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Exploring a link between faculty intrapreneurship, student entrepreneurship and ecosystem dynamism

Gustavo Hermínio Salati Marcondes de Moraes
School of Applied Sciences, UNICAMP, Campinas, Brazil and
Higher School of Economics, National Research University, Moscow, Russia

Paola Rücker Schaeffer
Department of Business Administration, Atitus Educação, Passo Fundo, Brazil

André Cherubini Alves
São Paulo School of Business Administration, Getulio Vargas Foundation, São Paulo, Brazil, and

Sohvi Heaton
Leavey School of Business, Santa Clara University, Santa Clara, California, USA

Abstract

Purpose – This study aims to understand the impact of student entrepreneurship and university support on faculty intrapreneurship. The authors also analyze the role of the university's dynamic and ordinary capabilities and the environmental dynamism in which the university is embedded.

Design/methodology/approach – With a large survey data set involving 680 professors and 2,230 students from 70 Brazilian universities, the authors use a multimethod approach with partial least squares structural equation modeling (PLS-SEM) and fuzzy-set qualitative comparative analysis (fsQCA).

Findings – The PLS-SEM results demonstrate that student entrepreneurship indirectly influences faculty intrapreneurship through the interaction of students with faculty and entrepreneurs, in addition to proving the intense influence of university support on faculty intrapreneurship, especially in a slow-growth environment. Additionally, the authors confirmed the moderating effect of universities' dynamic and ordinary capabilities on student interaction and university support, respectively, and some exciting differences considering the ecosystem dynamism. The fsQCA results deepened the differences between environments, presenting different configurations between the antecedents that lead to high levels of faculty intrapreneurship in fast and slow-growth environments.

Originality/value – The study makes a unique and significant contribution to the literature on faculty intrapreneurship by examining the cross-interactions between individual, organizational and environmental levels about the promotion of faculty intrapreneurship. From a practical point of view, it is possible to identify more effective, innovative and systematic ways to encourage faculty intrapreneurship in a developing country. The findings help open up the black box of faculty intrapreneurship.

Keywords Faculty intrapreneurship, Student entrepreneurship, University support, Dynamic capabilities, Ordinary capabilities, Ecosystem dynamism

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1. Introduction

Universities are considered institutions that generate and disseminate knowledge, but also, concomitantly with the two former academic missions (teaching and research),

they collaborate with society in general, promoting economic and social development (Cunningham *et al.*, 2022), being a critical actor within the knowledge economy (Etzkowitz and Leydesdorff, 2000; Moraes *et al.*, 2023).

The entrepreneurial university concept demands not only interactions with the productive sector but also the generation of internal companies, technology transfer offices and science parks, that is, commercialization activities and not just collaboration from a narrow perspective (Audretsch, 2014; Siegel and Wright, 2015). Thus, the university comes to be considered as a source of entrepreneurship, stimulating and nurturing entrepreneurship among different organizational stakeholders (Klofsten *et al.*, 2019) and fostering the production, dissemination and commercialization of knowledge (Guerrero and Urbano, 2012).

In this context, initiatives to promote entrepreneurial activity among students and faculty are growing in the university environment (Galán-Muros *et al.*, 2017; Moraes *et al.*, 2021). Such initiatives are often based on the principles of corporate entrepreneurship or intrapreneurship, even considering the specificities of universities (Woollard, 2010).

Academic entrepreneurship can focus on the commercialization of research or intrapreneurship (Wadhwani *et al.*, 2017). The professor can be a corporate entrepreneur by guiding social and behavioral change by acting in university entrepreneurial initiatives (Moraes *et al.*, 2020).

Even with the legitimacy that academic entrepreneurship has recently received (Miller and Acs, 2017), incentives for entrepreneurial activity are often contradictory, with explicit mentions in the mission of universities but having research and publication aspects as leading evaluation indicators (Benneworth *et al.*, 2017). The lack of measurement and valuation in aspects related to entrepreneurship leads to significant heterogeneity in universities regarding results, impacts and business support (Cunningham *et al.*, 2022; Muscio and Ramaciotti, 2019).

Faculty intrapreneurship, linked to business creation in the context of university or engagement in entrepreneurship activities, requires fostering a culture of innovation that disseminates knowledge through new channels. Thus, it is necessary to consider the university's corporate strategy for this incentive (Kirby, 2006; Woollard, 2010). The issues of culture, policies and practices best suited to stimulating entrepreneurship are lacking in the literature and are closely linked to entrepreneurial universities (Bercovitz and Feldman, 2006; Kirby, 2006; Siegel and Wright, 2015). These universities are involved in an entrepreneurial ecosystem (Miller and Acs, 2017), geographically located in a large center or the countryside, and it can also influence the entrepreneurial behavior of the faculty (Fischer *et al.*, 2019), as differences in environmental dynamism lead to different needs for flexibility and strategic adaptation (Li and Liu, 2014).

Given that university entrepreneurs are primarily drawn from the university community, such as students and faculty (Miller and Acs, 2017), it is expected that more significant interaction between them is positive for corporate entrepreneurship, as it can explore and develop an entrepreneurial mindset in the community (Cunningham *et al.*, 2022), and it is an important gap in the literature on intrapreneurship in universities (Moraes *et al.*, 2020), especially with a focus on faculty (Fischer *et al.*, 2019; Freel *et al.*, 2019).

In this study, we analyze multilevel interactions among individuals, universities and environments that may jointly influence the development of faculty intrapreneurship. More specifically, we aim to understand the impact of student entrepreneurship and university support on faculty intrapreneurship, also analyzing the role of the university's dynamic and ordinary capabilities and the environmental dynamism in which the university is embedded. The notion of university entrepreneurship has been investigated at various levels of

analysis, such as individual (e.g. role identity modification – Jain *et al.*, 2009), organizational (e.g. university monetary incentives – Link and Siegel, 2005) and environmental factors (e.g. national technology transfer infrastructure – Munari *et al.*, 2016). However, cross-interactions concerning promoting faculty intrapreneurship at the individual, organizational and environmental levels have been studied less.

We also contribute to the literature on dynamic capabilities in two ways. Existing studies have paid little attention to the differential roles of ordinary and dynamic capabilities. Understanding this is important because developing dynamic capabilities can be expensive. If having ordinary capabilities is sufficient, organizations can save the costs of developing dynamic capabilities. Our research contributes to the growing focus on research into the micro foundation of dynamic capabilities (Helfat and Peteraf, 2015) by illustrating the influence of student cognition relating to social capital in entrepreneurship on faculty intrapreneurship enactment.

The remaining of the paper is structured as follows. Section 2 presents the theoretical foundation. Section 3 describes the methodology used, and Section 4 presents the study's results for partial least squares structural equation modeling (PLS-SEM) and fuzzy-set qualitative comparative analysis (fsQCA). Section 5 presents the discussion, and Section 6 explores the conclusion, limitations and future research avenues.

2. Theoretical foundations

2.1 Student entrepreneurship and faculty intrapreneurship

Academic entrepreneurship encompasses any university-affiliated individual who founded a new business or any entrepreneur who creates a new company to exploit the intellectual properties generated at the university (Urbano and Guerrero, 2013). In this way, academic entrepreneurship goes beyond the commercialization of results from research and also includes businesses founded by professors, students or postdocs who have a link with the university (Hayter *et al.*, 2018).

Student entrepreneurship, faculty entrepreneurship and intrapreneurship are closely related to academic entrepreneurship. Faculty entrepreneurship refers to the establishment of companies by individuals involved in academic roles, specifically those who work as university professors. Likewise, student entrepreneurship concerns the creation of businesses by students, i.e. when an individual who attends classes at the university also undertakes income-generating entrepreneurial activities (Bergmann *et al.*, 2016).

Student entrepreneurship, despite still being a subject little addressed in the literature (Alves *et al.*, 2019; Pinheiro *et al.*, 2023), is a phenomenon that has gained prominence (Åstebro *et al.*, 2012). Feldman *et al.* (2019) point out the lack of research that systematically discusses this phenomenon, analyzing student entrepreneurship ecosystems, their evolution, and their impact at the macro, institutional and agent levels.

The faculty intrapreneurship, on the other hand, concerns the faculty's support and involvement in their universities' entrepreneurial activities, incorporating tools and innovations in their academic activities to make the university competitive (Valka *et al.*, 2020), and it is this concept that we adopt in this research. Researchers and students of universities who tend to generate more entrepreneurial activity are also more likely to become entrepreneurs or act as intrapreneurs, giving rise to positive feedback in the ecosystem (Hayter *et al.*, 2018; Stuart and Ding, 2006).

