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ECONOMIC AND SOCIAL DEVELOPMENT: PUBLIC POLICY IN INDUSTRY AND HIGHER EDUCATION TO FOSTER SUSTAINABLE DEVELOPMENT

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Thesis submitted to the Postgraduate Programme in Administration at the Federal University of Espírito Santo, as a partial requirement for the award of the degree of Doctor of Administration.

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At the beginning of my PhD journey, I expressed to Prof. Adonai my desire to deepen my understanding of quantitative approaches and explore diverse techniques to become a well-prepared researcher. Through the four articles that form this thesis, as well as other projects we have undertaken together over the years, I can confidently say that I have achieved that goal and more. Today, I have the privilege of teaching data analysis at the Federal Institute of Espirito Santo (IFES), Viana campus, a testament to the skills and confidence I developed under his mentorship.

In summary, I am profoundly grateful to Prof. Adonai for his invaluable contributions to my work and for the partnership we have built throughout this journey.

EPIGRAPH

Like a diamond revealed through refinement, education is the training of the mind to think, to question, to create knowledge that endures and to inspire others. Just as the universe evolves, expanding into greater complexity and revealing infinite potential.

Inspired by Albert Einstein

ABSTRACT

Economic, social and sustainable development is approached in this thesis from the perspective of seeking the common good of society, that is, a view of development that goes beyond economic issues to include an expansion of the richness of human life and choice opportunities. This thesis was developed within the context of potential interactions among three spheres: university, industry, and government. More specifically, aspects of Public Policies (PPs) directed toward both the industrial sector and the educational field—namely, the university—were examined in the broader context of promoting economic, social, and sustainable development in society. Four scientific articles were developed. The first, investigated the field where PPs are implemented in relation to the industry (related to SDG 9), that is, International Entrepreneurship (IE). Drawing on results of the first article -related to impact and Dynamic Capabilities (DC)-, the second article evaluated the impact of a Brazilian national program that aims to foster exports using the lens of DC in the analysis. After that and focusing on PPs directed to the educational field (related to SDG 4), the third article analysed how future professionals are being prepared to face the global context where the companies participating in the program evaluated are immersed. The third article of this thesis evaluated the direct and indirect effects of Entrepreneurial Intentions (EI) of new professionals on Global Competence (GC) and sustainability dimensions. Additionally, the moderator effect of a geopolitical aspect was measured. Finally, besides what was related to the educational role of university (first mission), a fourth article investigated the public engagement of universities through professors' involvement in outreach projects (third mission of universities), considered here as evidence of the contributions of education as a PP to the development addressed in this thesis. Regarding PPs directed toward industry, this thesis first provides valuable insights and a state of the art to the field of IE. Moreover, the thesis presents empirical findings related to the implementation of a specific PP in the IE sector, contributing both to practice and theory. The practical contribution involves the evaluation of a program designed to foster exports, while the theoretical contribution stems from the use of the DC lens, offering new insights to the PPs field when coupled with the DC lens. Furthermore, in considering the university as part of an educational policy, this thesis explored how universities prepare new professionals to operate in a global context. The results of the third article, among others, contribute for a further discussion of a Sustainable Global Entrepreneurship. Additionally, regarding the university's contribution to society through the involvement of professors in outreach projects, the article offers tools to measure such contribution. Taken together, the findings of this study confirm that collaboration among universities, industry, and government in public policy processes—when each actor fulfils its role while supporting the others—can promote economic, social, and sustainable development. The recommendations of this thesis can contribute with benefits that go beyond economics issues, that is, the ones related to the development of people immerse in a rapidly evolving global context.

Keywords: Economic, Social and Sustainable development, Public Policy, Impact Evaluation, Global Competence, University Public Engagement, SDG4, SDG9.

RESUMO

O desenvolvimento econômico, social e sustentável é abordado, nesta tese, sob a perspectiva da busca pelo bem comum da sociedade, ou seja, uma visão de desenvolvimento que vai além da perspectiva econômica para incluir a expansão da riqueza da vida humana e das oportunidades de escolha. Esta tese foi desenvolvida no contexto de potenciais interações entre três esferas: universidade, indústria e governo. Mais especificamente, aspectos relacionados com Políticas Públicas (PPs) voltadas tanto para o setor industrial quanto para o campo educacional – ou seja, a universidade – foram examinados no contexto mais amplo de promoção do desenvolvimento econômico, social e sustentável na sociedade. Quatro artigos científicos foram desenvolvidos. O primeiro investigou o campo onde PPs são implementadas em relação à indústria (relacionado ao ODS 9), ou seja, o Empreendedorismo Internacional (EI). Com base nos resultados desse primeiro artigo - impacto e Capabilidades Dinâmicas (CD), o segundo artigo avaliou o impacto de um programa nacional brasileiro que visa fomentar as exportações usando a lente das CD na análise. Em seguida, e com foco em PPs voltadas para o campo educacional (relacionados ao ODS 4), o terceiro artigo analisou como futuros profissionais estão sendo preparados para enfrentar o contexto global onde as empresas participantes no programa avaliado no segundo artigo estão imersas. O terceiro artigo avaliou os efeitos diretos e indiretos da Intenção Empreendedora (IE) de novos professionais nas dimensões de Competência Global (CG) e sustentabilidade. Além disso, o efeito moderador de um aspecto geopolítico foi medido. Finalmente, além do que se relaciona ao papel educacional da universidade (primeira missão), o quarto artigo desta tese investigou o engajamento público das universidades por meio do envolvimento de professores em projetos de extensão (terceira missão das universidades), considerado aqui como evidência das contribuições da educação como PP para o desenvolvimento abordado nesta tese. Em relação a PPs voltadas para a indústria, esta tese primeiro fornece insights valiosos e um estado da arte para o campo do EI. Além disso, a tese apresenta descobertas empíricas relacionadas à implementação de uma PP específica neste setor de EI, contribuindo tanto para a prática quanto para a teoria. A contribuição prática envolve a avaliação de um programa projetado para fomentar exportações, enquanto a contribuição teórica decorre do uso da lente CD, oferecendo novos insights para o campo das PPs quando acoplados à lente CD. Além disso, ao considerar a universidade como parte de uma política educacional, esta tese explorou como as universidades preparam novos profissionais para operar em um contexto global. Os resultados do terceiro artigo, entre outros, contribuem para uma discussão mais aprofundada sobre Empreendedorismo Global Sustentável. Além disso, em relação à contribuição da universidade para a sociedade por meio do envolvimento de professores em projetos de extensão, o quarto artigo desta tese oferece ferramentas para mensurar tal contribuição. Assim, considerando todos os achados desta pesquisa, confirma-se a tese inicial de que- por meio da interação entre universidade, indústria e governo na formulação, implementação e avaliação de políticas públicas- tendo cada ator cumprindo seu papel apoiando os demais, tal colaboração pode impulsionar o desenvolvimento econômico, social e sustentável para a sociedade. As recomendações desta pesquisa contribuem para tornar possível a tese aqui defendida trazendo benefícios que vão além das questões econômicas, ou seja, aqueles relacionados ao desenvolvimento de pessoas imersas em um contexto global em rápida evolução.

Palavras-chave: Desenvolvimento Econômico, Social e Sustentável, Política Pública, Avaliação de Impacto, Competência Global, Engajamento Público da Universidade, SDG 4, SDG 9.

FIGURES

TABLES

LIST OF ABBREVIATIONS

APEX	Brazilian Trade and Investment Promotion Agency
BG	Born Global
CAPES	Coordination for the Improvement of Higher Education Personnel
GC	Global Competence
CNI	National Confederation of Industry
DiD	Differences in Differences
EI	Entrepreneurial Intention
EFD	Federal Development Strategy
GDP	Gross Domestic Product
GEM	Global Entrepreneurship Monitor
GMPI	Global Multidimensional Poverty Index
HDI	Human Development Index
IE	International Entrepreneurship
INV	International New Ventures
PEIEX	Export Qualification Program
PP	Public Policy
PSM	Propensity Score Matching
SDG	Sustainable Development Goals
SECEX	Secretariat of Foreign Trade
SME	Small and Medium-sized Enterprises
SNPG	National Postgraduate System
THM	Triple Helix Model
UN	United Nations
UNDP	United Nation Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization

SUMMARY

1 INTRODUCTION

Before addressing public policy (PP) in the context of economic and social development and discussing the theoretical frameworks that underpin this research endeavour, it is important to provide a general overview of the entity responsible for formulating these policies, namely: the government. The government is widely recognized as one of the principal institutions of the state and serves as a primary policymaker (Souza, 2003, 2006; Sabatier & Weible, 2007; Weible & Sabatier, 2017; Batista et al., 2021). National governments seek, through public policies, to foster the economic, social and sustainable development of a given country—in short, the common good of a given society (King & Rebelo, 1990; Reinert, 1999; Acemoglu et al., 2014; Burroni, 2020).

Economic and social development are understood in the present work as the process which seeks the common good of society beyond the mere economic wealth. In this sense, the definition given by the United Nations Development Programme (UNDP) for human development, states that human development (or the approach to human development) refers to an expansion of the richness of human life, not only economically speaking, but also as an approach that focuses on people and their opportunities for choice (UNPD, 2022).

In line with this perspective, the United Nations (UN) launched an agenda in 2015 aimed at promoting sustainable development for humanity. The Sustainable Development Goals (SDGs), part of the UN's 2030 Agenda, comprise 17 targets designed to eradicate poverty and guide the world toward peace, prosperity, and opportunities for all—on a healthy planet. Among these 17 goals, those most closely related to this research endeavour are Goal 4, which focuses on quality education, and Goal 9, which emphasizes industry, innovation, and infrastructure. SDG 4 seeks to ensure quality education that is equitable and inclusive, promoting learning and opportunities for all while SDG 9 seeks to build resilient infrastructure in industry, promoting inclusive, sustainable and innovative industrialization (UN, 2020).

