

# The Entrepreneurial Orientation in the Transformation of Universities

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## ABSTRACT

Universities are a relevant and little-explored context to the study of strategic action, considering their need to adapt to environmental dynamics and establish a closer relationship with society. This study contributes to shedding light on how the changing process from a traditional university model to a more entrepreneurial model takes place. Thus, this study aims to analyze the role played by the universities' strategic management to the establishment of entrepreneurial orientation (EO) in the academic environment. For this sake, we did a multiple case study focusing on managers' decisions at the strategic level. The selected cases are three universities, two in Brazil and one in Sweden, recognized for their academic entrepreneurship approach in their environments. Based on these cases, the study reveals the influence of top-management decisions for the establishment of EO and how traditional institutions can pursue an entrepreneurial university model. The results emphasize the key role played by the universities' strategic management in establishing EO, through different levels of participation, but with recurrent behaviors in the implementation of the third academic mission.

## KEYWORDS

entrepreneurial orientation, strategic management, entrepreneurial university, third academic mission

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## 1. INTRODUCTION

In the last decades, universities around the world have been facing tensions as a result of the increase of external expectations. Debates on the future of higher education highlight the need for a transition to an entrepreneurial university to better face the challenge of keeping an impactful role in the economy and society. This transition can give universities a reinvigorated role in their traditional missions and the development of their regions (Etzkowitz & Zhou, 2017; Stensaker & Benner, 2013).

There are different models for the transformation of the traditional university as described in the academic literature, such as Clark (1998, 2004), Etzkowitz (2003) and Etzkowitz, Webster, Gebhardt, and Terra (2000), Nelles and Vorley (2010a) and Rothaermel, Agung, and Jiang (2007), with emphasis on those of Clark and Etzkowitz, considered seminal in the area. In general, these models emphasize the transformation from a hybrid, Humboldtian or traditional university model, based on teaching and research, to a more engaged and entrepreneurial university (Clark, 1998, 2004; Etzkowitz, 2013; Etzkowitz & Zhou, 2017; Tijssen, 2006).

The entrepreneurial university models have been inspiring academic leaders to join the changing process of universities. However, the models are limited to explaining how a process of change takes place and the role of decision-makers in this change. Although there is extensive literature addressing the entrepreneurial university phenomenon, we identified the need for a processual analysis to provide a better understanding of the changes that occur in the transformation from a traditional university model to an entrepreneurial university model. Therefore, this study engages in the effort of shedding light on how the changing process from a traditional university model to a more entrepreneurial model takes place.

In this context, this study aims to analyze the role played by universities' strategic management to establish the entrepreneurial orientation (EO) in the academic environment. EO has found broad support in the academic literature especially in the strategy and entrepreneurship fields, as addressed by Anderson, Kreiser, Kuratko, Hornsby, and Eshima (2015), Hitt, Ireland, Camp, and Sexton (2001), and Lumpkin and Dess (1996). EO dimensions refer to the extent managers at the strategic level are willing to take risks related to the business; to favor change and innovation pursuing competitive advantage; and to compete aggressively with other companies (Anderson et al., 2015; Covin & Slevin, 1988; George, 2011; George & Marino, 2011; Miller, 1983).

This study contributes to the approximation of EO literature, linked to the strategy field, with the empirical literature on entrepreneurial university phenomenon. EO's academic literature concentrates on private sector firms and there is an opportunity to explore EO in the academic setting. Indeed, knowledge about EO in the academics environment is evolving, mostly focused on measuring EO in different academic structures (e.g., Abou-Warda, 2015; Diáñez-González, Camelo-Ordaz, & Fernández-Alles, 2020; Krabel, 2018; Riviezzo, 2014; Todorovic, McNaughton, & Guild, 2011; Walter, Schmidt, & Walter, 2016). Quantitative studies predominate in EO, aiming to measure the relationship between behaviors and performance. These characteristics are present in several studies, such as Anderson et al. (2015), George (2011), George and Marino (2011), Lumpkin and Dess (1996), Wales (2016), and Wales, Wiklund, and McKelvie (2015).

Nevertheless, extant literature leaves a gap in the processual and qualitative studies, as shown by Covin and Miller (2014), Wales (2016), and Wiklund and Shepherd (2011). The need for qualitative studies is to provide a better understanding about the manifestation of the EO within organizations, with closer congruence between theory and management practice (Wales, 2016). This study addresses this gap, contributing to EO knowledge in the academic environment with

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a processual analysis to answer the following question: what is the role of the universities' strategic management regarding the establishment of the EO in the academic environment?

To discuss how EO affects the transformation processes of traditional institutions towards an entrepreneurial university model we did a multiple case study focusing on managers' decisions at the strategic level. The selected cases are three universities, two in Brazil and one in Sweden, which are recognized for their academic entrepreneurship approach in their environments. Based on these cases, the study reveals the influence of top-management decisions for the establishment of EO and how they can establish an entrepreneurial university approach in traditional institutions.

## 2. LITERATURE REVIEW

The term "entrepreneurial orientation" (EO) is "a corollary concept that emerged primarily from the strategic management literature" (Lumpkin & Dess, 1996, p. 136), based on Child's strategic choice perspective (1972, 1997), in which organization managers decide on the strategic action, rather than the deterministic view of the environment. Its origin is on studies from Mintzberg (1971, 1973), Miles, Snow, Meyer, and Coleman (1978), and Miller (1983). Mintzberg (1971) identified four roles describing the managers' control in the strategy process, such as the entrepreneur, who characterizes the manager as the designer and starts most of the controllable change in the organization. In another study, Mintzberg (1973) concluded that entrepreneurial companies tend to take more risks and are more proactive in pursuing new business opportunities.

Two subsequent studies from Miles et al. (1978) and Miller (1983) proposed typologies of companies. Miles et al. (1978) addressed three strategic types of organizations, including the prospector, which highlights the role of the entrepreneurial approach of the strategy, when companies must decide which products they must offer or which markets to enter. Miller (1983) considers EO a multidimensional concept addressing company level actions. Performance of companies is associated with the EO, i.e., companies that are less willing to take on entrepreneurial behaviors tend to achieve inferior results, compared to those who work following the entrepreneurial point of view.