This study argues that student interaction stimulates the relationship between student entrepreneurship and faculty intrapreneurship. Graduate students are critical actors in the technology commercialization process as they are familiar with the technology and are often highly motivated to work on the spinoff. Adding business school students to such

partnerships between faculty and graduate students allows for a stronger business perspective (Boh *et al.*, 2016).

Entrepreneurial students and their cognition can be integral micro foundations of faculty intrapreneurship. Shinnar *et al.* (2012) found that perceived barriers to entrepreneurship shape attitudes toward business ownership. The perceived availability of support, such as access to consultants and business support, positively impacts entrepreneurial intentions (Luthje and Franke, 2003). Similarly, students' perception of the importance of social capital in entrepreneurship may affect their behavior and help them engage more with professors. Slavtchev (2013) found that engaging professors have a high level of connection with firms founded by former students. This suggests that the perceived importance of the interaction regarding entrepreneurship, as an idiosyncratic element of cognition that can influence individual behaviors, could potentially undergird faculty intrapreneurship.

Faculty members appear to have greater bypassing opportunities when embedded in the context of entrepreneurial activity. In addition, the level of interaction between entrepreneurial students and alumni with professors with entrepreneurial and intrapreneurial experience is highly significant for stimulating entrepreneurial activity among professors (Hayter *et al.*, 2017; Mosey and Wright, 2007). For example, case studies of Federal University of São Carlos (UFSCar) and São Carlos Institute of Physics (University of São Paulo – USP), two leading universities in the State of São Paulo, prove this relationship. The generation of spin-offs by students from labs led by senior professors stimulated faculty intrapreneurship and entrepreneurship.

This study explores whether the student and faculty interaction regarding entrepreneurial activities is critical to faculty intrapreneurship. Thus, we present the first proposition of the research:

P1. Interaction with student entrepreneurship positively influences faculty intrapreneurship.

2.2 University support as an antecedent of faculty intrapreneurship

The importance of commercialization activities, especially those related to creating new ventures, is highlighted in the literature on entrepreneurial universities (Fischer *et al.*, 2019). In this sense, the university environment that supports entrepreneurship plays a prominent role in stimulating faculty entrepreneurship (Åstebro *et al.*, 2012; Bergmann *et al.*, 2016) and corporate entrepreneurship (Walsh *et al.*, 2021). Shaping the university environment to promote good interaction between students, faculty and employees is crucial for academic entrepreneurship (Cunningham *et al.*, 2022). The importance of interaction and networking for academic entrepreneurship has already been proven with PhD students, analyzing participation in mobility and collaboration activities, as well as student participation and the perceived degree of support for the commercialization of various levels of education in the university hierarchy (Bienkowska *et al.*, 2016).

Universities that have a specialized structure of support, in addition to organizational practices that foster entrepreneurial activities, are more prominent and likely to generate results and impacts on entrepreneurship (Galán-Muros *et al.*, 2017; Klofsten *et al.*, 2019; Urbano and Guerrero, 2013). The university can stimulate three university capabilities that facilitate the process of enterprise formation: creating new paths of action, balancing academic and commercial interests and integrating new resources (Rasmussen and Borch, 2010). Universities are places where students coexist with available financial resources, cutting-edge research and technologies, qualified human capital, an entrepreneurial culture, extensive options for curricular and extracurricular activities, including business plan

competitions and, finally, support for the formation of networks between entrepreneurs, venture capital, incubators, science parks, among other agents (Hayter *et al.*, 2017; Miller and Acs, 2017).

The conducive milieu within a university setting can engender entrepreneurship and intrapreneurship, contingent upon the efficacy of prevailing structures and methodologies in fostering an entrepreneurial ethos among faculty, students and staff (Canever *et al.*, 2017; Fischer *et al.*, 2019; Moraes *et al.*, 2020; Walsh *et al.*, 2021). Consequently, facilitating practical engagement necessitates affording a spectrum of institutional entrepreneurs within the university internal autonomy to actively contribute to the creation of novel external institutions aimed at resolving regional innovation system challenges, thereby concurrently generating fresh opportunities and challenges (Benneworth *et al.*, 2017).

In this context, it becomes imperative for the university environment to establish a framework capable of assimilating, implementing, encouraging, supporting, recognizing and advancing entrepreneurial conduct among faculty to realize favorable intrapreneurial outcomes (Moraes *et al.*, 2020). Consequently, our second proposition assumes the following formulation:

P2. University support related to entrepreneurship positively influences faculty intrapreneurship.

2.3 Dynamic and ordinary capabilities in a university context

Dynamic capabilities highlight how flexible the organization is and how it can adapt to act strategically to shape the environment (Teece, 2016). The concept can also be used for universities, which are included in an ecosystem and need to integrate their resources to seize opportunities (sensing) and deal with the challenges that arise (seizing) (Leih and Teece, 2016), a context that is more challenging for Latin American universities (Sigahi *et al.*, 2022). Through dynamic capabilities, universities can coordinate their entrepreneurial activities to ensure superior benefits and maintain leadership in competitive environments (Leih and Teece, 2016).

For the university environment to develop its dynamic capabilities, it is necessary to offer activities and encourage interactions that produce long-term value, with the faculty being a fundamental actor in the process (Heaton *et al.*, 2020). The greater the dynamic capabilities of the university, the greater the support for academic entrepreneurship. By engaging in activities aimed at entrepreneurship, the faculty can act in an intrapreneurial way, identifying opportunities that contribute to the university's shape outcomes (Heaton *et al.*, 2020).

The dynamic capabilities observed in research-intensive universities such as Fundação Getúlio Vargas and USP, for example, do not only encompass the mobilization of teaching activities. In these cases, the university's three missions – teaching, research and outreach – are reconfigured based on internationalization initiatives, connections with the innovation and entrepreneurship ecosystem and offering courses with foreign professors.

Thus, given the importance of the interaction between students and faculty to stimulate the faculty's intrapreneurial behavior (Hayter *et al.*, 2017; Mosey and Wright, 2007), it is expected that the university's dynamic capabilities influence this relationship. Some researchers have used the dynamic capabilities framework in the context of universities (e.g. Heaton *et al.*, 2023). Examples of a university's dynamic capabilities include its effort to identify opportunities in its ecosystem and orchestrate its resources to seize the opportunities (Bozeman *et al.*, 2015; Leih and Teece, 2016). Universities with strong dynamic

capabilities can coordinate their entrepreneurial activities to ensure superior benefits and maintain leadership in competitive environments (Leih and Teece, 2016).

In this regard, we expect that dynamic capabilities contribute to faculty intrapreneurship by positively moderating the relationship between student interaction and faculty intrapreneurship. Asset orchestration is a core of dynamic capabilities (Lovallo *et al.*, 2020). Such resource orchestrations are important in developing a relationship between student interaction and faculty intrapreneurship. By using its dynamic capabilities, a university might offer activities and encourage interactions between student entrepreneurs and faculty that produce long-term value, with the faculty being a key actor in the process (Heaton *et al.*, 2020).

On the other hand, ordinary capabilities seek efficiency and are more static, allowing companies to keep up with competitors (Schriber and Löwstedt, 2020), being more firmly rooted in routines than dynamic capabilities (Teece, 2016). Thus, ordinary capabilities are important but less strategic than dynamic capabilities to increase sustained competitive advantage (Teece, 2016).

In the university context, ordinary capabilities refer to the main activities of universities, such as teaching and research, in this case, referring to entrepreneurship. Thus, these capabilities can define how the university intends to invest its resources and explore its core capabilities (Guerrero *et al.*, 2021). For example, in the context of encouraging faculty intrapreneurship, ordinary capabilities may be related to the quantity and quality of courses related to entrepreneurship, given that these are the most common entrepreneurial stimulus actions in Brazilian universities (Moraes *et al.*, 2020). In this case, teaching-led universities, which are the majority in the Brazilian context, seek to promote student entrepreneurship by offering courses and disciplines, lacking a support structure and organizational practices that allow them to explore intrapreneurship in different dimensions.

Due to the nature of the development of university teaching activities, most of these firms are probably more focused on ordinary capabilities (Teece, 2016). In recent years, the ordinary capabilities of universities have been transformed into entrepreneurial actions by valuing the knowledge-based economy (Klofsten *et al.*, 2019). In this context, it is expected that these core activities (ordinary capabilities) of the university related to entrepreneurship influence university support's impact on the faculty's intrapreneurship. Thus, we present the third proposition of the research:

P3. The ordinary and dynamic capabilities influence, respectively, university support and student interaction in the faculty intrapreneurship context.