Reinert (1999) conceptualizes the common good from a systemic and synergy-based perspective, viewing it as a dynamic process in which government intervention contributes to expanding the overall size of the economic pie. Such intervention may involve the promotion of specific industries—not with the aim of directly benefiting consumers or producers, but because the resulting gains accrue to the system as a whole.

In this sense, the intervention serves the common good (King & Rebelo, 1990).

According to Baumol (2004), the characteristic that most clearly distinguishes the government from other organizations is its coercive power. This coercive capacity enables the government to impose constraints on the actions of all citizens in certain circumstances. For instance: (1) when individuals, if left to their own devices, may fail to make decisions in their own long-term best interest—such as contributing to retirement savings; and (2) when the willingness of individuals to accept constraints on their own behaviour is necessary for enforcing similar constraints on others—such as laws prohibiting theft. Baumol (2004) identifies a third, and more significant, category of government intervention: the loss of potential benefits due to the absence of coercive action in relation to certain activities. An illustrative example provided by Baumol (2004) is the use of taxes to finance innovation. In this context, the benefits of innovation extend far beyond the individuals directly involved in the innovation process, accruing to the general population.

According to Reinert (1999), there is a type of activist and idealistic state, which the author terms the *Renaissance State*. Reinert (1999) argues that this state was a necessary phase for all currently industrialized nations, it is characterized by the recording of economic activities and the creation of a common good through increased returns and self-applicable feedback mechanisms. Reinert views this state as the foundational stage for the emergence of the modern state (Pierson, 2004), one in which there was heightened awareness of humanity's condition, previously marked by the ignorance and poverty of the Middle Ages.

Moving forward in time, Acemoglu et al. (2014) empirically refuted claims about why the United States managed to develop much more than other countries, arguing that this development was not because Europeans brought more human capital per person, but rather due to efforts to establish institutions that allowed for greater education among their inhabitants. According to these authors, the opposite occurred in countries such as Peru and Mexico, where their colonizers opted for a more extractive orientation.

Humanity has witnessed and participated in its own progress, marked by successes and setbacks throughout history. Over time, we have also observed various approaches and forms of government striving to achieve the development and common good of their nations. One such example, as discussed by Acemoglu et al. (2014), is how decisions regarding the institutions established within a country have significantly influenced the economic future and social development of a given country. This underscores the critical role that institutions—specifically governments—play in shaping a nation's development (Burroni, 2020).

Maddison (2006) reports on macroeconomic data covering an extensive period, demonstrating that the world economy had its best performance in the second half of the last century. The world Gross Domestic Product (GDP) increased six-fold in the period from 1950 to 1998, with an average growth of 3.9% per year, compared with 1.6% from 1820 to 1950 and 0.3% from 1500 to 1820. Real per capita income increased 2.1% per year compared with 0.9% from 1820 to 1950, and 0.05% from 1500 to 1820. Thus, per capita growth was 42 times faster than in the era that the author calls proto-capitalist and twice as fast as in the first 13 decades of our capitalist era.

Maddison (2006) divides the capitalist epoch into five distinct phases of development. The slowest growth was recorded in the early phase of capitalist development (+/-1820-1870), when significant growth was largely confined to European countries and to the United States, Canada, Australia and New Zealand. Then, the old "liberal order" (+/-1870-1913), was the third best, with growth marginally slower than our era. In the fourth best phase (+/-1913-1950), growth was below potential because of two world wars and the intervening collapse of world trade, capital markets and migration. The "golden age" (+/-1950-73) was by far the best in terms of growth performance. Finally, our age, from +/-1973 onwards (characterized as the "neoliberal order") has been the second-best period.

Significant progress has been made, resulting in improved quality of life for many people. According to Maddison (2006), starting in 1820, notable economic growth was observed in some countries, with many others benefiting from this growth in subsequent years. However, disparities between countries persist, and in some cases, these differences are stark. One useful indicator for illustrating these disparities is the Human Development Index (HDI), developed by the UNDP.

The HDI has three dimensions that relate to: a long and healthy life, education and standard of living. The health dimension is measured by life expectancy at birth; the education dimension is measured by the average years of schooling for adults aged 25 and over and the expected years of schooling for school-age children. The standard of living dimension is measured by gross national income per capita.

The Human Development Report (2023/24) highlights significant disparities in the development levels of countries. The highest-ranking nations are predominantly from Europe, exceptions for the United States, Canada, some countries in Oceania, some from

Asia and the Middle East. In contrast, Latin American countries rank low worldwide though Chile stands as an exception ranked highest in the region placed 44th in the group with a very high HDI. Brazil, on the other hand, is ranked 89th, falling within the group of countries with a high HDI, according to the list of 193 countries (UNDP, 2024).

An argument advanced in this thesis is that public policy implemented by governments largely determine the level of development and common good of countries, which in turn is reflected to some extent in the HDI ranking (Baumol, 2004). Governments have followed and continue to follow different paths in terms of political and economic systems. In this sense, the eras mentioned by Maddison (2006) were influenced by different strands of economic thought, which consequently influenced the actions of organizations, including governments and the states to which these governments belonged to.

In the case of the periods that encompass the beginnings of capitalism +/- 1820 to 1870 and the old liberal order +/- 1870 to 1913 mentioned by Maddison (2006), the liberal strand of thought stands out. In this strand we can mention the ideas of one of the most influential economists of the Austrian school, Friedrich Hayek (See the Road to Serfdom, 1944), who defended freedom and non-intervention of the state in the functioning of the economy. Among these periods of more liberal thought, the emergence of Karl Marx's ideas against capitalism (See the Communist Manifesto, 1848) also stands out, having been adopted and marking the course of some countries, including the Soviet Union.

Subsequently, the period between 1913 and 1950, whose growth was affected by two world wars, among other reasons, and the period between 1950 and 1973, which presented the best results according to Maddison (2006), highlighted the ideas of economist John Maynard Keynes (See The general theory of employment, interest and money, 1936). Keynes' postulates called for greater state intervention, and it is worth noting that his ideas were applied after episodes that marked the history of our planet such as world wars and the episode known as the depression of 1929, with the fall of the New York stock exchange in the United States.

Keynes' ideas were later widely applied by various countries and are still defended today. Finally, we arrive at our current era, starting in 1973, a period that shows the second-best performance (Maddison, 2006). In this period, the ideas of freedom and free markets once again come to the forefront, bringing back the name of Hayek and another important figure in global economics, economist Milton Friedman (see *Capitalism and*

Freedom, 1962), who, through much of his work, contributed to monetary policy questioning the state's intervention capacity as proposed by Keynes.

It is important to emphasize that it is not within the scope of this thesis to address economic thought or its authors in depth, but rather to contextualize some of them in order to draw attention to the importance of the influence of the strands of global economic thought on governments in formulating and implementing their policies. As previously explained and exemplified by the periods brought up by Maddison (2006), since the beginning of capitalism, the actions of governments have positively or negatively affected this development.

Revealing a more concerning picture of global development, the Global Multidimensional Poverty Index (GMPI) 2021, published by the UNDP, presents striking data. Among the 5.9 billion people living in the 109 countries analysed, 1.3 billion are classified as living in multidimensional poverty. Notably, half of this population consists of children. Although progress had been made in reducing poverty levels, the Covid-19 pandemic significantly reversed these gains, particularly in the world’s poorest countries.

Furthermore, almost two-thirds of people living in multidimensional poverty belong to households where no girl or woman has completed at least six years of schooling. More recently, the GMPI (2024) reported that over half of the 1.1 billion poor people are children under the age of 18 (584 million) and globally, 27.9 percent of children live in poverty, compared with 13.5 percent of adults.

According to the GMPI (2021), people are counted as part of multidimensional poverty if they are deprived in one-third or more of 10 indicators grouped into 3 dimensions: health, education and living conditions. The GMPI is the product of the incidence of multidimensional poverty and the intensity of multidimensional poverty that ranges from 0 to 1, where higher values imply greater multidimensional poverty.

Regarding the panorama laid out so far and focusing on the government's role in the pursuit of economic and social development, which in turn leads to an improvement in people's quality of life, this doctoral thesis proposes to address the topic of PP and their impact on the economic and social development of society. More specifically, it seeks to evaluate the impact of a national policy on the exports of companies in Brazilian municipalities and to address the role of the university, understood as an educational policy, in the training of new professionals as well as regarding university's contribution to society through academics.

Through PPs, governments seek to boost the economic and social development of countries (King & Rebelo, 1990; Reinert, 1999; Acemoglu et al., 2014; Burroni, 2020). One of the areas in which these PPs are developed and applied is entrepreneurship (Acs & Storey, 2004; Acs & Szerb, 2007; Acs, 2008; Acs et al., 2016; Castaño et al., 2016; Urbano et al., 2019). In the specific case of International Entrepreneurship (IE), among the expected benefits of implementing policies that promote and support it in a given country are the development of an entrepreneurial culture, increased exports, increased employment and income generation (Naretto et al., 2004), as well as the acquisition of new capabilities (Teece, Pisano & Shuen, 1997; Zahra et al., 2006; Teece, 2007) that could contribute to improve the competitiveness of companies and of the country in the global context.

In terms of competitiveness, according to the Brazilian National Confederation of Industry (CNI), Brazil ranks second-last among 18 countries from different latitudes analysed in a study carried out between 2019 and 2020. Among the Latin American countries analysed in this study, Brazil (17) is far from the best-placed in the ranking, Chile (8) and only surpasses the last-placed, Argentina (18) (CNI, 2020). In the same competitiveness report, now using data from 2023/2024, Brazil ranks last among the 18 countries evaluated (CNI, 2025). Regarding Brazil's share in the production of the global manufacturing industry, a drop was recorded from 1.31% in 2020 to 1.28% in 2021 (CNI, 2022). In 2022 and 2023, the figure stood at 1.22% (CNI, 2024).