Covin and Slevin (1988) refined Miller's (1983) definition and explained EO as an effect on strategic level decision making. EO is related to taking some level of risk in strategic decisions (risk-taking dimension); to favoring change and innovation in order to gain competitive advantage (innovativeness dimension), and to compete aggressively with other companies (proactiveness dimension). These authors also explain that non-entrepreneurial or conservative companies are those in which the management style at the strategic level is decidedly averse to risk and innovation and is passive or reactive.

The EO concept evolved, and Lumpkin and Dess (1996) distinguished new variables, adding competitive aggressiveness and autonomy as essential dimensions of entrepreneurship. Studies vary in the use of these five components, with the majority still focusing on the original three. In this study, EO includes the three dimensions commonly used in the literature – proactiveness, innovativeness, and risk-taking – following Anderson et al. (2015), George (2011), and George and Marino (2011).

Miller (2011, p. 875), in a critical reflection of Miller (1983), highlights that EO supports processual analysis related to how "entrepreneurs behave in creating their "new entry" – be that entry a new firm, a new product or technology, or a new market". Miller (2011) calls attention to the processual strength of EO, although several scales and measures have been essential in EO publications (e.g., Naldi, Nordqvist, Sjöberg, & Wiklund, 2007; Poon, Ainuddin, & Junit, 2006). The criticism of the wide use of EO scales is that EO's studies must avoid gathering

heterogeneous samples that don't differentiate the contexts. In this sense, qualitative studies can offer contextualized findings relevant to describing particular contexts and behaviors related to EO dimensions (Miller, 2011).

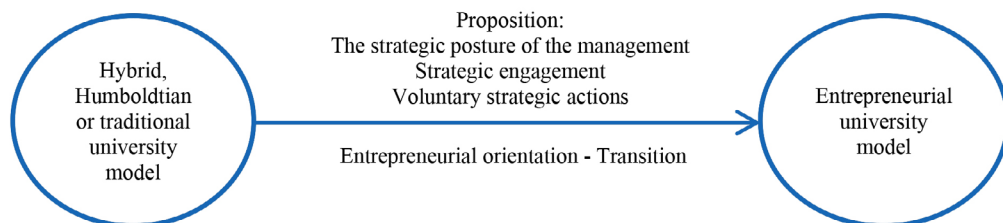
Aligned to this perspective, analysis about how EO takes place in universities can shed light on contextual particularities that do not fit to EO in corporations of private sector firms. Indeed, there are already scales to measure EO within universities (e.g., Riviezzo, 2014; Todorovic et al., 2011). Nevertheless, the measures gathered with scales do not shed light on the changing process, leaving room to new qualitative studies, as suggested in Miller (2011).

Decisions and ways of achieving change towards an entrepreneurial university model can result in idiosyncratic sources of competitiveness. The local and regional context of the universities' activity, the skills of management, and the resource capacity of each institution can be influential on EO. This argument is rooted in Child's strategic choice perspective (1972, 1997), which drew attention to the active role of managers with the power to influence the structures of their organizations or the course of strategic actions, based on a non-deterministic position of the environment.

This transformation can give universities a reinvigorated role in their traditional missions and the development of their regions. The different means of implementing this model, along with each region's particularities, provide a rich source that can be explored strategically by the managers of those institutions. Some universities' tradition in the development of their regions, portrayed in a series of overlaps with society in its areas of coverage, sustains and guides a closer relationship with the entrepreneurial university model. The ability to perform these connections in a voluntarist way, between university and environment, through EO, constitutes a genuinely innovative or entrepreneurial university.

In short, the strategic position advocated here does not mean a top-down approach, but the direct, engaged, and active involvement of the university's strategic management in the decisions inherent to the changes towards the entrepreneurial ideal, including through the definition of specific institutional policies for this purpose. In this perspective, the following theoretical proposition is presented: the EO in the university is established through the strategic posture of the management in an engaging way, and through strategic actions of voluntarist nature, supported in the non-deterministic perspective of the environment, which provide the institutional transformation. This idea is depicted in Figure 1.

We propose that decisions made on the strategic management level are essential in the changing process of universities from a traditional model to an entrepreneurial model. We consider that the primary locus where decisions are made in the university-environment relationship, including under situations in which the economic and institutional environments influence the models and performance of organizations which work in higher education. This is related to what Etzkowitz and Zhou (2017) exposed, who highlighted the need for a strategic vision formulated and implemented by academic leadership as one of the pillars of entrepreneurial university.



**Figure 1.** Conceptual framework of the research  
*Source:* authors.

Despite the isomorphic pressures on the development of the entrepreneurial university (Etzkowitz et al., 2000; Philpott, Dooley, O'Reilly, & Lupton, 2011), the perception of the environment in an indeterministic way suggests that the strategy is linked to modification and construction actions of the external environment (Bignetti & Paiva, 2002). This is in line with what was proposed by Clark (2004, 2006), who addresses the need for assertive ambition, combating inertia and accumulating experiences for the sustainability of the change process towards an entrepreneurial university model. Etzkowitz and Zhou (2017) state that the university has a crucial role in the triple helix approach, through the technology transfer, the incubation of new firms, and the conduction of regional renewal efforts.

In general, the literature about the entrepreneurial university and the several models around this theme, mainly those from Clark and Etzkowitz, address to a diversity of subjects that have a connection and are closely related, including actions and mechanisms inside and surrounding the academic environment, such as university ecosystems, patents, research commercialization, academic spin-offs, entrepreneurial behavior, graduate's careers, among others. Consequently, there are a variety of theoretical approaches that are used to explain the empirical phenomenon and contribute to its own progress.

Klofsten, Fayolle, Guerrero, Mian, Urbano, and Wright (2019) organize the discussion around the entrepreneurial university in five key strategic challenges, pursuing the institutional transformation into effective economic and societal change agents: a) internal factors; b) external or environmental factors; c) teaching and learning entrepreneurship; d) support to different entrepreneurial pathways; e) impact measures of the entrepreneurial university. These challenges summarize the literature advancement and point out several avenues and questions for future research, as detailed by these authors.

Similarly, Centobelli, Cerchione, Esposito, and Shashi (2019) show an important overview of the concept of the entrepreneurial university. Through a systematic literature review, these authors analyzed 64 papers published in the period of 1990-2016 and the results contribute with a synthesis of the main theoretical approaches (e.g., triple helix model, grounded theory of university adaptation, strategic actions theory, model of development of an entrepreneurial university, among others) and topic area (e.g., taxonomy of entrepreneurial university definitions, factors affecting entrepreneurial university, effects of entrepreneurial issues on university activity, entrepreneurial university performance measurement).