2.4 The role of environmental dynamism

Faculty intrapreneurship is also affected by the environment in which the university is embedded. Economic action is influenced by not only the self-interest of the individual or organization but also the Web of relationships and institutions in which the individual is embedded (Granovetter, 1985). Universities are embedded in an entrepreneurial ecosystem (Miller and Acs, 2017), which can also influence the entrepreneurial behavior of the faculty (Fischer *et al.*, 2019). For instance, Feldman and Desrochers (2003) found that the relative lack of spin-offs at Johns Hopkins reflected the university's context.

The dynamic capabilities framework defines some boundaries, particularly regarding the environment (Arend and Bromiley, 2009). Eisenhardt and Martin (2000) highlight the positive roles of dynamic capabilities in terms of speed. Put differently, "patching is less critical when markets are relatively unchanging, but when markets are turbulent, patching becomes crucial" (Eisenhardt and Brown, 1999, p. 72). Environmental dynamism can be

defined as how unpredictable the structural are that affect how firms compete with each other in the competitive environment (Drnevich and Kriauciunas, 2011; Miller and Friesen, 1983).

A general consensus is that dynamic capabilities are more beneficial in a dynamic environment than in a nondynamic environment since they help firms change their resource base in response to environmental dynamism (Helfat *et al.*, 2007). Prior work implies that these types of capabilities may hold differing implications for competitive advantage and firm performance (Drnevich and Kriauciunas, 2011). In a stable and slowly-moving environment with little technological or consumer behavior change, ordinary capabilities might be sufficient so firms do not need to develop dynamic capabilities that are often costly to develop and maintain (Teece, 2016). In a highly volatile and fast-growing environment with constant threats from competitors and frequent opportunities, firms need flexibility and frequent strategic adaptation to survive, emphasizing dynamic capabilities (Li and Liu, 2014). Thus, our fourth proposition can be stated as:

P4. There are differences in the determinants of faculty intrapreneurship according to environmental dynamism, considering fast and slow-growth environments.

3. Methodology

The research used a quantitative methodology with a multimethod approach, integrating a symmetric with an asymmetric technique. PLS-SEM was the symmetric technique used to validate the constructs and the theoretical model from a predictive perspective (Hair *et al.*, 2022). The fsQCA was the asymmetric technique used to complement the results providing more detailed insights into the causal relationships of the model (Rasoolimanesh *et al.*, 2021) and helping to understand the link between student entrepreneurship and faculty intrapreneurship.

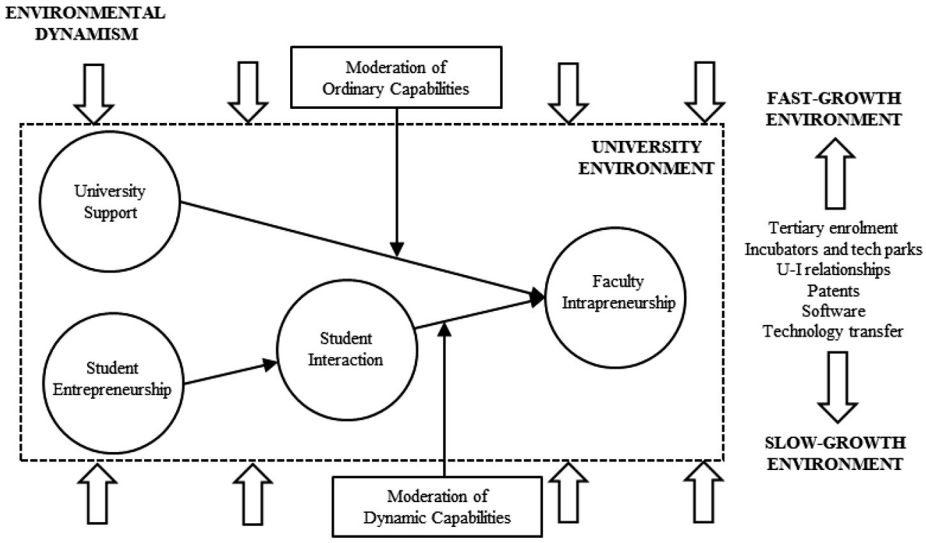
Figure 1 presents the conceptual model of the research, developed based on the research objective and the theoretical framework shown.

The research model considers the influence of student entrepreneurship, student interaction and university support on faculty intrapreneurship. The university support relationship is moderated by the university's ordinary capabilities, while the dynamic capabilities moderate the student interaction relationship. In the environmental context, the model tests the differences in relationships considering fast-moving and slow-moving environments.

3.1 Databases used in the study

The study indicators were composed of secondary databases and were collected from different sources. The two main databases used came from the fourth edition of the study entitled Entrepreneurship in Brazilian universities, conducted by Endeavor Brazil in partnership with the Brazilian Support Service for Micro and Small Enterprises and the Data Popular Institute. This survey with Brazilian universities aims to guide the strategies of universities and leaders who work with university entrepreneurship in the country, whether professors, deans or public policymakers. The databases were made available to the researchers for this article under a confidentiality agreement.

The sample of professors comprises 680 respondents, and the sample of university students includes 2,230 respondents. The interviews covered more than 70 higher education institutions located in 22 Brazilian states (Endeavor, 2017). Data collection was carried out by Instituto Data Popular, which is one of the leading research institutes in Brazil. Both the



Source: Authors' own work

Figure 1.
Theoretical model

faculty and student databases provide a representative sample of Brazil, with a confidence interval of 95% (Endeavor, 2017). The Data Popular Institute used the 2015 Higher Education Census, carried out by the Ministry of Education of Brazil, to ensure the statistical representativeness of the sample. The Data Popular Institute team conducted the interviews in person with students and professors. Additionally, telephone interviews were conducted with professors. The collection period comprised the months of April and May 2016 (Endeavor, 2017).

The data used to classify fast-moving and slow-moving environments were collected annually between 2010 and 2016, considering different sources: tertiary enrollment indicators from the Ministry of Education (MEC) and National Institute of Educational Studies and Research (INEP); the number of incubators and tech parks from the National Association of Entities Promoting Innovative Enterprises (Anprotec); the number of universities and industry interactions from Brazilian Council for Scientific and Technological Development (CNPq); and the number of patents, technology transfers and software in the city from Brazilian National Institute of Industrial Property (INPI). The analytical period covered six consecutive years for the contextual information of cities (2010–2016).

The researchers carefully integrated the different databases, considering the faculty's responses as the main basis, given the focus of the study on faculty intrapreneurship.

3.2 Construct indicators – measures

The details of the study indicators are presented in Table 1. The table shows the name of the constructs (latent variables), the indicators that make up the construct with their description, the different scales for each indicator and the data source.

The faculty intrapreneurship construct was based on studies by Valka *et al.* (2020), Hayter *et al.* (2018), Stuart and Ding (2006) and Moraes *et al.* (2020), and considered two indicators, (i) the faculty's relationship with the promotion of entrepreneurship at the

Variable	Description	Source
Faculty intrapreneurship	Relation with the promotion of entrepreneurship Propensity to entrepreneurship	Endeavor Brasil faculty database
University support related to entrepreneurship	Entrepreneurship related programs Entrepreneurship related subjects in different educational levels Entrepreneurship related research activities Institutional partnership or support received from agencies/institutions Institutional partnership or support offered to agencies/institutions	Endeavor Brasil faculty database
Student entrepreneurship	Acting as an entrepreneur Entrepreneurial intention	Endeavor Brasil student database
Student interaction	Importance of interacting with professors Importance of interacting with entrepreneurs Importance of interacting with mentors	Endeavor Brasil student database
Dynamic capabilities	Entrepreneurship-related events Quality of entrepreneurship-related programs	Endeavor Brasil faculty database
Ordinary capabilities	Adequacy of the offer of entrepreneurship courses Quality of entrepreneurship courses	Endeavor Brasil faculty database
Ecosystem dynamism	Entrepreneurial ecosystem city-level indicators' 6-year growth average	MEC/INEP, INPI, CNPq, Anprotec

Table 1.
Model indicators

Source: Authors' own work

university – a Likert scale of 1 to 4, 1 a person without much contact with the entrepreneurship action and 4 a leader in entrepreneurship promotion; and (ii) the faculty's propensity to entrepreneurship – a Likert scale of 1 to 4, 1 a person that is not interested in being an entrepreneur and 4 an entrepreneur, in the university context.