Regarding exports from this industry specifically, the CNI reports that Brazil's global share fell to 0.84% in 2019, to 0.77% in 2020, and improved in 2021, reaching 0.81%. The figures confirm the negative and regressive performance that the country's manufacturing has been showing since 2012, still failing to reach pre-COVID-19 pandemic levels (CNI, 2022). Improved outcomes were reported for 2022 and 2023, with Brazil recording identical industry-specific figures of 0.92% in both years (CNI, 2024). The Brazilian Micro and Small Business Support Service (SEBRAE), reports that approximately 8 out of 10 Brazilian companies that exported in 2015 did not do so again in the following years, with one of the most cited reasons being the lack of international demand, and along with this, that 83% of companies did not receive any type of institutional support (SEBRAE, 2018). The same agency states that, in 2022, exports by micro and small companies totalled US$3.2 billion, representing 0.9% of Brazil's total exports (SEBRAE, 2025). Regarding services, the scenario is not much different. According to the Foreign Trade Secretariat (SECEX) of the Ministry of Economy, in 2020 (latest report of this kind available) there was a 17% decrease in service exports, falling to US$ 28.5 billion. According to SECEX, the share of services in Brazilian foreign trade is more dynamic than that of goods, but also historically lower. There was an increase in the share of services in total Brazilian foreign trade from 2005 to 2016, rising from 16.6% to 23.3%. However, after this peak, there was a constant decline, reaching 17.3% in 2020. Regarding imports of services in Brazil, these have always had a greater weight in the country's trade balance of services. Furthermore, as with exports of services, there was a drop in the case of imports of 30.2% in 2020, falling to US$ 48 billion (Secex, 2020).

Governments are expected to establish policies and strategies to boost the growth and stability of the national economy. In the case of Brazil, through Decree No. 10,531 of October 26, 2020, the Federal Development Strategy (EFD) was defined for Brazil for the period from 2020 to 2031. The EFD considers the macroeconomic scenario for the country's next 12 years and is organized into 5 axes: Economic, Institutional, Infrastructure, Environmental and Social, in which according to the EFD the main guideline is (...) "to increase the income and quality of life of the Brazilian population while reducing social and regional inequalities" (EFD 2020-2031, p. 6).

Regarding PP as a topic of academic research, Batista et al. (2021) describe the field as the analysis of the "State in action." Capella (2020) argues that in Brazil, PP remains a largely unexplored field that is still in its developmental stages. Methodologically, since the 1980s, what Ramacciotti and Bernardino (2020) refer to as *methodological pluralism* has characterized the area of PP analysis. Notably, the 2021 Nobel Prize in Economics was awarded to David Card, Joshua D. Angrist, and Guido W. Imbens. In the case of Angrist and Imbens, for their methodological contributions to the analysis of causal relationships (The Nobel Prize, 2021).

Weible and Sabatier (2017, p. 2) define PP as deliberate decisions – actions and non-actions – of a government or equivalent authority, directed towards specific objectives. In the words of Jann and Wegrich (2017), policy analysis has its origins in the 1950s, in an understanding of policies as a process that occurs in stages and within a framework that became known as the PP cycle. And from this framework, the emergence of other approaches and models in PP studies was made possible, for example: the so-called policy design (Sidney, 2017).

The formulation of PPs involves identifying problems, demands, and proposals that eventually evolve into government programs. These programs establish objectives and outline various alternative actions to achieve the goals set by PPs (Jann & Wegrich, 2017). In this context, Gertler et al. (2018) argue that PPs or programs aimed at generating specific changes are rarely evaluated thoroughly. Managers tend to focus on controlling the delivery of program inputs, rather than assessing the outcomes and overall impact achieved.

In addition to the macroeconomic context and PP, it is essential to consider factors such as entrepreneurship, national infrastructure, and bureaucratic processes when assessing how dynamic or challenging the environment is for entrepreneurs—especially in a post-pandemic context, as highlighted in the 2022/2023 Global Entrepreneurship Monitor (GEM) report (GEM, 2023). In this regard, the World Bank's *Subnational Doing Business in Brazil* report (2021) reveals that Brazil faces significant obstacles to entrepreneurship and business creation, primarily due to its lengthy and bureaucratic administrative procedures.

According to the report, this challenging environment is primarily due to the lack of coordination between local and national agencies. It also highlights the heterogeneity among Brazilian states—attributed to this coordination gap—with some states demonstrating greater efficiency in facilitating the creation of businesses. When focusing on the legal framework and PPs aimed at promoting and developing IE, it is essential that governments, alongside industry and academic actors, play a key role (Etzkowitz, 2008; Mazzucato, 2013; Peris-Ortiz et al., 2016).

The Brazilian Trade and Investment Promotion Agency (ApexBrasil) created the Export Qualification Program (PEIEX), implemented in all regions of the country, through partnerships between Apex-Brasil and educational institutions such as universities, technology parks or research support foundations or industry federations to help companies export. In this study, PEIEX is taken as one of the research objects, in which we will seek to evaluate its impact on its general purpose, that is, to promote exports in Brazilian companies that participate in the program. In a second moment, the analysis of this research endeavour will focus on the study of the role of the university in promoting aspects such as entrepreneurship and Global Competence (GC) in future professionals who will have to face a global scenario (a point that will be addressed later in this thesis).

In the context of IE, the approach diverges from the traditional view of internationalization, which is primarily grounded in the Uppsala model and focused on larger firms (Johanson & Vahlne, 1977). According to McDougall and Oviatt (2000) and Zahra and George (2002), IE begins from the union of two areas of research, international business and entrepreneurship. According to the aforementioned authors, this was the view of researchers who observed that certain companies internationalized more quickly, many since their founding. This was the case of Oviatt and Mcdougall (1994) in relation to “International New Ventures” (INV) and of the authors Knight and Cavusgil (1996, 2004), who adopted the already existing term, “Born Global” (BG). There is a consensus among authors about the triggers that led to the emergence and growth of IE, including advances in technology, communications and transportation (McDougall & Oviatt, 2000; Autio, 2005; Knight & Liesch, 2016; Zahra, 2021).

It is also important to consider the factors that influence the internationalization processes of companies, both positively and negatively (Ortiz-Rojo, 2025), particularly for smaller firms, which are most affected by resource constraints. In this context, support for IE becomes essential, with PPs playing a crucial role in fostering this support. Such policies not only enable the creation of jobs and income but also enhance companies' capabilities to improve their competitiveness and promote a culture of innovation—both within companies and among the people involved.

According to Borges et al. (2013), the development of PPs in Brazil should be grounded in scientific research. In the field of IE, Ortiz-Rojo and Lacruz (2023a) note that research remains limited and is often subsumed under the broader area of entrepreneurship, which itself is still emerging. Borges et al. (2013) further argue that PPs for entrepreneurship in Brazil remain insufficient. This gap can be attributed to the fact that entrepreneurship is a relatively new field in the country, with a limited number of postgraduate programs focused specifically on the subject.

Echoing this gap, Campos et al. (2020) assert that the availability of courses focused on entrepreneurship in stricto sensu postgraduate programs in Brazil remains below the desired level. The same observation is made regarding undergraduate Business Administration courses (Henrique & Cunha, 2008; Flores, Hoeltgebaum & Silveira, 2008; Vieira et al., 2013; Silva & Patrus, 2017).

Regarding the undergraduate Business Administration courses, particularly those that address IE in Brazilian federal universities, Ortiz-Rojo and Lacruz (2023c) report that out of 69 federal universities in Brazil, 57 offer the Administration course. However, only 4 of these courses directly include the IE discipline. Furthermore, among the courses that do cover IE, there is a marked focus on export and import processes, often overlooking topics related to management, innovation, strategy, the challenges companies face in international markets, and the role of the entrepreneur themselves.

In this context of education and training, according to the 2019 report by the Coordination for the Improvement of Higher Education Personnel (CAPES), on the proposal to improve the evaluation of Postgraduate Studies, research in Brazil must incorporate internationalization, innovation and structured interaction of the National Postgraduate System (SNPG) with extra-academic sectors in the transfer of knowledge and innovation from academia to society (Ortiz-Rojo & Finardi, 2022). Still in relation to the role of academia in society, the UN SDG number 4 – Quality Education – aims to ensure inclusive, equitable and quality education to promote lifelong learning opportunities for all (UN, 2020).

For Jongbloed et al. (2008), universities play a very important role in the well-being of society, including aspects of education that affect social and economic issues. In this sense, understanding the role of universities as part of a public education policy, Breschi et al. (2019) suggest that universities should take a more proactive role, particularly in contributing to entrepreneurship and innovation. Moreover, universities can play a key part in promoting the concept of GC (Ortiz-Rojo & Lacruz, 2026) and global citizenship (Guimarães & Finardi, 2021), within both the academic community and society at large. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), global citizenship is related to a sense of belonging to a broader community and common humanity, it emphasizes political, economic, social and cultural interdependency and interconnectedness between the local, the national and the global (UNESCO, 2015, p. 14). The GC concept has to do with having an open mind to understand others in terms of their cultural norms and expectations, and along with this leveraging this knowledge to interact, communicate and work effectively outside one's own environment and take responsible action towards sustainability and collective well-being (Morais & Ogden, 2011; OECD, 2016).

By fostering entrepreneurship and GC, universities are seen as contributors to economic and social development, as well as sustainability. They play a key role in equipping individuals with the necessary competencies for these goals (Malacarne & Brunstein, 2021)—that is, for the kind of human development promoted by the UNDP (2022). Moreover, by encouraging entrepreneurship and innovation, universities can also support the achievement of two of the 17 Sustainable Development Goals (SDGs) outlined in the UN's 2023 Agenda for Sustainable Development (UN, 2020), particularly Goal 9, which focuses on innovation and sustainable industry.

1.1 Theoretical general lens of the thesis: Triple Helix Model

The discussion presented so far invites us to think about how organizations can work with the goal of achieving the economic and social development of the population. This thesis focuses on analysing the impact that a given PP can have on the population, as well as the role that universities – understood as education policies - play in contributing to the training of new professionals, preparing them for the challenges of the current global context and for society and its development.