Within universities, the central concern is to find the synergies that link the different academic missions (teaching, research, as well as entrepreneurship and innovation), which enable the institutional transformation, as suggested by Boardman and Ponomariov (2009), Etzkowitz et al. (2000), Philpott et al. (2011), and Van Looy, Landoni, Callaert, Pottelsberghe, Sapsalis, and Debackere (2011). Naturally, this process is not free from tensions and conflicts involving university departments and academics, as approached by Kalar and Antoncic (2015), Rasmussen, Moen, and Gulbrandsen (2006), and Urbano and Guerrero (2013).

### 3. METHOD

Data for this research was obtained by a multiple case study. This technique is used to understand a complex, context-dependent phenomenon (Eisenhardt, 1989; Yin, 2017) and must be chosen to examine contemporary events, but without the manipulation of relevant behaviors. This paper also assumes the character of a retrospective case study, especially based on forms of data collection through interviews and documents. Retrospective perspective refers to the temporal dimension in qualitative research and consists of looking back at a process or development (Flick, 2007).

The use of the case study technique in research on the phenomenon of the entrepreneurial university is advocated by Clark (2006), who maintains that case studies are the basis for research results in specific places and times. Additionally, Wiklund and Shepherd (2011) suggest that multiple case studies on EO can be used as a basis for comparing and contrasting evidence, in the search for building theory around the exploration and dissemination of results.

Based on this technique, the unit of analysis adopted was at the organizational level; that is, the transformations that occurred in the university as a whole by pursuing an entrepreneurial university model. This definition is closely related to the essence of the EO concept defined by Miller (1983), characterized by entrepreneurial activities at the organizational level, with an emphasis on organizational structure, strategy, and leadership.

The focus of this research is concentrated on two groups: a) the institutional strategic level, including members of the rectory and direct advisors, who make the institutional macro-decisions, the institutional way, and the internal organization of resources for the implementation of institutional policies; b) complementary or support units directly involved in the intent of EO, such as technology parks, incubators, innovation agencies, technology transfer offices, among others, represented by their directors, managers or main executives.

Once the unit of analysis was defined, the research protocol for data collection procedures was adopted, validated by two experts in the field, both with theoretical knowledge on the subject and managerial experiences at the strategic level at universities. The protocol used in this research follows the structure proposed by Yin (2017), composed of four sections: a) overview of the case study project; b) field procedures; c) case study questions; d) guide to the case study report.

Regarding the choice of cases, the initial criterion used was based on the logic of the spectrum of entrepreneurial activities exposed by Philpott et al. (2011). This logic indicates that academic activities, both soft and hard, can contribute to the third academic mission. The soft-hard spectrum is related to the entrepreneurial sophistication in each academic activity, considering publishing, grantsmanship, and consulting, as softer activities, and technology parks, spin-off firms, and patenting as hard activities. In addition, it is assumed that universities that have these activities in a tangible form can reveal significant experiences in the implementation of EO, due to their trajectories in the transition towards an entrepreneurial university model.

Based on the research strategy designed through multiple case studies, three cases were investigated: two in Brazil and one in Sweden. In Brazil, the two universities chosen as the research subjects were the Pontifícia Universidade Católica do Rio Grande do Sul (Pontifical Catholic University of Rio Grande do Sul, PUCRS) and Pontifícia Universidade Católica do Rio de Janeiro (Pontifical Catholic University of Rio de Janeiro, PUC-Rio). Tecnopuc (PUCRS' Science and Technology Park) was elected in 2016 and 2009 as the best technology park of Brazil. Raiar, the business incubator of PUCRS, was elected in 2014 as the best incubator of companies oriented to the generation and intensive use of technologies by the National Association of Entities Promoting Innovative Enterprises (Anprotec, 2018). In the case of PUC-Rio, the most striking indicator, and also object, of this study refers to the capacity of fundraising from



industry, ranking 29th among universities worldwide in the edition 2019 (THE, 2018). About 50% of the institution’s revenues originate from research projects and collaboration with private companies and government (PUC-Rio Innovation Agency [AGI], 2016), which is uncommon in the Brazilian context.

In Sweden, the research focused on the case of Lund University (LU). LU is ranked among the top 100 universities in the world, according to the Quacquarelli Symonds (QS) and Times Higher Education (THE) 2019 rankings, in the 92nd and 98th positions, respectively (QS, 2018; THE, 2018). LU ranks as the 2nd Swedish institution in the specific indicator on revenues from industry, in THE 2019 ranking (THE, 2018), which portrays its ability to transfer knowledge. It is linked to the Ideon Science Park, founded in 1983, with the collaboration between the university, the municipality of Lund, and the Wihlborgs Fastigheter AB, being the first technology park in Sweden and the second in Europe after Cambridge, in 1973 (Fehrman, Westling, & Blomqvist, 2005; Kaiserfeld, 2017; Staaf, 2016).

These particular characteristics sustain the actions and achievements obtained by the studied universities pursuing changes in their organizational model. A brief overview of the three studied higher education institutions (HEIs) is presented in Chart 1.

**Chart 1**  
*The studied cases*

	PUCRS	PUC-Rio	Lund University
Type of HEI	Community (non-state public)	Community (non-state public)	Public
Location	Southern Brazil (Porto Alegre, RS)	Southeast Brazil (Rio de Janeiro, RJ)	South Sweden (Skåne Region)
Foundation Year	1948	1946	1666
Students	30,000	22,500	42,000
Employees	Total: 6,000 • Professors: 1,300 • Technical and administrative staff: 4,700	Total: 3,000 • Professors: 1,200 • Technical and administrative staff: 1,800	Total: 7,500 • Professors: 800 • Research academics and students: 4,200 • Technical and administrative staff: 2,500

*Source:* elaborated by the authors based on research data.

Similar to what was exposed by Guerrero, Urbano, Cunningham, and Organ (2014), when comparing European regions, despite the common strategic objective and certain comparable economic and social conditions, entrepreneurial universities are different due to their particular characteristics. Therefore, case studies in different contexts are appropriate, given the environmental conditions for the insertion of universities and the challenges they face.