The indicators of the latent variable university support were based on studies by Cunningham *et al.* (2022), Fischer *et al.* (2019) and Moraes *et al.* (2020), and considered five indicators, (i) research activities – the sum of 8 research activities options, (ii) programs – the sum of 11 programs options, (iii) subjects related to entrepreneurship – the sum of 8 subjects options, (iv) institutional partnerships or support received – the sum of 13 partnership or support received and (v) institutional partnerships or support received – the sum of 13 partnership or support offered.

The student entrepreneurship construct had its indicators based on the concepts of Alves *et al.* (2019), Åstebro *et al.* (2012) and Bergmann *et al.* (2016) and considered two indicators: (i) whether the student acts as an entrepreneur – a Likert scale of 1 to 3, 1 never, 2 in the past and 3 yes, and (ii) the student's entrepreneurial intention – a binary variable, 0 no and 1 yes.

The student interaction construct was based on the studies by Hayter *et al.* (2017) and Mosey and Wright (2007), and considered three indicators, the student's perception of the importance of the interaction with (i) professors, (ii) entrepreneurs and (iii) mentors to be more prepared for entrepreneurship – all of them with a Likert scale of 1 to 5, 1 not at all important, and 5 extremely important.

The dynamic capabilities and ordinary capabilities constructs considered the following studies for the selection of indicators: Heaton *et al.* (2020), Klofsten *et al.* (2019), Leih and Teece (2016) and Schriber and Löwstedt (2020). The dynamic capabilities latent variable considered two indicators, (i) entrepreneurship events offered by the university – the sum of

seven entrepreneurship events offered; (ii) the level of satisfaction with the entrepreneurship programs offered – a Likert scale of 1 to 5 (1 not at all satisfied, and 5 totally satisfied). The ordinary capabilities construct considered two indicators, the level of satisfaction with the (i) quantity and (ii) quality of entrepreneurship courses offered by the university – both with a Likert scale of 1 to 5 (1 not at all satisfied, and 5 totally satisfied).

Finally, the dynamism of the ecosystem was based on the studies by Autio *et al.* (2014), Carayannis *et al.* (2016) and Fuster *et al.* (2019), classifying the environments with a binary variable – 0 slow-moving environment and 1 fast-moving environment. We considered the average growth between 2010 and 2016 of the entrepreneurial ecosystem indicators (tertiary enrollment, incubators and tech parks, U-I relationships, patents, software and technology transfer).

4. Results

The analysis of the results was separated according to the techniques, with the results of the PLS-SEM being presented first and then the results of the fsQCA. Before the analyses, we treated the data with the analysis of normality, collinearity, homoscedasticity and the absence of multicollinearity in the data distribution. According to the results, the data distribution is not normal, and there are no collinearity problems – no correlation between dependent variables is greater than 0.60. For homoscedasticity analysis, the residual scatterplot was analyzed, which did not show a clear pattern, which indicates that it is adequate. Multicollinearity was also evaluated, with the variance inflation factor (VIF) analysis, which presented good values – less than 5. All values shown are within the limits established by Hair *et al.* (2022).

Complementarily, the analysis of the common method bias was conducted (Podsakoff *et al.*, 2003) through the correlation values between the dependent variables and control variables available in the secondary database. The results indicated no significant correlation, indicating the absence or little influence of this bias in this study.

4.1 Results of partial least squares structural equation modeling analysis

The analysis of the results obtained by the PLS-SEM was divided into three topics: evaluation of the measurement model, assessment of the structural model and moderation and multigroup analysis.

4.1.1 Evaluation of the measurement model. As all the model constructs are reflexive, in the analysis of the measurement model, the convergent validity, the discriminant validity and the reliability of the indicators were verified (Hair *et al.*, 2022).

The first step of the analysis was the verification of the cross-factor loadings of the indicators to verify the convergent analysis. In this analysis, the factor loadings between indicators of the same construct must be greater than 0.7. Values between 0.4 and 0.7 are also considered valid; however, it is also necessary to assess whether these indicators are essential for the average variance extracted (AVE) and composite reliability indicators (Hair *et al.*, 2022). In this step, no indicators had to be deleted.

The AVE is a criterion also used in the convergent validity of the model, and the values must be greater than 0.50 (Hair *et al.*, 2022). Reliability was assessed using Cronbach's alpha, composite reliability and rho_A, which must be above 0.70. However, Hair *et al.* (2022) mention that Cronbach's alpha is an indicator susceptible to the number of variables in the construct, and composite reliability is more suitable for this analysis. Discriminant validity was assessed by the cross-loadings and by the square root of AVE (presented on the diagonal in italic in Table 2), which must be higher than the correlations of the latent variables. The indicators are shown in Table 2 and are within the established limits.

Constructs	Faculty intrapreneurship	Student entrepreneurship	Student interaction	University support
Faculty intrapreneurship	*0.850*			
Student entrepreneurship	0.110	*0.823*		
Student interaction	0.214	0.561	*0.795*	
University support	0.421	0.065	0.093	*0.733*
Cronbach's alpha	0.621	0.574	0.534	0.781
rho_A	0.700	0.839	0.771	0.798
Composite reliability	0.839	0.803	0.799	0.851
Average variance extracted	0.722	0.677	0.632	0.537

Source: Authors' own work

Table 2. Assessment of measurement model

4.1.2 Evaluation of the structural model. Before evaluating the structural model, we verified the VIF and the values are below 5 being adequate (Hair *et al.*, 2022). Subsequently, the significance of the indicators and the Student's *t*-test were evaluated using the bootstrapping technique. Table 3 shows the values of the coefficients between the constructs and their respective Student's *t*-tests. The results indicate that all relationships are significant.

The value of the coefficient of determination R^2 was 0.208 for faculty intrapreneurship and 0.315 for student interaction, both considered high due to the complexity of the model.

4.1.3 Moderation and multigroup analysis. The moderation analysis was performed using the bootstrapping technique. The calculation method used was the product indicator, which uses all paired combinations of the moderator and predictor indicators (Hair *et al.*, 2022).

So, we analyzed the moderating effects of dynamic capabilities and ordinary capabilities. Results suggest that the effects are significant. However, while the moderating effect of ordinary capabilities on the relationship between university support and faculty intrapreneurship is positive, the effect of dynamic capabilities on the relationship between student interaction and faculty intrapreneurship is negative.

To perform the multigroup analysis, we evaluated the differences in the parameter estimates of outer weights, outer loadings and path coefficients of the fast-moving and slow-moving groups (Hair *et al.*, 2022). Results suggest differences between the environments in the three relationships, indicating that the influence of student interaction in faculty intrapreneurship is more intense in the fast-moving group. In contrast, the impacts of university support in faculty intrapreneurship and student intrapreneurship in student interaction are more intense in the slow-moving group.

Relationship	Path coefficient	*t*-value	*p*-value	Effect size (f^2)	Significant at 5%?
University support → Intrapreneurial behavior	0.405	10,647	0.000	0.205	Yes
Student entrepreneurship → Student interaction	0.561	16,176	0.000	0.459	Yes
Student interaction → Intrapreneurial behavior	0.176	4,331	0.000	0.039	Yes

Source: Authors' own work

Table 3. Assessment of structural model

Figure 2 presents the results of the PLS-SEM, considering relationships and moderators.