The analysis proposed in this thesis considers key actors in the economic and social development of society, as well as in the formulation and implementation of public policies, namely: university, industry and government. Epistemologically speaking, the lens that allows this triple approach is that of the Triple Helix Model (THM) (Etzkowitz & Leydesdorff, 1995; Leydesdorff & Etzkowitz, 1996; Leydesdorff & Etzkowitz, 1998; Leydesdorff, 2000; Etzkowitz & Leydesdorff, 2000; Etzkowitz, 2008; Ranga & Etzkowitz, 2013; Etzkowitz & Zhou, 2017).

The THM was proposed as a response to the need to model knowledge in a global system (Leydesdorff & Etzkowitz, 1996), in which three dynamics are highlighted: the economic dynamics of the market, the internal dynamics of knowledge production and the governance of the interface at different levels, making the interaction among university, industry and government the key to innovation and growth in a knowledge-based economy (Etzkowitz, 2008).

Ranga and Etzkowitz (2013) report that the Triple Helix concept of university-industry-government relations began in the 1990s with the work of Etzkowitz and Leydesdorff (1995). The THM interprets a change from an industry-government dyad, dominant in the industrial society, to a triadic relationship among university, industry and government in the knowledge society (Ranga & Etzkowitz, 2013).

On the one hand, as Leydesdorff and Etzkowitz (1996) explain, evolutionary economics focused on the co-evolution of firms and technologies within a given knowledge infrastructure. On the other hand, sociological studies emphasized the institutional dynamics governing the relationships between academia and industry. Within this context, the THM takes as its point of departure the traditional forms of institutional differentiation among universities, industry, and government. Consequently, the THM posits a broader role for the knowledge sector in shaping the political and economic infrastructure of society (Leydesdorff & Etzkowitz, 1996).

In the interaction envisioned by the THM among universities, industry, and government, it is recognized that, beyond the connections formed between these institutional spheres, each is increasingly capable of adopting roles traditionally associated with the others (Etzkowitz, 2008). Within this context, universities engage in activities such as knowledge commercialization and business creation, while companies develop an academic dimension—sharing knowledge and training employees with increasingly advanced skill sets (Leydesdorff & Etzkowitz, 1998).

According to Leydesdorff and Etzkowitz (1998), new communication codes emerge at the interface between institutions. The authors argue that science is no longer valued solely for its pursuit of truth, but also for its practical applications. Legal systems are increasingly designed to support innovation processes, while industries are being transformed and restructured to enable control and adaptation to new technological possibilities. In this evolving landscape, institutions are actively engaged in the transitions driven by their mutual interactions (Leydesdorff, 2000).

The central postulate of the THM highlights the potential for innovation and economic development within a knowledge-based society, emphasizing a more prominent role for the university (Ranga & Etzkowitz, 2013). It also involves the hybridization of elements from the university, industry, and government, which facilitates the emergence of new institutional formats for the production, transfer, and application of knowledge (Etzkowitz & Leydesdorff, 1995). In this regard, Etzkowitz (2008) notes that the evolution of the THM stems from two contrasting models: the statist model, in which the government controls both the university and industry; and the laissez-faire model, where the three institutional spheres operate independently, interacting only minimally across well-defined boundaries. From both perspectives, one can observe, on the one hand, a movement toward greater autonomy for universities and industry in relation to the state, and on the other hand, a growing recognition of the need for deeper interdependence among these institutional spheres (Etzkowitz, 2008).

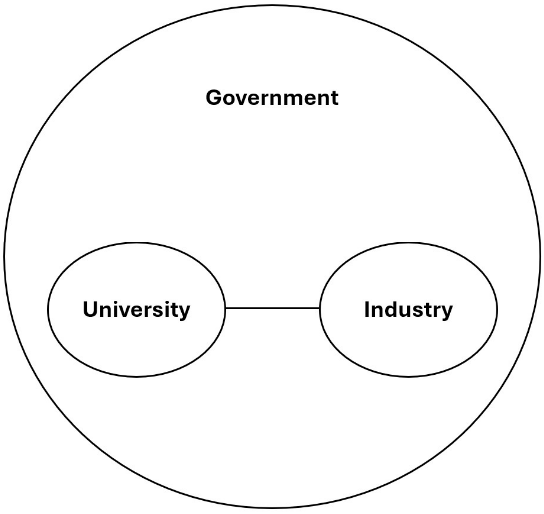
The interaction among the institutional spheres of university, industry, and government—each performing both its traditional functions and, at times, adopting the roles of the others, in various combinations—serves as a catalyst for organizational creativity. It is within these dynamic interactions that new organizational innovations emerge, particularly through the interplay of the three helices in the THM. The development of the THM can be understood as an evolutionary transition, one that, as Etzkowitz (2008) emphasizes, leads to a configuration of three institutional spheres that are equal and overlapping in influence. According to the author, dual helices—those involving only two of the three spheres, without a third mediating element—often produce antagonistic relationships. These tensions are reflected in broader societal debates about the proper balance between government and industry, particularly concerning the roles of labour and capital, which are frequently expressed through competing ideologies such as socialism and capitalism (Etzkowitz & Leydesdorff, 2000).

In the context of the modern state and the industrial era of the 18th century, statist societies emphasized the coordinating role of government, whereas laissez-faire societies prioritized the productive capacity of industry as the primary engine of economic and social development (Etzkowitz & Leydesdorff, 2000; Etzkowitz, 2008; Ranga & Etzkowitz, 2013). At this point, it is important to recall the historical phases of the world economy identified by Maddison (2006), and how these stages have shaped governmental actions and policy orientations over time (Leydesdorff & Etzkowitz, 1996; Etzkowitz, 2008; Etzkowitz & Zhou, 2017).

Thus, through the lens of the THM, this thesis investigates the role of the university in fostering entrepreneurship and GC that contribute to societal sustainability and development. In addition, it examines the role of industry—represented by exporting companies impacted by the PP under analysis—and government, as the originator of PPs, specifically the one evaluated in this study: the PEIEX program.

Figures 1, 2 and 3 present the three models of interaction among the university, industry and government reported by Etzkowitz (2008).

Figure 1. Statist Model



Source: Etzkowitz (2008).

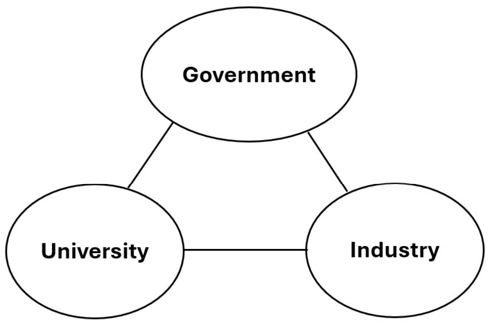
In the statist model, according to Etzkowitz and Leydesdorff (2000), the State encompasses and is situated above the university and industry, directing relations between these two spheres. The former Soviet Union is a good example of this model, along with Eastern European countries under socialism in the past (Etzkowitz & Zhou, 2017), as well as less rigid versions of this model in some Latin American countries (Etzkowitz, 2008).

In the statist model, it is noted that in the interaction among universities, industry and government, it is precisely the latter that dominates the relationships. Etzkowitz (2008) states that both industry and universities are subordinate parties coordinated by the State, and that in this model, what is expected is for the government to take the lead in developing projects and delivering resources for new initiatives. Industry and universities are seen as relatively weak institutional spheres that require strong guidance, and eventually even control (Etzkowitz & Zhou, 2017).

In the context of a more powerful and controlling state, voices are emerging that call for a discussion on the role of the State. This role has been deconstructed by an established image of the State as one that is limited to basic functions, unable to play a more significant role, such as driving innovation (Mazzucato, 2013). According to Mazzucato, the State has been under attack, dismantled, and labelled as bureaucratic and inert, among other criticisms.

According to Mazzucato (2013), although innovation is not the primary role of the State, its historical capacity in certain countries (e.g., the United States) to play an entrepreneurial role in society may be the most effective way to defend its existence and size, allowing it to act as an 'Entrepreneurial State'. To this end, it is essential to truly understand how the economy works and avoid perpetuating stereotypes that serve only ideological purposes (Mazzucato, 2013). In the framework proposed by the aforementioned author, where the State is more prominent and expansive, it is important to consider, among other factors, a key concern for scholars regarding the role and performance of the State, that is, the relationship between state expenditure, its size, and efficiency (Becker & Mulligan, 2003; Hauner & Kyobe, 2010; Facchini & Melki, 2013; da Cruz & Marques, 2014).

Figure 2. ***Laissez-faire Model***

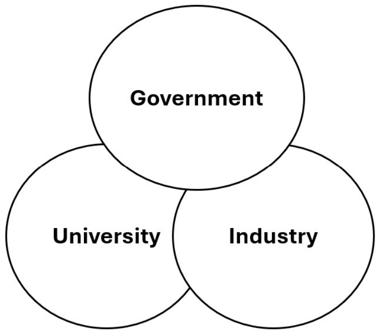


Source: Etzkowitz (2008)

In the Laissez-faire model, the power of the State is diminished, and it no longer functions as the dominant or hierarchically superior entity in the relationship between universities, industry, and government (Etzkowitz & Leydesdorff, 2000). While the boundaries between these spheres still exist and serve to constrain and regulate their interactions, the model allows for greater autonomy in initiating and implementing actions. Within this framework, the university, for instance, assumes a more prominent role in knowledge production—through teaching and research dissemination—and in fostering an entrepreneurial culture (Jongbloed et al., 2008; Audretsch, 2014).

In this context, industry is seen as engaging in increased interaction both with universities and within its own sector. These two spheres can be understood as mutually reinforcing, with their collaboration supported—and, in some ways, mediated—by the government. The government thus acts as an active and facilitating agent in the development of innovation and the promotion of growth within a knowledge-based economy, as postulated by the THM (Etzkowitz, 2008). The THM is discussed below.