Besides, the comparison of universities from different countries offers a real opportunity for learning about entrepreneurial academics, policymakers, and professionals (Guerrero et al., 2014). Some studies have adopted this line, strictly in the contexts of developed countries, such as those developed by Clark (1998), Guerrero et al. (2014), and Kalar and Antoncic (2015). However, there is limited literature on the development of the entrepreneurial university phenomenon within emerging countries. Thus, an empirical study involving this context is important to increase the existing knowledge to better understand the accomplishment of this phenomenon in different economic and social realities (San & Sijde, 2014).

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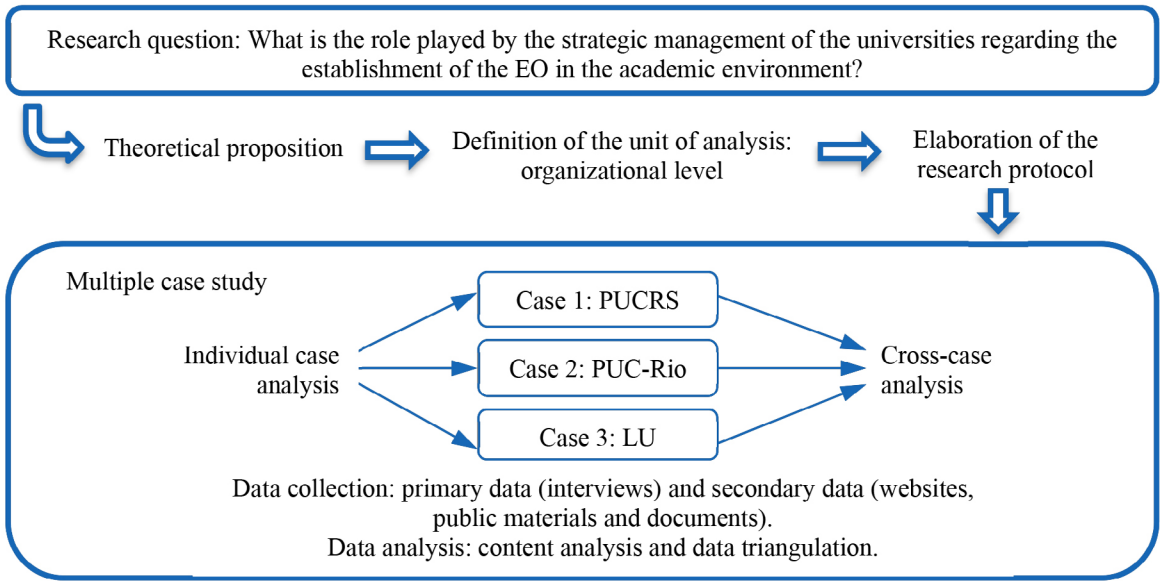
For the data collection, the present study used various procedures, labeled as direct or primary sources and indirect or secondary sources. As a direct data source, 40 “in loco” interviews (15 in PUCRS, 14 in PUC-Rio, and 11 in LU) were carried out with those main involved in implementing the EO in the researched universities, covering the two groups mentioned, that is, the members of the board and directors of the complementary or support units directly related to the third academic mission. The interviews followed a semi-structured script, based on the theoretical proposition, and were carried out from January to March 2017, in Brazil, and in June 2017 in Sweden. Each interview ranged from 46 min to 1 hour 28 min, and all of them were recorded. In addition to the primary sources, a number of secondary data was collected on the researched cases, especially through the university websites, public materials, and/or documents provided by the institutions, books, academic articles, etc.

Both data collection and analysis followed the structure of the theoretical proposition previously formulated in this article. Especially in regards to analysis, the task was guided by the comparison of the concepts that emerged as a result of fieldwork with those existing in theory, as supported by Eisenhardt (1989).

Thus, two basic procedures were adopted for the data analysis: the content analysis and data triangulation. The content analysis was used in the treatment of the interviews, which were transcribed in full. For this, the steps proposed by Cohen, Manion, and Morrison (2007) were used and the analysis was initiated by coding and categorization of the transcribed material. As suggested, the codes emerged from the content of the interviews and the subcategories originated from the literature used. The subcategories generated (strategic posture of the management; voluntary strategic actions; influencing factors; historical landmarks) derived from the previously elaborated theoretical proposition. Subsequently, the connections between the subcategories were established by comparison and the final step of the theoretical considerations was based on the results of the analysis.

As a second procedure adopted in the data analysis, triangulation was performed by cross-referencing information obtained from different data sources, including primary and secondary data. In general, the data from different sources was contrasted in several points about the issue, which gave greater validity and reliability to what was collected. Figure 2 shows a short flowchart in order to summarize the methodological procedures adopted.





*Figure 2.* Research design  
*Source:* authors.

## 4. THE CASES IN BRAZIL AND SWEDEN

This section addresses the three researched universities. Firstly, the cases are presented and discussed individually, by analyzing the transformations carried out by the universities towards an entrepreneurial university model. The actions, mechanisms, and milestones that depict these transformations in the cases studied are used as the basis for the proposed analysis. Following, the cases are cross-analyzed in order to highlight the most significant similarities and peculiarities found in the study.

### 4.1. CASE 1: PUCRS

From 1988 onwards, PUCRS has been changing from an emphasis on private undergraduate education to a research university connected to a tech park, and several projects favoring entrepreneurship and innovation. The entrepreneurial path pursued by PUCRS is notably marked by a series of actions and mechanisms developed by the institution to foster innovation and entrepreneurship in its academic environment, such as the creation of an institutional program for academic qualification and of Technology Management Agency (AGT). The transformation accomplished by PUCRS provided the formation of a singular EO, fit to its academic environment and its context.

An important initial institutional milestone that laid the foundations for the transformation of PUCRS towards an entrepreneurial university model was the program called “A thousand Masters and Ph.D. degrees for the Year 2000”, created in 1988, as detailed by Spolidoro and Audy (2008). Although this program was initiated with a different purpose from the entrepreneurial aim, it represents the zero mark of the institutional transformation practically, due to its subsequent developments in the quality of teaching and research activities and the establishment of the basic elements for the EO of PUCRS.

The creation of this program has the features of a strategic action based on the indeterministic perspective of the environment, as addressed by Bignetti and Paiva (2002), Child (1972, 1997), Lewin and Volberda (1999), and Miles et al. (1978), opposing the inertia or institutional passivity. Led by their main managers at the time, the implementation of the program “A thousand Master’s and Ph.D. degrees for the year 2000” is characterized by adapting PUCRS to a function of organizational strategy, as supported by Hodgson (2013) and Lewin and Volberda (1999).