4.2 Results of fuzzy-set qualitative comparative analysis

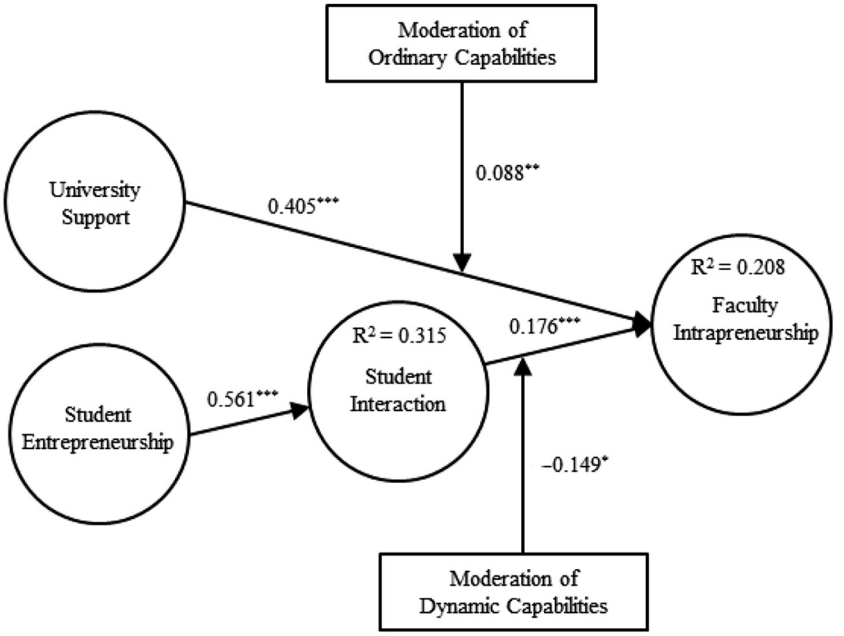
The fsQCA technique identifies cause conditions that lead to high levels of an outcome. In this study, faculty intrapreneurship is the outcome, while university support, student entrepreneurship, student interaction, ordinary capabilities and dynamic capabilities are the results.

The analysis of fsQCA followed the following steps: calibration, analysis of necessary conditions, creation of truth tables and analysis of sufficient conditions (Ragin, 2006; Rasoolimanesh *et al.*, 2021).

For calibration, we standardized the scores of the latent variables (extracted from the PLS-SEM) from 0 to 1. We used values of 0 (no set membership) and 1 (full set membership), with 0.5 being the crossover point. We separated the worksheet into groups (fast and slow-growth) to deepen the results in the comparative analysis.

Next, we analyzed whether necessary conditions existed for each group. Still, the results suggested that no isolated condition or configuration reached critical consistency and coverage values greater than 0.9 to be considered as necessary conditions. Thus, we created truth tables with all possible configurations for each group. Finally, we analyze sufficient configurations and configurational paths for high levels of faculty intrapreneurship for fast and slow-growth groups (Tables 4 and 5).

Results present interesting configurational differences in fast versus slow-growth environments. University support is present in all paths. For fast growth, however, it is possible to highlight the role of dynamic capabilities as a core-contributing factor in three paths out of



Source: Authors' own work

Figure 2.
PLS-SEM results

Configurations	Raw coverage	Unique coverage	Consistency
Configurations for high levels of FI			
FI = f (US, DC, OC, SE, SI)			
US*DC*∼OC*∼SE	0.158	0.066	0.822
DC*∼OC*∼SE*SI	0.111	0.020	0.871
US*DC*∼OC*SI	0.172	0.081	0.825
US*∼DC*OC*∼SE*SI	0.086	0.052	0.808

Configural paths for high levels of FI				
Condition	Path 1	Path 2	Path 3	Path 4
University support	●		●	●
Dynamic capabilities	●	●	●	○
Ordinary capabilities	○	○	○	●
Student intention	○	○		○
Student interaction		●	●	●
Solution coverage	0.311			
Solution consistency	0.809			

Notes: 1. black circles (●) indicate presence; white circles (○) denote negation = blank spaces denote absence. Large circles (●) indicate core contributing conditions; 2. FI = faculty intrapreneurship; US = university support; DC = dynamic capabilities; OC = ordinary capabilities; SE = student entrepreneurship; SI = student interaction
Source: Authors' own work

Table 4. Configurations and paths for high levels of faculty intrapreneurship in fast-growth environment

Configurations	Raw coverage	Unique coverage	Consistency
Configurations for high levels of FI			
FI = f (US, DC, OC, SE, SI)			
US*∼OC*∼SE*SI	0.097	0.064	0.829
US*DC*OC*∼SI	0.236	0.151	0.805
US*OC*SE*SI	0.241	0.155	0.858

Configural paths for high levels of FI			
Condition	Path 1	Path 2	Path 3
University support	●	●	●
Dynamic capabilities	●	●	
Ordinary capabilities		●	●
Student entrepreneurship	○	○	●
Student interaction	●		●
Solution coverage	0.460		
Solution consistency	0.814		

Notes: 1. black circles (●) indicate presence; white circles (○) denote negation = blank spaces denote absence. Large circles (●) indicate core contributing conditions; 2. FI = faculty intrapreneurship; US = university support; DC = dynamic capabilities; OC = ordinary capabilities; SE = student entrepreneurship; SI = student interaction
Source: Authors' own work

Table 5. Configurations and paths for high levels of faculty intrapreneurship in slow-growth environment

four. In fast-growth environment, all three paths that show dynamic capabilities, also show the absence of ordinary capabilities. Dynamic capabilities seem to operate in combination with university support or student interaction. In fast-growth, Path 4 is the only one that seems not to follow a certain pattern, presenting university support, ordinary capabilities and

student interaction as a core-contributing factor with dynamic capabilities and student interaction absent.

Patterns are quite different in a slow-growth environment. Path 1 poses a high relevance on student interaction as a core-contributing factor, with contributions from university support and dynamic capabilities. For a slow-growth environment, university support and dynamic capabilities only appear as core-contributing factors in Path 2, with an interesting additional core contribution from ordinary capabilities. Ordinary capabilities also operate as a core-contributing factor together of student interaction, in Path 3.

5. Discussion

We approach the topic of faculty intrapreneurship with a robust and probabilistic sample of students and faculty in a developing country, applying a conceptual model validated through symmetrical and asymmetrical methods. This empirical perspective allows us to investigate the specificity of the relationships that impact faculty intrapreneurship and generate new insights to assist academics, professionals and policymakers in designing initiatives and strategies to promote university intrapreneurship.

The results obtained with the symmetric technique of PLS-SEM, for the most part, are in line with previous research. The model presented a high explanatory factor for faculty intrapreneurship and student interaction. The main influencer of faculty intrapreneurship is university support, which reinforces the importance of adapting the university environment to incorporate initiatives aimed at entrepreneurship (Canever *et al.*, 2017; Walsh *et al.*, 2021). Other influencing factors are student interaction, which has a direct impact, and student entrepreneurship, which has an indirect impact through influencing the interaction. Thus, the more entrepreneurs interact in the university context, whether students, faculty or mentors, the more significant the positive impact on faculty intrapreneurship (Hayter *et al.*, 2017; Mosey and Wright, 2007).

In addition, the results of the PLS-SEM suggested the importance of dynamic and ordinary capabilities in these relationships. Ordinary capabilities have a positive moderating effect on the university support relationship within the faculty intrapreneurship. This result suggests that the better the main activities of entrepreneurship courses are structured in quantity and quality, the more significant the impact of university support. It is also possible to interpret that Brazilian universities work well with ordinary capacities. Dynamic capabilities, on the other hand, had a negative moderating effect on the student interaction relationship with faculty intrapreneurship. This result indicates that, at least in the context of Brazilian universities, the flexibility and strategic adaptation to the environment with the offer of events and the quality of programs has not been able to impact student-faculty interaction or faculty intrapreneurship positively. The negative moderating effect was the opposite of what we predicted, indicating that dynamic capabilities appear to negatively affect the relationship between student cognition and faculty intrapreneurship. There are several possible reasons for this finding. It may be costly to develop dynamic capabilities and difficult to manage them (Winter, 2003). Therefore, there might be a delay in achieving the expected returns from using them.

Regarding the analysis of differences in environmental dynamism, the results indicated significant differences when comparing fast and slow-growth environments. In the relationships between university support and faculty intrapreneurship, the influence is more significant in the slow-growth environment. This result indicates that the more the entrepreneurial ecosystem is developed, the less the need for university support to stimulate the intrapreneurial faculty since the ecosystem already helps in this process. In the student entrepreneurship relationship with student interaction, the results were also more intense in

the slow-growth environment, indicating that interaction is already naturally stimulated in this more mature ecosystem. The results indicated that the influence is more significant in the fast-growth environment in the student interaction relationship with faculty intrapreneurial. Thus, although university support has less impact on fast-growth, the interaction of students, professors and entrepreneurs is more important for faculty intrapreneurship. In this type of environment, there is already a more significant presence of entrepreneurs. Thus, this interaction between entrepreneurs and potential entrepreneurs will naturally be more meaningful, stimulating corporate entrepreneurship.

The fsQCA results provide more detailed insights into both types of environments (fast and slow-growth) into the complex causal relationships between antecedent constructs and configurations that result in faculty intrapreneurship. This comparison and contrast of the configurations in the environments allow the analysis of more subtle patterns and combinations between the elements that lead to the expected results of corporate entrepreneurship. The results indicated no necessary condition for faculty intrapreneurship in any group. The absence of one of the indicators in some university contexts will not prevent high levels of faculty intrapreneurship.