Figure 3. Triple Helix Model



Source: Etzkowitz (2008).

In the THM, there is increased interaction among the three institutional spheres—university, industry, and government. According to Etzkowitz and Leydesdorff (2000), this interaction gives rise to a form of knowledge infrastructure characterized by overlapping institutional roles, enabling each sphere to assume functions traditionally associated with the others. From this convergence, hybrid organizations may also emerge, resulting from the dynamic interplay between the spheres (Etzkowitz & Leydesdorff, 2000).

According to Etzkowitz (2008), this third model of Triple Helix interaction—illustrated in Figure 3—serves as a tool for understanding why the three spheres maintain a relative degree of independence. It explains where interactions occur and how the dynamics of the THM unfold along a spectrum ranging from dependence to interdependence. Furthermore, the model provides insight into both conflicts and the convergence of interests among the spheres.

As a result of the increased interaction fostered by this model, not only do hybrid organizations emerge—as highlighted by Etzkowitz and Leydesdorff (2000)—but, as noted by Leydesdorff and Etzkowitz (1996), these organizations also contribute to job creation. Additionally, enhanced learning and development are expected across all three spheres, ultimately supporting the core objective of the Triple Helix Model: fostering innovation and driving growth within a knowledge-based economy (Leydesdorff & Etzkowitz, 1996; Etzkowitz, 2008).

Building on the dynamics of the THM—with its emphasis on increased interaction and the emergence of new organizational forms—scholars have proposed new frameworks to better explain the evolving relationships among the spheres and the innovations arising from them. For example, Carayannis and Campbell (2009) and Leydesdorff (2012) introduce the concept of a 'fourth helix', while Carayannis and Campbell (2010) extend this further by proposing a 'fifth helix'. Additionally, Peris-Ortiz et al. (2016) advance the broader concept of the 'Multiple Helices', reflecting the growing complexity of innovation systems.

Carayannis and Campbell (2009) proposed the addition of a fourth helix to the THM, identified as the 'media-based and culture-based public'. This helix encompasses elements such as media, the creative industries, culture, values, lifestyle, art, and potentially even a 'creative class'. According to the aforementioned authors, the integration of this fourth helix gives rise to an emerging fractal knowledge and innovation ecosystem—an environment particularly well-suited to the dynamics of a knowledge-based economy and society.

Leydesdorff (2012) also proposed a fourth helix, which he identified as 'internationalization'. According to the author, this addition was necessary to reflect the growing importance of international collaboration in shaping the interactions among the spheres of the THM. It is worth noting that, Leydesdorff (2012) developed this concept within the context of the 1990s, drawing on the example of Japan, where increased international academic cooperation—particularly in scientific publications—highlighted the expanding global dimension of knowledge production.

After proposing a fourth helix (Carayannis & Campbell, 2009), Carayannis and Campbell (2010) introduced the concept of a fifth helix, referred to as 'environment' (or nature). According to their proposal, in the interaction among the spheres of university, industry, and government—along with the fourth helix of the media- and culture-based public—a fifth helix was necessary to provide an analytical framework that connects knowledge and innovation to environmental considerations. This fifth helix also incorporates the concept of 'social ecology', emphasizing the interdependence between innovation systems and the environment.

Another significant contribution to understanding the advancement of the THM and the sustainable competitiveness of economies and companies is the 'Multiple Helix Ecosystems for Sustainable Competitiveness' proposed by Peris-Ortiz et al. (2016). These authors acknowledge the evolution of the THM and the proposals for additional helices discussed earlier. They highlight the incorporation of environmental aspects, which help establish the framework mentioned above. Additionally, Peris-Ortiz et al. (2016) examine factors related to the interactions among the spheres in the multiple helix model, including governance (Lacruz, 2016). Lacruz (2016) offers a governance framework with two primary drivers: the macrostructure of power and the macroprocesses of organizational management, which classify the governance environment. According to Lacruz (2016), this framework does not aim to optimize decision-making on key governance issues but instead identifies mechanisms that contribute to a deeper understanding of governance in partnerships within the THM environment.

Various helices have been added to the THM, each considering different aspects of innovation and societal development. This research acknowledges and incorporates these aspects through approaches that are integral to the study. More specifically, the concepts of human development, Global Competence, and the two sustainable development goals from the UN 2030 Agenda—focusing on education and innovation—serve as key frameworks addressing the issues introduced by the fourth, fifth, and multiple helices. Theoretically, this study uses the THM as an overarching framework to assess the impact of public policy on the population involved, focusing on its potential to drive economic and social development. Additionally, the study examines the role of universities in contributing to society and in preparing new professionals with skills in entrepreneurship and Global Competencies, thereby fostering sustainability. In this regard, the term THM remains central to this thesis.

1.2 Thesis of the study

Reiterating the concepts and considerations presented so far, this research thesis argues that PPs have the potential to influence a country's economic and social development. More specifically, the interaction among university, industry, and government is considered a key driver of innovation and growth in a knowledge-based economy (Etzkowitz, 2008). Within this framework and based on the premise that PPs are a primary tool through which governments aim to stimulate development (King &

Rebelo, 1990; Acemoglu, Johnson, & Robinson, 2014), this research endeavour emphasizes the importance of policy action. The formulation, implementation, and evaluation of such policies can play a crucial role in fostering development and improving the population's quality of life (Reinert, 1999).

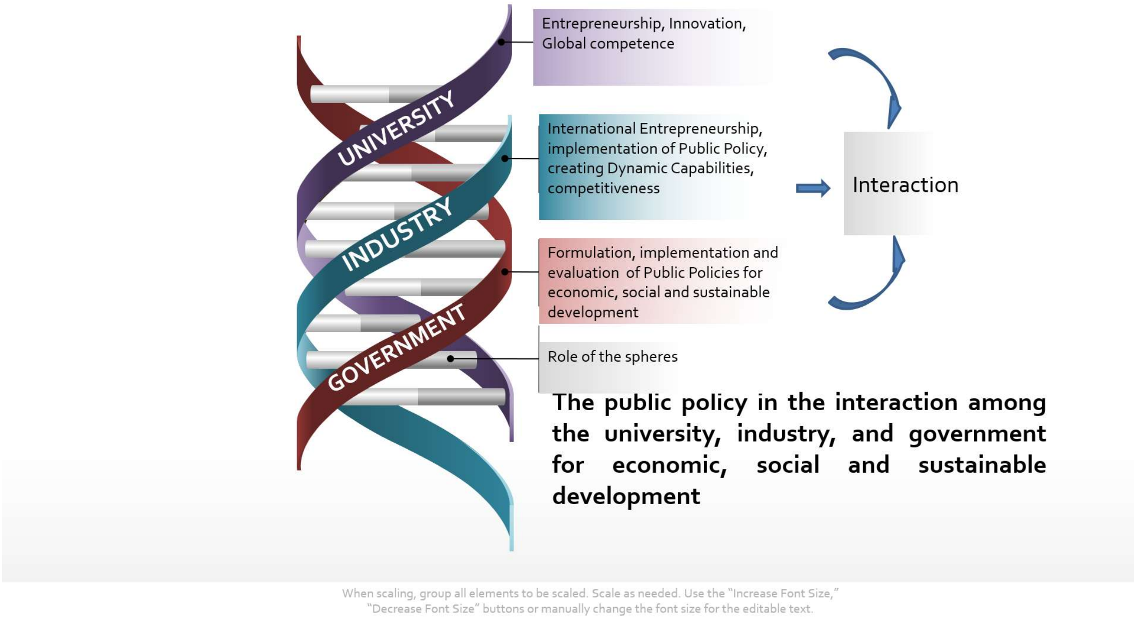
Thus, it is understood, in this thesis, that programs such as PEIEX, have the potential to contribute positively to this development. Specifically, in the case of PEIEX, by promoting company exports, there is an opportunity to foster the incorporation of new capabilities and learning for both the firm and the entrepreneur (Teece, 2007). Moreover, by encouraging exports and facilitating the incorporation or adjustment of organizational capabilities, programs like PEIEX may ultimately enhance the competitiveness of individual firms and, more broadly, boost the national economy (Zahra et al., 2006).

Thus, as a result of the positive impact of a PPs such as the one analysed in this study—namely, the increase in exports by Brazilian companies—it is possible to generate new learning, employment opportunities, and income for the population involved, as well as greater competitiveness for companies. These outcomes can contribute not only to improvements in quality of life but also to the well-being of those involved and to the broader economic and social development previously discussed (King & Rebelo, 1990).

Furthermore, this thesis understands the university, as part of public education policy, to play a fundamental role not only in teaching and research but also in contributing to society through university outreach activities. In addition, by fostering entrepreneurship and preparing future professionals for the global scenario, the university also contributes to the economic and social development of the population. By training professionals with a global perspective, the university can foster not only a sense of local and regional belonging but also a sense of global belonging within the community (UNESCO, 2015). This, in turn, encourages initiatives for global interaction, both economically and culturally. Such a global awareness can help individuals better understand and engage with various global aspects, including the environment in which future international professionals and entrepreneurs operate. This environment demands that they act as innovative agents who are also committed to environmental sustainability (Peris-Ortiz et al., 2016).

The university—by promoting a global perspective among future professionals—can also play a key role in fostering an innovative mindset (Ranga & Etzkowitz, 2013). This includes nurturing a sense of global belonging that encourages a positive relationship with innovation and the pursuit of new opportunities. Moreover, through the interaction among university, industry, and government in the formulation, implementation, and evaluation of public policy—where each actor fulfils its role while also supporting the others—it is theorized, through the analytical lens adopted in this study, that such collaboration can drive economic, social and sustainable development. This, ultimately, is the central thesis defended in this research endeavour. (see Figure 4).

Figure 4. Thesis of the study



Source: author

1.3 Objectives

This thesis aimed, within the context of interaction among the university, industry, and government spheres, to investigate aspects related to these three domains in the context of PPs directed towards industry and towards the university—the latter considered an educational PP—intended to promote economic, social, and sustainable development. This study sought to explore and provide evidence from one of the fields where PPs are implemented to promote entrepreneurship and exports—namely, IE.