The institution felt pressured by the competitive environment and the sectorial competition and also by its own internal environment that instigated the progress in its quality. External and internal pressures on the institution are supported in the studies of Lumpkin and Dess (1996) and Walter, Auer, and Ritter (2006), who discuss, in the development of the EO, the influence of managerial style, leadership characteristics, organizational structure, as internal factors, while environmental dynamism and sectorial structure, are external factors. Especially on the external environment, Clark (1998) addresses the influence of the competitive environment of higher education on the strategic behavior of universities. These influences have resulted in the creation of that program, as it is highlighted in the following excerpt of the interview:

“I would say that in 1988 when PUCRS launched a professor qualification program, called ‘A thousand Master’s and Ph.D. degrees for the year 2000’, it is an important milestone. This was a qualification process that wasted the energies of the University throughout the 1990s but transformed it into the research University as it is today. Then, in 1988, when PUCRS launched this program, which aimed to qualify the teaching staff of the University with a Master’s or a Ph.D. degree, I would say that it is the first milestone” (Interviewee 6 - Innovation and Development Director).

The impact of this program on the institution was practically immediate, since, even before its end, PUCRS needed to move again intentionally to “welcome” the demands made by the professors who were returning from their qualifications. As reported in the interviews, the return of qualified professors from universities of excellence in Brazil and abroad has directly impacted the quantity and quality of the research projects developed, especially those involving university-industry-government.

As a result, PUCRS created the AGT in 1999 to stimulate and enable the development of research and innovation projects in a cooperative way between university-industry-government, as pointed out by Audy and Knebel (2015). By this specific vocation for university interaction with external actors, the creation of the AGT represents a milestone in the establishment of the institutional EO, but now in a purposeful way, towards an entrepreneurial university.

“The second (milestone) is the creation of the AGT. The creation of the AGT is an important landmark because it is the first sector conceived and structured in the University specifically to stimulate and to organize the projects of interaction with companies” (Interviewee 8 – Rector’s advisor in Science, Technology, and Innovation).

“The program ‘A thousand Masters and Ph.D. degrees’, this decision of the rector, was exactly to enable that we had academics capable of doing research. With this decision and to give the conditions for them, you had to have a structure that actually served the professor, as a means of putting all the potential in your researcher formation. So, that was one of the main fuses for the creation of the AGT” (Interviewee 9 - Tecnopuc Director).

These institutional milestones, endowed with managerial intentionality, reveal an important aspect of the change made by PUCRS, even though the former was created with a different purpose from the entrepreneurial intent. Underlying the facts, there was a reinforcement and expansion of traditional academic missions, teaching and research, towards the new focus of knowledge application, set by the third academic mission of economic and social development, as established by Etzkowitz and Zhou (2017). These voluntaristic actions also paved the way for future decisions by PUCRS towards an entrepreneurial university model, especially those related to the creation of new institutional mechanisms of innovation and entrepreneurship, such as the inauguration of Tecnopuc and the creation of RAIAR incubator in 2003 and the organization of different institutional mechanisms in the Innovation and Entrepreneurship Network of PUCRS (INOVAPUCRS) in 2006, as mentioned by Audy and Knebel (2015).

From the strategy point of view, these actions developed by PUCRS are closely related to the strategy modeling defined by Mintzberg (1987) or crafting strategy. From this perspective, an interactive process is established between organization and environment, on a “modeled” path, where the natural propensity to experiment serves as a stimulus for the strategic change. It becomes particularly true for PUCRS since the actions developed by its strategic managers and the influences received from the environment have been combined over time into an essentially interactive process.

This interactive process is found in the literature, in the studies of Bignetti and Paiva (2002) and Lewin and Volberda (1999). From the indeterministic perspective of the environment, Bignetti and Paiva (2002) explain that organization and environment are interconnected, and that the organizational actors influence and are influenced by the environment, which induces the organization to cause or immediately assume the market transformations. In the case of PUCRS, this last aspect becomes evident, especially in relation to the institutional actions and reactions. Similarly, Lewin and Volberda (1999) address the implications of the strategic choice perspective for the strategy, from which managers should consider the several forms of interaction of the organization with its environment and consequent mutual adaptation.

#### 4.2. CASE 2: PUC-RIO

Since the beginning of the 1990s, PUC-Rio has been developing actions, originating essentially among academics, pursuing external support for research activities. Gradually, these movements have become effective and increasingly supported by actions at the strategic level of the University, which realized that entrepreneurship and innovation could leverage sustainability and academic reputation by reinforcing access to external funding for research activities. We highlight the creation of the Development Office, the Genesis Institute, and the PUC-Rio Innovation Agency (AGI).

An important initial milestone, which portrays PUC-Rio’s transformation towards an entrepreneurial university model, emerged in the early 1990s. Prior to this, PUC-Rio received significant financial contributions from the federal government, through Financier of Studies and Projects (FINEP), for research and postgraduate development. These contributions were substantial, and enabled these sectors to move forward, as well as the maintenance of qualified and dedicated teaching staff to research several areas of knowledge, especially the technological ones.

However, economic and higher education contexts have changed over the years. In 1992 the federal government reorganized its support for research in order to better serve the Brazilian HEIs, focusing primarily on technological areas, as in the case of PUC-Rio. Consequently, the significant financial resources destined for PUC-Rio were gradually discontinued and it faced

serious structural problems, as pointed out by Guarany (2006). This situation led PUC-Rio to an intense crisis during the 1990s, which unrestrictedly overlapped its institutional development.

“Until the 1990s, the whole technological area of PUC-Rio was financed by the Ministry of Science and Technology, by FINEP in fact. Then there was a big problem when FINEP left the postgraduate level. All our postgraduate courses in technology depended on the resources of FINEP, which even paid the professors. So, there was a very serious problem at that moment” (Interviewee 23 – Vice Dean for Development).

In the midst of turbulence, PUC-Rio needed to quickly find alternatives to support their advances and the quality achieved for decades, as some signs began to indicate the need for an immediate solution, such as the exit of some professors or group of professors from certain areas, which weakened what had already been built. The moment demanded an urgent organizational adaptation, according to Hodgson (2013) and Lewin and Volberda (1999), involving changes in the strategies and structure of PUC-Rio as a reaction to the cut of the resources historically received from the government.