The fast-growth environment group presented four paths that lead to the desired level of faculty intrapreneurship. University support, student interaction and dynamic capabilities appear in three paths as core contribution conditions. Ordinary capabilities appear in only one path. In two paths, we obtained high results of corporate entrepreneurship with only two determinants: dynamic capabilities and university support in Path 1, and dynamic capabilities and student interaction in Path 2. This result demonstrates the importance of more strategic requirements to boost corporate entrepreneurship in more developed environments.

The slow-growing environment group presented three pathways that lead to high levels of faculty intrapreneurship. University support is present in all of them, being a central condition in one of them. In this environment, ordinary capabilities and student entrepreneurship also appear in some paths. Path 1 has student interaction as the core condition and university support and dynamic capabilities as the present conditions. Path 2 features university support, dynamic and ordinary capabilities, all as core conditions. Path 3 presents ordinary capabilities and student entrepreneurship as core conditions and university support and student interaction as present. These results show the importance of better developing university support and university core capabilities in less developed ecosystems.

The study presents three main theoretical implications. First, our research fills a critical gap between the link of student entrepreneurship with faculty intrapreneurship, demonstrating the importance of interaction between students, entrepreneurs and faculty in driving corporate entrepreneurship (Freel *et al.*, 2019). Faculty engagement in university entrepreneurial activities requires an entrepreneurial mindset in the community, fostering a culture of innovation at the university (Woollard, 2010).

Second, we contribute to the extant corporate entrepreneurship literature is manifested through the presentation of an empirically substantiated theoretical model. This model, supported by a robust probabilistic sample, systematically investigates the antecedents of faculty intrapreneurship. Our examination furnishes comprehensive insights into the phenomenon of faculty intrapreneurship within Brazilian universities. It is noteworthy that the exploration of faculty intrapreneurship remains nascent, and there is a paucity of research addressing its antecedents, as observed in the work of Freel *et al.* (2019).

Third, we present exciting insights into how environmental dynamism influences how the university should prepare its entrepreneurial activities, emphasizing its dynamic or

ordinary capabilities. This result proves the importance of considering the dynamism of environmental changes to plan strategic actions and adapt resources to new opportunities (Hanvanich, 2006). The differences in the ecosystem in which the university is embedded also determine and impact academic activities (Heaton *et al.*, 2020), and we prove that these differences impact faculty intrapreneurship in a developing country.

From a practical point of view, discerning more efficacious, innovative and methodical approaches to foster faculty intrapreneurship in a developing country is feasible. Consequently, this study delineates three principal practical implications. First, to invigorate faculty intrapreneurship and engage faculty as potent collaborators in cultivating a more entrepreneurial university milieu, a cautious approach is warranted. Mere replication of initiatives from other universities is cautioned against without a comprehensive analysis of the extant capabilities of the university and the contextual nuances within its ecosystem. The considerable divergence in support mechanisms for entrepreneurship across universities is notable, as highlighted in the work of Cunningham *et al.* (2022), and extant evaluation indicators inadequately capture this intricacy, as posited by Benneworth *et al.* (2017).

Second, the entrepreneurial university needs to have a long-term vision to reach the appropriate stimulus for faculty intrapreneurship (Woollard, 2010), considering issues of culture, policies and practices that are most appropriate to stimulate entrepreneurship (Siegel and Wright, 2015). The importance of interaction between students, entrepreneurs and faculty makes this long-term vision clear, considering that this level of interaction can only be obtained when all these individuals participate in a coordinated way in entrepreneurship events and activities in the universities.

Third, managers must prioritize specific actions for environments with a fast or slow-growth ecosystem. For example, in slow-growth environments, it is suggested that managers prioritize strengthening university support and ordinary capabilities. Some university support actions that can be considered are entrepreneurship programs, institutional partnerships or support from agencies and institutions, mentorship programs, the provision of equity-free funding, demo days, matchmaking events and pitch competitions. For ordinary capabilities, priority should be given to the quantity and quality of entrepreneurship courses, which act as basic and essential foundations in stimulating entrepreneurship. Entrepreneurship teaching should facilitate learning, empowering, experiential, cooperative and reflective (Klofsten *et al.*, 2019). For fast-growth environments, universities must prioritize improving their dynamic capabilities and the interaction between students, entrepreneurs and faculty. Thus, we can suggest some actions for this context:

- to offer strategic events such as global entrepreneurship week, innovation fair, entrepreneurship fair, visits and excursions focused on entrepreneurship, hackathons and pitch competition; and
- improve the quality of entrepreneurship programs, with investments in infrastructure and incentives and invitations to the participation of academics and entrepreneurs.

6. Conclusions and limitations

Initiatives to promote entrepreneurial activity among students and faculty are growing in the university environment (Galán-Muros *et al.*, 2017; Moraes *et al.*, 2023); however, fundamental gaps persist in our comprehension regarding the effectiveness of universities' strategies to further promote faculty intrapreneurship. This research sought to understand the antecedents of faculty intrapreneurship, exploring a link between faculty intrapreneurship, student entrepreneurship and the dynamism of the ecosystem.

The empirical results emphasized the need for a broader analysis, considering the entrepreneurial ecosystem and the university environment, to establish strategic guidelines for entrepreneurship with its courses, programs, events, actions and partnerships. The research findings are in line with research that reinforces the dependence of corporate entrepreneurship effectiveness on a connection of high-level strategies at the organizational level, requiring the implementation of a culture that promotes entrepreneurial commitment among academics and students (Kirby, 2006; Siegel and Wright, 2015).

The research also demonstrates several combinations between factors of the entrepreneurial ecosystem and internal aspects of the university that promote faculty intrapreneurship. Thus, according to environmental dynamism, a range of dynamic organizational capabilities can be used to obtain the desired corporate entrepreneurship outcome. However, the entrepreneurship agenda of universities needs to establish clear objectives and indicators (Klofsten *et al.*, 2019).

The article also has some limitations. The research used secondary databases, which present a limited number of indicators for forming the research constructs. The data collected from the student and faculty bases was carried out with a single cross-section, which makes it difficult to analyze the associations between the variables of interest over time. The complex integration between the three databases implied the use of data from 2016, as it was the last period in which data from the three databases were available.

Thus, suggestions for future research are presented. The same model can be applied in different contexts, whether of countries, states or educational levels, allowing the comparison of results. Longitudinal research could investigate how relationships between variables evolve over time in specific contexts. Or still, qualitative research deepens the understanding of certain antecedents of faculty intrapreneurship with a more grounded perspective.

References

Alves, A.C., Fischer, B., Schaeffer, P.R. and Queiroz, S. (2019), "Determinants of student entrepreneurship", *Innovation and Management Review*, Vol. 16 No. 2, pp. 96-117, doi: 10.1108/INMR-02-2018-0002.

Arend, R.J. and Bromiley, P. (2009), "Assessing the dynamic capabilities view: spare change, everyone?", *Strategic Organization*, Vol. 7 No. 1, pp. 75-90, doi: 10.1177/1476127008100132.

Åstebro, T., Bazzazian, N. and Braguinsky, S. (2012), "Startups by recent university graduates and their faculty: implications for university entrepreneurship policy", *Research Policy*, Vol. 41 No. 4, pp. 663-677, doi: 10.1016/j.respol.2012.01.004.

Audretsch, D.B. (2014), "From the entrepreneurial university to the university for the entrepreneurial society", *The Journal of Technology Transfer*, Vol. 39 No. 3, pp. 313-321, doi: 10.1007/s10961-012-9288-1.

Autio, E., Kenney, M., Mustar, P., Siegel, D. and Wright, M. (2014), "Entrepreneurial innovation: the importance of context", *Research Policy*, Vol. 43 No. 7, pp. 1097-1108, doi: 10.1016/j.respol.2014.01.015.

Benneworth, P., Pinheiro, R. and Karlsen, J. (2017), "Strategic agency and institutional change: investigating the role of universities in regional innovation systems (RISs)", *Regional Studies*, Vol. 51 No. 2, pp. 235-248, doi: 10.1080/00343404.2016.1215599.

Bercovitz, J. and Feldman, M. (2006), "Entpreneneriall universities and technology transfer: a conceptual framework for understanding knowledge-based economic development", *The Journal of Technology Transfer*, Vol. 31 No. 1, pp. 175-188, doi: 10.1007/s10961-005-5029-z.