In addition, one Brazilian PP implemented in this field was evaluated to contribute with empirical and robust evidence regarding the outcomes of such policy implementation. Furthermore, considering the university's role in fostering development, the study examined how the university contributes to prepare new professionals to navigate the current global context. It also investigated how the university's contribution to society—and to economic, social, and sustainable development—is materialised through its third mission, namely outreach.

Based on the above, and considering the contribution and interaction among the three spheres addressed in this study—university, industry, and government—for an economic, social and sustainable development, this thesis establishes the following objectives and procedures:

1.3.1 General objective 1 - To understand the cognitive structure of the research area of International Entrepreneurship. For this general objective, the following procedures were established:

1.3.1.1 To carry out a bibliometric study to analyse the area of International Entrepreneurship studies.

1.3.1.2 To develop a research agenda for the area of International Entrepreneurship studies.

1.3.2 General objective 2 – To evaluate the potential impact, at the national level, of the PEIEX program on the exports of companies from municipalities participating in the program. For this general objective, the following procedures were established:

1.3.2.1 Using econometric statistical techniques, evaluate the possible impact of PEIEX on the exports of companies belonging to municipalities participating in the program.

1.3.2.2 To contribute to both the evaluated program and the Public Policy evaluation area. Furthermore, to contribute to the Dynamic Capabilities study area in the context of Public Policy evaluation.

1.3.3 General objective 3 - To analyse the direct and indirect effects in the relationship between Entrepreneurial Intention, Global Competence and the three dimensions of sustainability and the moderated (by a geopolitical aspect) effect in the relationship between the dimensions of Global Competence and sustainability dimensions. For this general objective, the following procedures were established:

1.3.3.1 Using the Partial Least Square Structural Equations Modelling technique, to evaluate the direct, indirect and moderating effects on the relationship between the variables of the proposed model.

1.3.3.2 To deliver a model to measure the direct and indirect effects on the relationship between the Entrepreneurial Intention of future professionals, Global Competence and the dimensions of Sustainability. In addition, the model will consider the moderating effect of the geopolitical aspect related to the location of future professionals (higher education students).

1.3.4 General objective 4 - To empirically test a developed instrument and assess the fit of a model that examines professors' involvement in outreach projects. For this general objective, the following procedures were established:

1.3.4.1 To develop an instrument to measure professors' involvement in outreach projects.

1.3.4.2 To deliver a validated model to measure professors' involvement in outreach projects as a means of contributing to the measurement of university public engagement.

1.4 Contributions

This research thesis aims to contribute both theoretically and empirically to advance knowledge and development. On a theoretical level, it seeks to advance the understanding of the concepts discussed herein, particularly by exploring how the theoretical lenses adopted in this study can be integrated to support analyses like the one undertaken. Specifically, the THM provides a framework for examining the three key spheres central to this research—university, industry, and government—allowing for an analysis of their interactions and roles in the formulation, implementation, and impact of PPs.

Furthermore, each of the articles that comprise this thesis adopts different theoretical lenses, which are expected to contribute not only to the advancement of the THM but also to the broader understanding and potential application of these lenses in future research. By integrating theoretical perspectives, and as reported in each respective article, these are seldom explored together in the literature. For example, in article 2 of this thesis, the evaluation of PPs implemented in the private sector incorporates the lens of DC into the analysis, an approach that has been eventually observed just in the public sector (Kattel & Mazzucato, 2018). Therefore, this study aims to offer conceptual tools that may inspire new applications and avenues for investigation.

Based on the central thesis of this study, which examines the interaction among the spheres addressed here, it is understood that each sphere plays a critical role in fostering economic and social development. The government, as the entity responsible for formulating PPs, can provide support to the other spheres and should ensure that policy formulation is informed by research conducted at universities. The university, for its part, contributes through its research to the field of PP and human capital development, while also promoting entrepreneurship, innovation, and a global perspective among future professionals by implementing initiatives that bring these values to life. In the case of industry, it is responsible for incorporating the benefits of PPs—such as the program evaluated in this study—along with education and university extension policies.

Furthermore, industry plays a crucial role in applying the concepts discussed in this study. For instance, in the context of implementing and evaluating PPs, DC can be explored and analysed with the understanding that they contribute for creating a more competitive and innovative industry. This, in turn, can generate employment, income, and improved conditions for all stakeholders involved.

In the interaction of the spheres, each plays a significant role in advancing economic and social development. The way in which the theoretical lenses used in this study are integrated is believed to contribute both to theory and to the state of the art in each of the fields explored. In the case of IE, the perspectives offered by the thematic structure of this field have contributed to the cognitive framework of IE studies and its current state of the art. This approach also highlights key underlying concepts, such as DC and impact, which are crucial when addressing IE. These concepts can stimulate new research and methodologies, as exemplified by the second scientific article developed in this research. This article evaluates the potential impact of a PP using a quantitative approach, incorporating DC in the analysis of this impact. Through this methodology, the study contributes with empirical evidence to deepen the understanding of aspects such as learning, competitiveness, DC, and the evaluation of PPs.

The third article of this thesis considers the relevant role of universities in preparing new professionals for the global context. It builds on the context of companies participating in the evaluated programme that face such a global context in the second article of this thesis. The concepts of Entrepreneurial Intention (EI), GC, and Sustainability are used to make an empirical contribution to the field of EI by demonstrating both the direct and indirect effects of EI on GC and on sustainability dimensions. This study, through its model, paves the way for broader discussions among scholars and policymakers about Sustainable Global Entrepreneurship, which is both the context of the companies participating in the program evaluated in the second article of this thesis and the context for which new professionals need to be prepared.

In the fourth article, the focus shifted to the materialization of the university's contribution to society as part of the educational PP in which the university participates. It was possible to validate and develop a scale and model that measure the university's engagement with the community, particularly through the involvement of professors in outreach projects.

In terms of the practical contributions, this research endeavour, by examining the impact of the PEIEX program, generates new insights for those involved in its management and implementation. These insights could lead to improvements in the development and execution of the program, as well as the introduction of new initiatives that align with PEIEX's goal: to promote exports by Brazilian companies and maximize the associated benefits. These benefits include, for example, increased exports, higher income, job creation, and enhanced learning opportunities for all stakeholders involved.

Furthermore, this thesis contributes to understanding the university's role in society and sustainable development. It advocates for a more active and engaged role for the university, one that extends beyond its traditional mission of education. This role involves promoting awareness of a global perspective, encompassing both academic training and the development of global competence—where individuals see themselves as members of a global society and understand its implications and opportunities. Additionally, by considering the university's third mission—outreach—and the role of academics, this study helps to better understand and measure the university's contribution to society.

In this context, those involved in industry (e.g., IE) and future professionals who will face the global market should both be considered as part of this group of globally aware citizens. We understand that our contribution lies not only in ensuring that these individuals are better prepared to engage in this global context, but also in helping them better understand what this means—particularly in terms of the opportunities and challenges involved.

1.5 Thesis structure

This thesis was developed, structured and presented in the form of articles – in accordance with Resolution 01/2022 of the Postgraduate Program in Administration (PPGAdm) of the Federal University of Espírito Santo (UFES). To this end, the four articles included in this thesis are designed to address both the general and specific objectives of the study. Each article adopts its own methodological approach, with limitations identified in relation to the specific objective it aims to achieve. Below, Figure 5 presents the four scientific articles that make up this research thesis, their alignment with the objectives of the study and the contribution of each one to the overarching thesis. As previously mentioned, this thesis explores PPs from both the industry perspective (related to SDG 9) and the educational field (related to SDG 4). Articles 1 and 2 focus on the industry, while Articles 3 and 4 address education. All four articles are connected sequentially, providing a comprehensive approach to this research endeavour.

Figure 5. Articles of the Thesis

		Objective	Contribution
PPs in the industry	Art. 1	To understand the cognitive structure of the research area of International Entrepreneurship	Contribution to the understanding of the field of IE. Through thematic maps, it adds to the knowledge of the cognitive structure of IE, along with a research agenda
	Art. 2	To evaluate the potential impact of a Brazilian export promotion program on the exports from companies in participating municipalities in the program	Causal inference of the potential impact of PEIEX. Adjustments or formulation of PP aimed at goals similar to those of PEIEX. Also, a contribution to the advancement of DC field in the context of PP evaluation
PPs in education	Art. 3	To analyse the direct and indirect effects in the relationship between EI, GC and the three dimensions of sustainability and the moderated (by a geopolitical aspect) effect in the relationship between GC and sustainability dimensions	Empirical contribution to the field of EI demonstrating the direct and indirect effects of EI on GC and on sustainability dimensions. The study paves the way for a broader discussion including scholars and police makers about a Sustainable Global Entrepreneurship
	Art. 4	To empirically test a developed instrument and assess the fit of a model that examines professors' involvement in outreach projects	Enhancing our understanding of professors' involvement in publicly engaged universities and its broader societal impact, offering a validated model for its measurement

Source: author

1.5.1 Approach for the first article of the thesis

The first article of this thesis, entitled *"International Entrepreneurship: Thematic Mapping and Research Agenda Proposal"*, co-authored by my advisor, was published in 2023 in the journal *Organizações & Sociedade* (https://doi.org/10.1590/1984-92302023v30n0010EN). This article addresses the first general objective of the research: to understand the cognitive structure of the field of IE. In this article a bibliometric analysis of the IE literature was conducted to propose a research agenda for the field. More specifically, the article aims to contribute to a deeper understanding of the theoretical and conceptual foundations of the context in which the exporting firms—one of the key research objects in this thesis—are situated.

This article contributes both to the state of the art and the cognitive structure of the IE research field, as well as to identify concepts that may emerge as key elements within it. As highlighted in the study, the IE field has experienced significant growth in the number of publications, not only in specialized journals such as the *Journal of International Entrepreneurship* but also in a variety of related academic journals.