The crisis “forced” the institution to rethink its university model. Although, in a reactive way, PUC-Rio needed to find new forms of financing the structure developed. In response, the Development Office, linked to the Technical Scientific Center (CTC), was created in 1994, thus bringing together the areas of Engineering and Physics, Mathematics and Chemistry, being entrusted of the institutional transformation based on cooperative projects with companies. The beginning of the activities of the Development Office resulted in the creation of the Genesis Institute in 1997, which is an important mechanism for university-industry-government interaction, especially for the incubation of companies and the raising of external resources for several activities of the university. These actions are also detailed by Guarany (2006).

At the same time, the mobilization of the teaching staff began, especially of those professors involved in research, in the several laboratories or institutes of PUC-Rio, pursuing partnerships with companies to finance research in progress or new research. Although pressured by the internal crisis and some difficulties in the university-company approach, rooted in the historical “abyss” between them, the movements carried out by PUC-Rio found support in the business environment. Thus, it began to expand their links, based on the demands of the companies themselves and of the research carried out by the teaching staff. With the advancement of these activities, in 2003, the institution created the Intellectual Property Business Office (ENPI), later renamed as AGI (AGI, 2016), as another mechanism for university-industry-government interaction, but in this case, it is focused on technology transfer and intellectual property.

These advances showed the organizational capacity to generate technology transfer and the development of an entrepreneurial ethos within the institution, both being pillars of an entrepreneurial university, as emphasized by Etzkowitz and Zhou (2017). Gradually, the dissemination of entrepreneurial behaviors in several areas of PUC-Rio resulted in changes in the institutional structure and culture, along with a substantially revised general organizational character, as proposed by Clark (2001).

The actions found at PUC-Rio reveal an important bottom-up change carried out by the teaching staff, who pursued new ways of financing research and approaching the business community. The characteristics of the strategic management of PUC-Rio are intrinsic to the movements and are marked by the decentralization and freedom of action of the teaching staff. Both behaviors were fundamental for PUC-Rio to collectively find alternatives to financial sustainability for research and postgraduate studies, and to carry out a steadier relationship with companies.

“PUC-Rio is bottom-up, anabatic. Maybe things here flow a lot from the bottom up, which does not mean it is just that. When I say things flow from the bottom up, it does not mean that no actions are taken by the Rector’s Office. [...] So, innovation happened spontaneously. The rector did not have a meeting with the vice-rector, deans. [...] Here we do not control almost anything; things just happen. This structure is capillarized and dismembered by the institution. Our management mechanism is a decentralized mechanism” (Interviewee 20 - Administrative Vice Dean).

“The academic community had strong participation in building the crisis exits, which were built on the assemblies of professors, talking and building a solution that could keep alive those projects we were developing here. [...] and to the extent that the academic community responded to this, it is obvious that it had the institutional support. It was a great partnership between the institution and the professors here that gradually built this model” (Interviewee 25 - Academic Vice Dean).

These facts show that the EO of PUC-Rio was stimulated, initially, by external factors. The influence of environmental factors under the EO is found in the studies of Lumpkin and Dess (1996) and Walter et al. (2006). Although significantly affected by the reduction in resources from the federal government, PUC-Rio’s strategic management did not opt for decisions that could facilitate adaptation to the new institutional reality, such as the dismissal of professors and the reorganization of their staff and expenses in general, but took a stand that reflects the indeterministic perception of the environment, endowed with volition (Bignetti & Paiva, 2002), and collectively constructed assertive ambitious (Clark, 2004, 2006), pursuing solutions to the institutional crisis.

With an engaged attitude in the new entrepreneurial behaviors, as proposed by Anderson et al. (2015), the strategic management of PUC-Rio did not deliberate unilaterally on the actions necessary to overcome the institutional crisis, but supported the movements carried out by the professors and students regarding closer relationships to the companies and the need for more dissemination of entrepreneurship and innovation in the institution. This attitude is symbolically portrayed in the creation of the Development Office, the Genesis Institute, and the AGI, which facilitated the transformation of the institutional model.

### 4.3. CASE 3: LUND UNIVERSITY

The entrepreneurial path developed by LU reveals an interesting turn in its 3.5 centuries of history, from the university reform accomplished by the Swedish government, in the late 1970s. As a result, motivated by both external and internal factors, LU began to build its EO and engaged in activities of greater interaction between university-industry-government, as shown by the establishment of Ideon, Sweden’s first tech park (Kaiserfeld, 2017). Subsequently, LU took advantage of several initiatives that constituted its transformative processes towards an entrepreneurial university, such as the creation of the internal mechanisms Lund University Limited Company (LUAB) and Lund University Innovation System (LUIS).

An important milestone in the institutional transformation of LU in developing its third academic mission lies in the university reform accomplished by the Swedish government in 1977. Characterized as a public institution, this reform directly impacted the LU activities, which benefited from the greater autonomy delegated to it by the government and had to respond to the call for greater dissemination of knowledge on research and development to society in general.

Although this change referred to the higher education sector, and to the national context of Sweden as a whole, the core of its success involved the organizational adaptation perspective of each university, as explained by Hodgson (2013) and Lewin and Volberda (1999). With more freedom to deliberate on its own strategic choices, LU began a transformation process towards an entrepreneurial university model, which either contrasted with its secular history or was subsidized in its own path.

In addition to this national-level process, simultaneous to other environmental factors, restricted to the regional context of the LU, pushed for changes. In the late 1970s, the labor market in the LU region, Scania, was particularly affected by a serious crisis that reflected the structural transformation of the Swedish industry. In that time and context, the discussions about the creation of a technological park emerged in LU. The discussions went “beyond the walls” of LU, involving several actors, especially through the university-industry-government interaction, and materialized themselves with the launch of the Ideon Science Park, which was built in 1983 in the city of Lund. Ideon’s activities were gradually achieving success, supported by the predominance of companies that had close links with LU, particularly with the Faculty of Medicine and the Institute of Technology (LTH) (Kaiserfeld, 2017).

“So, all faculties started to do research and then, in the early 1900s, some of this research was of the kind that we thought we could do commercialization of it and started with innovation and, in the mid-1900s, there were quite a few like the ultrasonography, we had the artificial kidney and other things which started and became big companies. And that of course started to be a signal for all researchers that now you can also develop further your research, not only for the purpose of research, but also for something else. And then Ideon came up” (Interviewee 35 - Vice-Chancellor for External Engagement).

