D.; WALLACE, James. Investigating the factors influencing academic staff attitudes toward the formation of a technological university. *Studies in Higher Education*, *48* (7), p. 1025-1038, 2023. <http://dx.doi.org/10.1080/03075079.2023.2180629>

STEPHENS, Simon; GALLAGHER, Padraig. Metrics, metrics, metrics: the emergence of technological universities in Ireland. *Quality Assurance in Education*, *30* (1), p. 19–31, 2022. <https://doi.org/10.1108/QAE-04-2021-0060>

UTFPR – Universidade Tecnológica Federal do Paraná. *Plano de desenvolvimento institucional da Universidade Tecnológica Federal do Paraná*: 2023-2027. Curitiba: EDUTFPR, 2023. Available at: <https://nuvem.utfpr.edu.br/index.php/s/rNpmWcJ8plfRQYc#pdfviewer>. Accessed on: 15/10/2024.

UTFPR – Universidade Tecnológica Federal do Paraná. *Projeto Político-Pedagógico Institucional (PPI)*. Curitiba: Universidade Tecnológica Federal do Paraná, 2007. Available at: <https://www.utfpr.edu.br/documentos/reitoria/documentos-institucionais/ppi/ppi-2007/@@download/file>. Accessed on: 15/10/2024.

UTFPR – Universidade Tecnológica Federal do Paraná. *Projeto Pedagógico Institucional da Universidade Tecnológica Federal do Paraná*. Curitiba: EDUTFPR, 2019. Available at: <https://www.utfpr.edu.br/documentos/reitoria/documentos-institucionais/ppi/ppi-2019>. Accessed on: 15/10/2024.

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DECLARATION OF CONFLICT OF INTEREST

The authors declare that there is no conflict of interest with this article.