In the future research agenda proposed by the first article of this thesis, the concepts of DC and the impact of promoting IE are highlighted, among others. These concepts provided a foundation for the subsequent impact assessment of the PEIEX program in the participating municipalities, which included companies classified as part of the IE field (Oviatt & McDougall, 1994; McDougall & Oviatt, 2000; Zahra & George, 2002). From a methodological perspective, the study applied thematic mapping to model the knowledge structure within the field of IE, drawing on the thematic structure of the discipline. In summary, the results suggest that the most prominent themes in the field include firm performance in IE, innovation, knowledge, entrepreneurial firms, entrepreneurial orientation, management, strategy, business models, and export behaviour. Additionally, the themes of performance, entrepreneurial orientation, entrepreneurship, impact, and management are identified as emerging areas within the IE literature.

1.5.2 Approach for the second article of the thesis

The second article developed as part of this thesis, written in co-authorship with the thesis advisor and João José de Matos Ferreira (Full Professor of Management, at *Universidade da Beira Interior*, Portugal), builds upon work previously presented and published—also in collaboration with my advisor—in the proceedings of the 10th Brazilian Meeting of Public Administration (EBAP) in 2023. Among its contributions were guidelines for assessing the impact of the PEIEX program. The version presented in this thesis, entitled "The impact of public policies: evaluating an export promotion program on fostering exports at the municipal level", is currently under review at the Organization & Society journal (Sage). Advancing the evaluation of public policies—specifically the PEIEX program—this article addresses the second general objective of this thesis: to evaluate the potential impact, at the national level, of the PEIEX program on the exports of companies from municipalities participating in the program. In this article, econometric statistical techniques were used to evaluate the potential impact of PEIEX on the exports of companies belonging to municipalities participating in the program to contribute both to the evaluated program and to the area of PP evaluation studies. Furthermore, to contribute to the area of DC in the context of PP evaluation.

This article used a panel data approach with secondary data applying several statistical techniques. Results of the study revealed no statistically significant variance in export performance between the municipalities that took part in the evaluated EPP and those that did not. The inclusion of lagged dependent variables and placebo group tests further confirmed the findings of no impact. Suggestions were made to policymakers to consider refining the execution of EPP by incorporating learning and feedback mechanisms to ensure long-term impact, which could influence future program adaptations.

To assess the impact of the PEIEX program, two methods were employed. The first method, Propensity Score Matching (PSM), aims to estimate the propensity of individuals (or observations) to belong to either the treatment or control group, matching participants with non-participants (Khandker et al., 2009). The second method applied was the Differences-in-Differences (DiD) technique, which compares changes in outcomes over time between the treatment group (program participants) and the control group (non-participants). The DiD method estimates the counterfactual change in outcomes for the treatment group by comparing it to the observed change in outcomes for the control group (White & Raitzer, 2017; Gertler et al., 2018).

PSM and DiD are considered the most appropriate methods for inferring the potential effect of the PP analysed (Gertler et al., 2018). These methods were applied using secondary data on Brazilian exports by municipality, which was published on the Comex Stat portal of the Ministry of Industry, Foreign Trade, and Services.

The choice of the PSM and DiD methods is based on the characteristics and assumptions of various methodological approaches used to evaluate the impact of a program or PP. These include random selection methods, instrumental variables, regression discontinuity, DiD, and matching techniques. It is important to note that the first three methods produce estimates of the counterfactual (essential for impact assessment, as explained in the article) when there are clear and explicit rules for assigning program beneficiaries. However, in the case of the PEIEX program, the allocation of beneficiaries lacks transparency, which makes the application of these methods less feasible for this study.

Both the PSM and DiD methods provide additional tools that are particularly useful when the rules for selecting beneficiaries are unclear, or when the other methods mentioned (random selection, instrumental variables, and regression discontinuity) are not applicable. However, it is important to note the potential difficulty in applying the matching method, which may require large datasets and can only be applied to observable characteristics within the sample. This limitation could make it challenging to define an appropriate comparison group.

1.5.3 Approach for the third article of the thesis

The third paper of this research thesis, entitled: "Educating for Sustainable Global Entrepreneurship: Assessing Entrepreneurial Intentions, Global Competence, and Sustainability in Emerging Professionals", was presented in a previous version, at the International Conference on Business Innovation, ICOBI 2025, held at NSBM Green University, Sri Lanka under the title "Future professionals' entrepreneurial intentions, sustainability and global competence: paving the way for a Sustainable Global Entrepreneurship". This third article is under review at The International Journal of Management Education (Elsevier) and was also produced in co-authorship with the thesis advisor and addresses the third general objective of the study, namely: to analyse the direct and indirect effects in the relationship between Entrepreneurial Intention (EI), GC, and the three dimensions of sustainability, as well as the moderating effect of a geopolitical aspect on the relationship between the dimensions of GC and sustainability. The Partial Least Squares Structural Equation Modelling (PLS-SEM) technique was used to evaluate the direct, indirect, and moderating effects in the relationships of the variables within the proposed model; and to develop a model to measure these effects, including the moderation in the relationship between the EI of future professionals, GC, and the dimensions of sustainability.

This article aimed to analyse and measure the effects of the EI of future professionals on the dimensions of GC and sustainability, within the context of higher education, reflecting a public education policy and considering the IE context of article 2 as a context that future professionals will participate in. The research adopts the perspective that universities can and should contribute to sustainability, as well as to economic and social development. By fostering entrepreneurship and promoting a global vision among future professionals, universities play a key role in contributing to the development of local, regional, and global societies (UNESCO, 2021).

In the methodological approach of this article, the PLS-SEM technique was applied to analyse data obtained from undergraduate students. The aim was to make an empirical contribution to the field of EI by demonstrating the direct and indirect effects of EI on GC and the dimensions of sustainability. This study paves the way to a broader discussion among scholars and policymakers about the concept of Sustainable Global Entrepreneurship.

1.5.4. Approach for the fourth article of the thesis

The fourth article of this thesis, entitled: "Evaluating a university public engagement through outreach projects: professors' involvement and measurement implications", also produced in co-authorship with my advisor, was published in the Technological Forecasting & Social Change journal (Elsevier https://doi.org/10.1016/j.techfore.2025.124106). The paper addresses the fourth and final general objective of the study, namely: to empirically test a developed instrument and assess the fit of a model that examines professors' involvement in outreach projects. This article developed an instrument to measure professors' involvement in outreach projects and delivered a validated model to measure professors' involvement in outreach projects as a means of contributing to the measurement of university public engagement.

This article sought to go beyond public education policy by examining the role of the university as an institution in contributing to society and fostering economic and social development. Specifically, the fourth article delved into the role of university academics—agents with the potential to materialize such contributions—particularly those involved in outreach projects, which represented the third mission of the university. These projects were designed to bridge the gap between academia and the community, enabling universities to make a meaningful impact.

The study provided a valuable tool and model for measuring the university's engagement with society, offering a framework to assess the theoretical aspects discussed earlier in this research regarding the university's role in societal and developmental contributions. The contribution of this article allowed universities to evaluate both the role of individual academics, and the institution as a whole, in fostering this engagement.

Figures 6 and 7, present, in a general way, the approach of this doctoral thesis.

Figure 6. Main objective, objectives and articles of the thesis

Main objective
To investigate an economic, social and sustainable development through the interaction of the university, industry, and government spheres

Objective 1	**Objective 2**	**Objective 3**	**Objective 4**
To understand the cognitive structure of the research area of IE	Evaluate the potential impact, at the national level, of the PEIEX program on the exports of companies from municipalities participating in the program	To analyse the direct and indirect effects in the relationship between EI, GC and the three dimensions of sustainability and the moderated (by a geopolitical aspect) effect in the relationship between GC and sustainability dimensions	To empirically test a developed instrument and assess the fit of a model that examines professors' involvement in outreach projects
Article 1	**Article 2**	**Article 3**	**Article 4**
International Entrepreneurship: thematic mapping and research agenda proposal	The impact of public policies: evaluating an export promotion program on fostering exports at the municipal level	Future professionals' entrepreneurial intentions, sustainability and global competence: paving the way for a sustainable global entrepreneurship	Evaluating a university public engagement through outreach projects: professors' involvement and measurement implications

Source: author

Figure 7. Method and lenses used in the study

Methods and lenses used

Method 1	**Method 2**	**Method 3**	**Method 4**
From the perspectives of the thematic structure of the field, the technique of thematic mapping was used to model the knowledge produced in the field of IE	For causal inference for the potential impact of PEIEX on the exports of companies from the municipalities participating in the program, the PSM and Dif Dif techniques will be used	Partial least squares structural equation modelling technique was applied to analyse data obtained from undergraduate students	A Confirmatory Factor Analysis was conducted to assess the proposed model's validity
Lenses	**Lenses**	**Lenses**	**Lenses**
International Entrepreneurship, International New Ventures and Born Global	Public Policy and Dynamic Capabilities	Entrepreneurial Intention, Global Competence and the Tripple Bottom Line of Sustainability with its three dimensions: economic, social and environmental	University public engagement and university contribution to society

Source: author

2 FIRST ARTICLE: International Entrepreneurship: Thematic Mapping and Research Agenda Proposal

Ramón Andrés Ortiz-Rojo

Adonai José Lacruz

Abstract

This study aimed to carry out a bibliometric analysis of the production on International Entrepreneurship IE based on perspectives of the thematic structure of the field using thematic mapping techniques to model the knowledge produced in it. Data from the scientific production on the subject were collected from Scopus and Web of Science databases. Three thematic maps representing the periods of 1995-2004, 2005-2014 and 2015-2022 were yielded in the study. The discussion of results concludes that IE is a research area that has grown significantly since the second period, showing a considerable increase in publications from 127 in the first period to 1,042 in the second. This increase remained constant reaching 1,934 in the third and final period. The themes that stood out the most and were most representative in the field of IE were performance of companies in IE, innovation, knowledge, entrepreneurial companies, entrepreneurial orientation, management, strategy, model and export behaviour. A conceptual variation of the themes was also observed with the performance theme standing out, maintaining a high representativeness in the three periods analysed with displacements between the basic themes – transversal – and the driving themes. Another highlight was the capabilities' theme, which, over time, resulted in the dynamic capabilities theme. As emerging themes, performance, entrepreneurial orientation, entrepreneurship, impact and management appear. Based on the results and conclusions of this study, a research agenda is proposed.