Together, these factors – the university reform of 1977 and the inception of Ideon in 1983 – represented an important push in the secular history of LU, by mandating universities to take broader societal considerations and establishing an EO. Both factors demanded a voluntaristic position of the management, based on the indeterministic perspective of the environment, as supported by Bignetti and Paiva (2002), Child (1972, 1997), Lewin and Volberda (1999), and Miles et al. (1978). With reactive actions in some moments, but proactive in others, LU’s movements were essentially interactive with its environment, through the mutual adaptation between the organization and its environmental domain, as discussed by Bignetti and Paiva (2002) and Lewin and Volberda (1999).

Although these factors contributed significantly to institutional strategic reorientation, LU’s central leadership did not assume a deliberate position regarding the third academic mission, which determined a new direction, but rather allowed its development at other university levels. The institutional transformation was mostly fostered by a bottom-up process in the “foundations” of the university, that is, at the level of faculties or schools and their professors, researchers, and students, which varied according to the entrepreneurial abilities of each academic area.

Besides taking care of the differences that characterize the different academic areas that form a university with a broad profile, especially those regarding entrepreneurship and innovation, LU needed to balance its academic tradition with the inclusion of the new growing role in the institution. Marked by a long institutional path, LU adopted a “controlled” posture, which allowed the advance of the entrepreneurial initiatives that emerged from the “basis”, while maintaining a strong focus on teaching activities and especially research.



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“And it is very clear from that thesis that there were very little, let’s say, internal directives to become more entrepreneurial. This was a bottom-up process. It was not the university which decided to become more entrepreneurial. [...] It was allowed, I would say, by the university leadership to grow these contacts, but it was not a university policy” (Interviewee 30 – Vice Dean at School of Economics and Management).

“We’re good at innovation and I think in entrepreneurship too, but I wouldn’t say we have a very strong strategy around what we’re doing. We have strategies for education, strategies for research, and of course innovation somehow, but it isn’t totally integrated into university management mindset, to be honest. [...] But I wouldn’t say there is a strategic mindset around those issues, basically because it’s rather fragmented due to the faculties, it’s a bottom-up process and the faculties for having different ideas about this” (Interviewee 31 - Executive Director of the Research, Collaboration and Innovation Division).

After the influence of the university reform of 1977 and the beginning of the Ideon activities, two other milestones in the legal-regulatory field contributed to establishing the LU’s EO in the 1990s. The first refers to the new reform of higher education, accomplished by the Swedish government in 1993 (Fehrman et al., 2005; Staaf, 2016). It fostered the universities to become more independent from the government, through greater freedom to establish their own educational profile, allocation of internal resources, and determination of funding priorities.

In order to outline, more emphatically, its profile on innovation and entrepreneurship, LU’s reaction to the higher education reform was immediate, through the LUAB, a holding company created in 1994, as discussed by Karlsson, Kristofferson-Wigren, and Landström (2015). LUAB was founded to support university innovations and to ensure the use and commercialization of the knowledge generated in LU.

The second legal-regulatory milestone of the 1990s that contributed to the establishment of entrepreneurial activities in LU took place in 1997, with the addition of the label “the third task” in the activities of the universities by the Swedish government, which referred directly to the duty of disseminating information and interaction with society in general, as discussed by Karlsson et al. (2015) and Staaf (2016). In addition to the higher education reform of 1993, the new legal determination boosted the development of EO, but in a timely manner, on the university’s interaction with its environment and alongside the traditional academic missions of teaching and research, as reported by Fehrman et al. (2005).

In response to this new task, and the initiatives that emerged from the “basis”, LU reacted in 1999 by creating the LUIS, a mechanism directly related to the application of knowledge generated in the university, and aimed at fostering the university-industry-government interaction. Similar to the reaction to the reform of higher education of 1977, LU once again showed its capacity for organizational adaptation as pointed out by Hodgson (2013) and Lewin and Volberda (1999), but now establishing its own mechanisms, specifically related to the implementation of the third academic mission.

#### 4.4. ONE DIRECTION AND STRATEGIC ENGAGEMENT

In the three studied cases, the strategic management presented elements that are joined in the indeterministic perspective of the environment, as discussed by Bignetti and Paiva (2002), Child (1972, 1997), Lewin and Volberda (1999), and Miles et al. (1978), able to adapt the organization to the environmental influences as well as to influence the surrounding environment. In an early way, or as a response to environmental changes, the behaviors carried out by the studied universities revealed important organizational adaptability, as recommended by Hodgson (2013) and Lewin and Volberda (1999). Inertia or organizational passivity gave way to voluntaristic behaviors, endowed with volition (Bignetti & Paiva, 2002; Clark, 2004, 2006) and supported by the strategic or managerial choice, according to Child (1972, 1997) and Miles et al. (1978).

In all cases, the strategic management of the institutions influenced the organizational transformation process, triggering mechanisms for the implementation of the third academic mission, such as the creation of the AGT at PUCRS in 1999, the Genesis Institute at PUC-Rio in 1997, and the LUIS at LU in 1999. However, the cases present different levels of participation of the institutions' strategic management in the transformation process, in the conception of the EO as a strategic posture, as supported by Anderson et al. (2015).

With greater participation, PUCRS stands out with a deliberate management posture towards the third academic mission, as adopted in its strategic plans. With a not so deliberate position, but one which sought to meet internal and external initiatives, there is LU, with a "controlled" posture including the third mission in its academic environment. With less participation, there is PUC-Rio, characterized by the decentralized management that adopted the bottom-up movements that emerged from its academic community.

The analyzed cases reveal particularities related to the institutions' strategic management. In the case of PUCRS, actions that were unreasonable to the entrepreneurial intent took shape during the institutional transformation, such as the program "A thousand Masters and Ph.D. degrees for the Year 2000", which was created in 1988. Combined with the influences received from the environment, these actions formed a "modeled" path, guided by the indeterministic perspective of the environment.

At PUC-Rio, cuts in government resources, which began in 1992, were the initial stimulus for institutional transformation. As a result of this new condition that affected its economic-financial balance, PUC-Rio's strategic management supported the movements that emanated from the academic community, and that essentially aimed at expanding the external funding and the university-industry-government interaction. The freedom of action allowed to the teaching staff provided a unique reaction that elevated the institution to a prominence level, in the international scenario, with regard to the ability to attract external resources.