Bergmann, H., Hundt, C. and Sternberg, R. (2016), "What makes student entrepreneurs? On the relevance (and irrelevance) of the university and the regional context for student start-ups", *Small Business Economics*, Vol. 47 No. 1, pp. 53-76, doi: 10.1007/s11187-016-9700-6.

Bienkowska, D., Klofsten, M. and Rasmussen, E. (2016), "PhD students in the entrepreneurial University - perceived support for academic entrepreneurship", *European Journal of Education*, Vol. 51 No. 1, pp. 56-72, doi: 10.1111/ejed.12160.

Boh, W.F., De-Haan, U. and Strom, R. (2016), "University technology transfer through entrepreneurship: faculty and students in spinoffs", *The Journal of Technology Transfer*, Vol. 41 No. 4, pp. 661-669, doi: 10.1007/s10961-015-9399-6.

Bozeman, B., Rimes, H. and Youtie, J. (2015), "The evolving state-of-the-art in technology transfer research: revisiting the contingent effectiveness model", *Research Policy*, Vol. 44 No. 1, pp. 34-49, doi: 10.1016/j.respol.2014.06.008.

Canever, M.D., Barral, M.R.M. and Ribeiro, F.G. (2017), "How does the public and private university environment affect students' entrepreneurial intention?", *Education + Training*, Vol. 59 No. 6, pp. 550-564, doi: 10.1108/ET-12-2016-0187.

Carayannis, E.G., Provance, M. and Grigoroudis, E. (2016), "Entrepreneurship ecosystems: an agent-based simulation approach", *The Journal of Technology Transfer*, Vol. 41 No. 3, pp. 631-653, doi: 10.1007/s10961-016-9466-7.

Cunningham, J.A., Lehmann, E.E. and Menter, M. (2022), "The organizational architecture of entrepreneurial universities across the stages of entrepreneurship: a conceptual framework", *Small Business Economics*, Vol. 59 No. 1, pp. 11-27, doi: 10.1007/s11187-021-00513-5.

Drnevich, P.L. and Kriauciunas, A.P. (2011), "Clarifying the conditions and limits of the contributions of ordinary and dynamic capabilities to relative firm performance", *Strategic Management Journal*, Vol. 32 No. 3, pp. 254-279, doi: 10.1002/smj.882.

Eisenhardt, K.Mand. and Brown, S.L. (1999), "Patching: restitching business portfolios in dynamics markets", *Harvard Business Review*, Vol. 77 No. 3, pp. 72-82.

Eisenhardt, K.M. and Martin, J.A. (2000), "Dynamic capabilities: what are they?", *Strategic Management Journal*, Vol. 21 Nos 10/11, pp. 1105-1121, doi: 10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E.

Endeavor (2017), "Entrepreneurship research in Brazilian universities".

Etzkowitz, H. and Leydesdorff, L. (2000), "The dynamics of innovation: from national systems and 'mode 2' to a triple helix of university–industry–government relations", *Research Policy*, Vol. 29 No. 2, pp. 109-123, doi: 10.1016/S0048-7333(99)00055-4.

Feldman, M. and Desrochers, P. (2003), "Research universities and local economic development: lessons from the history of the Johns Hopkins University", *Industry and Innovation*, Vol. 10 No. 1, pp. 5-24, doi: 10.1080/1366271032000068078.

Feldman, M., Siegel, D.S. and Wright, M. (2019), "New developments in innovation and entrepreneurial ecosystems", *Industrial and Corporate Change*, Vol. 28 No. 4, pp. 817-826, doi: 10.1093/icc/dtz031.

Fischer, B.B., Moraes, G.H.S.M. and Schaeffer, P.R. (2019), "Universities' institutional settings and academic entrepreneurship: notes from a developing country", *Technological Forecasting and Social Change*, Vol. 147, pp. 243-252, doi: 10.1016/j.techfore.2019.07.009.

Freel, M., Persaud, A. and Chamberlin, T. (2019), "Faculty ideals and universities' third mission", *Technological Forecasting and Social Change*, Vol. 147, pp. 10-21, doi: 10.1016/j.techfore.2019.06.019.

Fuster, E., Padilla-Meléndez, A., Lockett, N. and Del-Águila-Obra, A.R. (2019), "The emerging role of university spin-off companies in developing regional entrepreneurial university ecosystems: the case of Andalusia", *Technological Forecasting and Social Change*, Vol. 141, pp. 219-231, doi: 10.1016/j.techfore.2018.10.020.

Galán-Muros, V., van der Sijde, P., Groenewegen, P. and Baaken, T. (2017), "Nurture over nature: How do European universities support their collaboration with business?", *The Journal of Technology Transfer*, Vol. 42 No. 1, pp. 184-205, doi: 10.1007/s10961-015-9451-6.

Granovetter, M. (1985), "Economic action and social structure: the problem of embeddedness", *American Journal of Sociology*, Vol. 91 No. 3, pp. 481-510, doi: 10.1086/228311.

Guerrero, M. and Urbano, D. (2012), "The development of an entrepreneurial university", *The Journal of Technology Transfer*, Vol. 37 No. 1, pp. 43-74, doi: 10.1007/s10961-010-9171-x.

Guerrero, M., Heaton, S. and Urbano, D. (2021), "Building universities' intrapreneurial capabilities in the digital era: the role and impacts of massive open online courses (MOOCs)", *Technovation*, Vol. 99, p. 102139, doi: 10.1016/j.technovation.2020.102139.

Hair, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2022), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 3rd ed., Sage, Thousand Oaks, CA.

Hanvanich, S. (2006), "The relationship of learning and memory with organizational performance: the moderating role of turbulence", *Journal of the Academy of Marketing Science*, Vol. 34 No. 4, pp. 600-612, doi: 10.1177/0092070306287327.

Hayter, C.S., Lubynsky, R. and Maroulis, S. (2017), "Who is the academic entrepreneur? The role of graduate students in the development of university spinoffs", *The Journal of Technology Transfer*, Vol. 42 No. 6, pp. 1237-1254, doi: 10.1007/s10961-016-9470-y.

Hayter, C.S., Nelson, A.J., Zayed, S. and O'Connor, A.C. (2018), "Conceptualizing academic entrepreneurship ecosystems: a review, analysis and extension of the literature", *The Journal of Technology Transfer*, Vol. 43 No. 4, pp. 1039-1082, doi: 10.1007/s10961-018-9657-5.

Heaton, S., Lewin, D. and Teece, D.J. (2020), "Managing campus entrepreneurship: dynamic capabilities and university leadership", *Managerial and Decision Economics*, Vol. 41 No. 6, pp. 1126-1140, doi: 10.1002/mde.3015.

Heaton, S., Teece, D. and Agronin, E. (2023), "Dynamic capabilities and governance: an empirical investigation of financial performance of the higher education sector", *Strategic Management Journal*, Vol. 44 No. 2, pp. 520-548, doi: 10.1002/smj.3444.

Helfat, C.E., Finkelstein, S., Mitchell, W., Peteraf, M.A., Singh, H., Teece, D.J. and Winter, S.G. (2007), *Dynamic Capabilities*, Blackwell Publishers, Malden, MA.

Helfat, C.E. and Peteraf, M.A. (2015), "Managerial cognitive capabilities and the microfoundations of dynamic capabilities", *Strategic Management Journal*, Vol. 36 No. 6, pp. 831-850, doi: 10.1002/smj.2247.

Jain, S., George, G. and Maltarich, M. (2009), "Academics or entrepreneurs? Investigating role identity modification of university scientists involved in commercialization activity", *Research Policy*, Vol. 38 No. 6, pp. 922-935, doi: 10.1016/j.respol.2009.02.007.

Kirby, D.A. (2006), "Creating entrepreneurial universities in the UK: applying entrepreneurship theory to practice", *The Journal of Technology Transfer*, Vol. 31 No. 5, pp. 599-603, doi: 10.1007/s10961-006-9061-4.

Klofsten, M., Fayolle, A., Guerrero, M., Mian, S., Urbano, D. and Wright, M. (2019), "The entrepreneurial university as driver for economic growth and social change – key strategic challenges", *Technological Forecasting and Social Change*, Vol. 141, pp. 149-158, doi: 10.1016/j.techfore.2018.12.004.

Leih, S. and Teece, D. (2016), "Campus leadership and the entrepreneurial university: a dynamic capabilities perspective", *Academy of Management Perspectives*, Vol. 30 No. 2, pp. 182-210, doi: 10.5465/amp.2015.0022.

Li, D. and Liu, J. (2014), "Dynamic capabilities, environmental dynamism, and competitive advantage: evidence from China", *Journal of Business Research*, Vol. 67 No. 1, pp. 2793-2799, doi: 10.1016/j.jbusres.2012.08.007.

Link, A.N. and Siegel, D.S. (2005), "Generating science-based growth: an econometric analysis of the impact of organizational incentives on university–industry technology transfer", *The European Journal of Finance*, Vol. 11 No. 3, pp. 169-181, doi: 10.1080/1351847042000254211.

Lovallo, D., Brown, A.L., Teece, D.J. and Bardolet, D. (2020), "Resource re-allocation capabilities in internal capital markets: the value of overcoming inertia", *Strategic Management Journal*, Vol. 41 No. 8, pp. 1365-1380, doi: 10.1002/smj.3157.

Luthje, C. and Franke, N. (2003), "The 'making' of an entrepreneur: testing a model of entrepreneurial intent among engineering students at MIT", *R&D Management*, Vol. 33 No. 2, pp. 135-147, doi: 10.1111/1467-9310.00288.

Miller, D.J. and Acs, Z.J. (2017), "The campus as entrepreneurial ecosystem: the University of Chicago", *Small Business Economics*, Vol. 49 No. 1, pp. 75-95, doi: 10.1007/s11187-017-9868-4.

Miller, D. and Friesen, P.H. (1983), "Strategy-making and environment: the third link", *Strategic Management Journal*, Vol. 4, pp. 221-235, doi: 10.1002/smj.4250040304.

Moraes, G.H.S.M.D., Fischer, B.B., Campos, M.L. and Schaeffer, P.R. (2020), "University ecosystems and the commitment of faculty members to support entrepreneurial activity", *BAR – Brazilian Administration Review*, Vol. 17 No. 2, doi: 10.1590/1807-7692bar2020190013.

Moraes, G.H.S.M.D., Fischer, B.B., Guerrero, M., Rocha, A.K.L. and Schaeffer, P.R. (2021), "An inquiry into the linkages between university ecosystem and students' entrepreneurial intention and self-efficacy", *Innovations in Education and Teaching International*, Vol. 60 No. 1, pp. 1-12, doi: 10.1080/14703297.2021.1969262.

Moraes, G.D., Spers, E.E., Mendes, L. and Silva, H. D (2023), "Corporate entrepreneurship at the university: the influence of managerial support, autonomy and reward on the innovative behavior of university professors", *Journal of Entrepreneurship in Emerging Economies*, Vol. 15 No. 2, pp. 404-424, doi: 10.1108/JEEE-07-2021-0287.

Mosey, S. and Wright, M. (2007), "From human capital to social capital: a longitudinal study of technology-based academic entrepreneurs", *Entrepreneurship Theory and Practice*, Vol. 31 No. 6, pp. 909-935, doi: 10.1111/j.1540-6520.2007.00203.x.

Munari, F., Rasmussen, E., Toschi, L. and Villani, E. (2016), "Determinants of the university technology transfer policy-mix: a cross-national analysis of gap-funding instruments", *The Journal of Technology Transfer*, Vol. 41 No. 6, pp. 1377-1405, doi: 10.1007/s10961-015-9448-1.

Muscio, A. and Ramaciotti, L. (2019), "How does academia influence Ph.D. entrepreneurship? New insights on the entrepreneurial university", *Technovation*, Vols 82/83, pp. 16-24, doi: 10.1016/j.technovation.2019.02.003.

Pinheiro, G.T., Moraes, G.D. and Fischer, B.B. (2023), "Student entrepreneurship and perceptions on social norms and university environment: evidence from a developing country", *Journal of Entrepreneurship in Emerging Economies*, Vol. 15 No. 4, pp. 746-765, doi: 10.1108/JEEE-03-2021-0121.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.-Y. and Podsakoff, N.P. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp. 879-903, doi: 10.1037/0021-9010.88.5.879.

Ragin, C.C. (2006), "Set relations in social research: Evaluating their consistency and coverage", *Political Analysis*, Vol. 14 No. 3, pp. 291-310, doi: 10.1093/pan/mpj019.

Rasmussen, E. and Borch, O.J. (2010), "University capabilities in facilitating entrepreneurship: a longitudinal study of spin-off ventures at mid-range universities", *Research Policy*, Vol. 39 No. 5, pp. 602-612, doi: 10.1016/j.respol.2010.02.002.

Rasoolimanesh, S.M., Ringle, C.M., Sarstedt, M. and Olya, H. (2021), "The combined use of symmetric and asymmetric approaches: partial least squares-structural equation modeling and fuzzy-set qualitative comparative analysis", *International Journal of Contemporary Hospitality Management*, Vol. 33 No. 5, pp. 1571-1592, doi: 10.1108/IJCHM-10-2020-1164.

Schriber, S. and Löwstedt, J. (2020), "Reconsidering ordinary and dynamic capabilities in strategic change", *European Management Journal*, Vol. 38 No. 3, pp. 377-387, doi: 10.1016/j.emj.2019.12.006.

Shinnar, R.S., Giacomin, O. and Janssen, F. (2012), "Entrepreneurial perceptions and intentions: the role of gender and culture", *Entrepreneurship Theory and Practice*, Vol. 36 No. 3, pp. 465-493, doi: 10.1111/j.1540-6520.2012.00509.x.

Siegel, D.S. and Wright, M. (2015), "Academic entrepreneurship: time for a rethink?", *British Journal of Management*, Vol. 26 No. 4, pp. 582-595, doi: 10.1111/1467-8551.12116.

Sigahi, T.F.A.C., Sznelwar, L.I., Rampasso, I.S., Moraes, G.H.S.M., de Girotto Júnior, G., Pinto Júnior, A. and Anholon, R. (2022), "Proposal of guidelines to assist managers to face pressing challenges confronting Latin American universities: a complexity theory perspective", *Ergonomics*, Vol. 66 No. 9, pp. 1-16, doi: 10.1080/00140139.2022.2126895.

Slavtchev, V. (2013), "Proximity and the transfer of academic knowledge: evidence from the spatial pattern of industry collaborations of East German professors", *Regional Studies*, Vol. 47 No. 5, pp. 686-702, doi: 10.1080/00343404.2010.487058.

Stuart, T.E. and Ding, W.W. (2006), "When do scientists become entrepreneurs? The social structural antecedents of commercial activity in the academic life sciences", *American Journal of Sociology*, Vol. 112 No. 1, pp. 97-144, doi: 10.1086/502691.

Teece, D.J. (2016), "Dynamic capabilities and entrepreneurial management in large organizations: toward a theory of the (entrepreneurial) firm", *European Economic Review*, Vol. 86, pp. 202-216, doi: 10.1016/j.euroecorev.2015.11.006.

Urbano, D. and Guerrero, M. (2013), "Entrepreneurial universities", *Economic Development Quarterly*, Vol. 27 No. 1, pp. 40-55, doi: 10.1177/0891242412471973.

Valka, K., Roseira, C. and Campos, P. (2020), "Determinants of university employee intrapreneurial behavior: the case of Latvian Universities", *Industry and Higher Education*, Vol. 34 No. 3, pp. 190-202, doi: 10.1177/0950422219897817.

Wadhwani, R.D., Galvez-Behar, G., Mercelis, J. and Guagnini, A. (2017), "Academic entrepreneurship and institutional change in historical perspective", *Management and Organizational History*, Vol. 12 No. 3, pp. 175-198, doi: 10.1080/17449359.2017.1359903.

Walsh, G.S., Cunningham, J.A., Mordue, T., McLeay, F., O'Kane, C. and Connolly, N. (2021), "What business schools do to support academic entrepreneurship: a systematic literature review and future research agenda", *Studies in Higher Education*, Vol. 46 No. 5, pp. 988-999, doi: 10.1080/03075079.2021.1896805.

Winter, S.G. (2003), "Understanding dynamic capabilities", *Strategic Management Journal*, Vol. 24 No. 10, pp. 991-995, doi: 10.1002/smj.318.

Woollard, D. (2010), "Towards a theory of university entrepreneurship", *Industry and Higher Education*, Vol. 24 No. 6, pp. 413-427, doi: 10.5367/ihe.2010.0017.

Corresponding author
Gustavo Hermínio Salati Marcondes de Moraes can be contacted at: salati@unicamp.br