In the case of LU, the greater autonomy afforded by the higher education reforms of 1977 and 1993, carried out by the Swedish government, allowed the decisions from the institution's strategic management towards an entrepreneurial university model, as supported by Clark (1998) and Etzkowitz (2017). As LU is characterized by its secular history, the transformation process required a 'controlled' strategic posture, in order to balance its recognized academic tradition with the new entrepreneurial path. The main similarities and peculiarities of the researched cases are shown in Chart 2.

**Chart 2**

*The main evidence in the studied cases*

Similarities	<ul style="list-style-type: none"> <li>• Perception of the environment in an indeterministic perspective, with behaviors that are essentially interactive with the environment.</li> <li>• Capacity for organizational adaptation, in an anticipated or reactive way.</li> <li>• Voluntary behaviors of the institutions' strategic management, however with different levels of participation.</li> </ul>	
Main peculiarities	PUCRS	<ul style="list-style-type: none"> <li>• Unreasonable actions to the entrepreneurial intent that contributed to the establishment of its EO, for example, the program "A thousand Masters and Ph.D. degrees for the Year 2000", created in 1988.</li> </ul>
	PUC-Rio	<ul style="list-style-type: none"> <li>• Action freedom for the teaching staff as a result of the cuts in government resources that took place since 1992, which gave rise to a unique reaction in search of external resources.</li> </ul>
	LU	<ul style="list-style-type: none"> <li>• Use of the greater autonomy provided by the reforms of higher education, accomplished by the Swedish government in 1977 and 1993, for the transformation of the institutional profile.</li> </ul>

*Source:* authors.

## 5. FINAL REMARKS

The purpose of this article was to analyze the role played by universities' strategic management to the establishment of EO in the academic environment. The three studied cases show the key role developed by universities' strategic management in establishing EO, based on the definitions of Anderson et al. (2015), Covin and Slevin (1988), Lumpkin and Dess (1996), and Miller (1983), through the influence on organizational transformation towards an entrepreneurial university model.

Furthermore, the different ways of EO' establishment in the researched universities revealed several elements of proactiveness, risk-taking, and innovativeness, suitable to the academic context, under the definitions of Covin and Slevin (1988), Lumpkin and Dess (1996), and Miller (1983). The three cases presented recurrent behaviors in the implementation of the third academic mission, which is a critical requirement in the characterization of EO, as supported by Anderson et al. (2015).

On the one hand, despite the different contexts, the analysis revealed some similarities among the researched cases, which reinforces the importance of comparative studies in different countries, as accomplished by Clark (1998), Guerrero et al. (2014), and Kalar and Antoncic (2015). On the other, the analysis highlights the importance of the particularities of each case, which corroborates the researches of Nelles and Vorley (2010b), Philpott et al. (2011), and Stensaker and Benner (2013).

For the theoretical-conceptual literature on EO, the empirical evidence shows the close link of its basilar conceptual dimensions – proactiveness, risk-taking, and innovativeness – with the indeterministic perspective of the environment, in the light of that addressed by Bignetti and Paiva (2002), Child (1972, 1997), Lewin and Volberda (1999), and Miles et al. (1978). This relationship is based on the organizational adaptation capacity approached by Hodgson (2013) and Lewin and Volberda (1999) and on the adoption of voluntary behaviors by strategic management, supported by the perspective of the strategic or managerial choice of Child (1972, 1997) and Miles et al. (1978).

Similarly, for the empirical field, these aspects have important implications, since they indicate that the EO in the academic environment is established through a strategic mindset, based on the indeterministic perspective of the environment, which involves decisions committed to the third academic mission, especially long term, and non-sporadic actions. Additionally, evidence shows that teaching staff engagement – including bottom-up movement – played a significant role in organizational transformation processes for the implementation of the third academic mission.

In a broad sense, and especially for policy-makers, this study corroborates the importance of “the third task” for the academic environment and for the society as a whole, overcoming the concept of the university as “ivory tower”. The collaboration among university-industry-government and the development of actions and mechanisms that stimulate the implementation of the third academic mission are fundamental to promoting this changing process. The impact is inside universities, but mainly in the surrounding environment, as for example, the case of LU and the transformation in its region.

In spite of the voluntarism presented by the studied cases towards an entrepreneurial university model, the possibility of the influence of isomorphic pressures in the set of universities must not be ignored, as mentioned by Etzkowitz et al. (2000), especially those from national systems of higher education and from increasing competition aiming differentials and superior quality. This gap can be analyzed in the light of the institutional isomorphism, as addressed by DiMaggio and Powell (1983), and of broader research design, including the different actors involved and focused on this research line.

Regarding the chosen cases, it is highlighted that the three cases have successful paths in the process of institutional transformation towards an entrepreneurial university model, as well as exemplary practices in conducting efforts to establish EO in the academic environment. However, cases of failure or lacking internal support for institutional transformation, especially that caused by isomorphic pressures, can reveal new peculiarities and/or different results.

It should also be noted that universities in Brazil and Sweden are linked to different education and innovation systems at the national level. They produce varied influences in each university and in different contexts, especially in those of an emerging economy (Brazil) and an advanced economy (Sweden). Despite such differences, this research focused on the internal transformations and strategic behaviors carried out by the studied universities pursuing a new organizational model, based on the assumptions of the entrepreneurial university, through the establishment of EO in the academic environment.

In the logic of the academy following the empirical field, the relatively recent rise of EO in the academic environment, in many parts of the world, indicates new inquiries and curiosities to better elucidate it in different economic and social contexts. Consequently, there are several questions about this phenomenon to be investigated, which still raise doubts or new discussions from different theoretical combinations and perspectives, especially from the qualitative perspective, such as: a) the influence of institutions and government policies in the process of university transformation towards an entrepreneurial university model looks something relevant, but little explored by academia. The use of Institutional Theory can be an opportune apparatus for the analysis of such influence; b) the rise of the entrepreneurial university phenomenon in several parts of the world may lead universities to situations of isomorphic development trapped in an “iron cage”; c) the impact on regional development, provided by the establishment of EO in the academic environment, is a topic that deserves investigation, especially in regions that are less favored in their contexts or lack advanced infrastructure.

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The first author contributed in the phases of conceptualization, data collection and analysis, and general text writing. The second author contributed to the research supervision and in the phases of conceptualization, data analysis, and final writing of the paper. The third author contributed to the research supervision and in the phases of conceptualization, data analysis, and final writing of the paper.

#### CONFLICTS OF INTEREST

We (the authors) state that there are no conflicts of interest in this research.