Keywords: International Entrepreneurship; Bibliometrics; Research Agenda; Thematic Map

Introduction

International Entrepreneurship, after the publication of the study by McDougall (1989), considered the first work published in the area, began its development attracting several authors and contributions that marked the evolution of the theme, among them those of Oviatt and McDougall (1994), McDougall and Oviatt (2000), Zahra and George (2002), Knight and Cavusgil (1996, 2004), and Oviatt and McDougall (2005). There is a consensus that the starting point for the increase in research in the field of IE was the seminal work by Oviatt and McDougall (1994) with the definition of International New Ventures (INV). On the other hand, according to McDougall and Oviatt (2000) and Zahra and George (2002), IE originated in the confluence of two areas: international business and entrepreneurship.

There is also agreement among authors that advances in technology, communications and transport are among the triggers for the emergence of the IE phenomenon (Autio, 2005;

Knight & Liesch, 2016; McDougall & Oviatt, 2000; Zahra, 2021). These factors enabled the internationalization of INV (Oviatt & McDougall, 1994), as well as companies called Born Global (BG) (Knight & Cavusgil, 1996, 2004), even reaching new markets from their conception or very close to that.

According to the bibliometric study by Baier-Fuentes, Merigó, Amorós and Gaviria-Marín (2018), publications on IE showed a considerable increase in recent years – 85.6% between 2006 and 2015. The authors report that publications, regionally speaking, are mostly concentrated in some European countries and that the United States appears as the most important country in terms of publications in the area. In relation to Latin America, only four countries are cited: Brazil, Chile, Colombia and Costa Rica. Nave and Ferreira (2022), in their systematic review, considered the last 27 years of publications in the field of IE. The authors state that the production on IE shows an increase in publications and citations, mainly from 2014 onwards. In addition, the authors report four main clusters that encompass the production on IE, namely: international business networks and opportunities, institutional environments, characteristics and motivations of the entrepreneur and stimuli and processes of internationalization.

It is observed that, in recent years, along with the increase in publications on IE, there has also been an increased interest in systematic reviews that contribute to the state of the art in the area. However, and according to Baier-Fuentes et al. (2018), there is still a shortage of works that use bibliometric techniques in the field of IE since most studies do not go beyond the use of descriptive statistics to present results.

By applying bibliometric procedures, it is possible to study and measure texts and information in large volumes and mainly two dimensions: performance analysis and mapping (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011). According to the aforementioned authors, the objective of performance analysis is to evaluate groups such as countries, universities and researchers and the impact of their activities. Mapping, on the other hand, seeks to demonstrate the dynamic and structural aspects of research, that is, mapping is used to represent the cognitive structure of a given area of research. In the case of the motivation of this study, we consider the notable increase in publications in the field of IE and the lack, according to Baier-Fuentes et al. (2018), of studies that contribute to bibliometric analyses in the case of IE. We sought to provide a basis for the construction of future theoretical and empirical studies, by showing and analysing the evolution of the theme considering the entire publication since 1989 and taking McDougall's (1989) seminal article as a landmark.

Having outlined this panorama, the objective of this work is to carry out a bibliometric analysis of the production on IE, going deeper, specifically, in the thematic mapping. As such, this study advances the state of the art on IE presenting thematic maps for different periods. A contribution like this is considered relevant due to the fact that the IE theme has shown a significant increase in publications, as already mentioned, as well as the modifications and adaptations that IE has shown over time, for example, in terms of ways of undertaking and speed, moving from more traditional IE to BG, more linked to new technologies, as pointed out by Knight and Cavusgil (2004). Based on results of this study an agenda is proposed so as to inform future research in the area that may consider the new trends and aspects found and highlighted by the thematic maps of this study. To this end, the guidelines of Fisch and Block (2018) were followed focusing on these questions: What are the central themes of production in the IE area? What are the emerging issues within the IE?

Methodological procedures

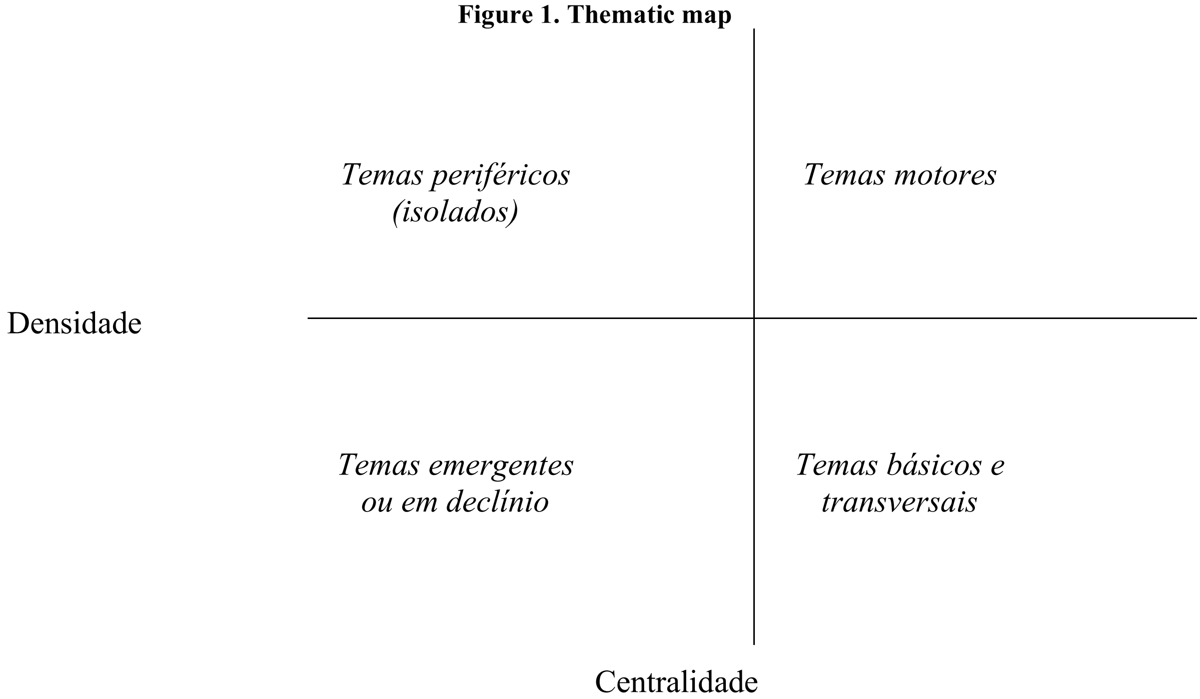
This empirical study examines the "knowledge production" of international entrepreneurship studies from the perspective of the thematic structures in the field using techniques of thematic mapping and systematic literature review to model the knowledge produced in the field of IE studies.

Fisch and Block's (2018) guidelines were followed for the systematic review of the literature in the business area presenting the motivation for the theme and formulating research questions that guided the studies. Also, the relevant literature was systematically identified balancing breadth and depth of sources of analysis, focusing on concepts rather than on studies to obtain a relevant conclusion, outlining paths for future research.

With regard to thematic mapping, specifically, it will be used the approach proposed by Cobo et al. (2011) of a thematic map graphic scheme, from which, from two perpendiculars (vertical and horizontal) on a Cartesian axis with the Callon density (measure of the internal strength of the network) in the ordinate and the Callon centrality (measure of the degree of interaction of a network with other networks) in the abscissa, four quadrants follow (Figure 1).

As seen in Figure 1, the upper right quadrant indicates driving themes for the field – well-developed and important – as they have strong centrality and high density. In turn, the lower right quadrant presents basic and transversal themes, important for the field, but less developed, as it has a strong centrality and low density. The lower left quadrant shows emerging or disappearing themes with low density and weak centrality. Finally, the upper left quadrant indicates highly developed themes though with irrelevant external ties, that is, high density but weak centrality. As such, the upper left quadrant themes are of marginal importance to the field, being specialized and peripheral in nature.

Figure 1. Thematic map



Source: from Cobo, López-Herrera, Herrerra-Viedma and Herrera (2011, p. 151)

This analytical perspective examines how the literature has formed interconnections of research themes that can distinguish this field of research – a prerequisite for forming its disciplinary identity – while also helping to understand its evolution. It important to bear in mind that thematic maps were prepared from the keywords plus the field identified in the documents.

When seeking to describe trends in the field, it was assumed that the data set should be as comprehensive as possible, including grey literature, in order to avoid selection bias (Mendes-da-Silva, 2019). By grey literature we mean that the data should be composed by books and chapters; published articles and articles approved for publication in scientific journals (early access); articles and abstracts published in proceedings of scientific events.

The query was made on June 13, 2022, in the bases of Scopus and the Web of Science - the largest databases of peer-reviewed publications in the field of applied social sciences. For the selection of documents, a search was carried out to verify the use of terms in the title, keywords or keywords plus or in the abstract of the documents, without delimiting time or language or type of document (e.g., article or book chapter) or source documents (e.g., journals and conferences). The queries used are shown below.

Web of Science:

ALL= (“International Entrepreneur*” OR “International New Venture” OR “Born global”)

Scopus:

TITLE-ABS-KEY (“International Entrepreneur*” OR “International New Venture” OR “Born global”)

At this stage, 4,145 documents were identified. It does not, however, rule out that the search for greater coverage can lead to a “deviation” of quality – for example, documents from journals with very different impact factors, taking the impact factor as a proxy for quality or dimension of the scientific production. For data processing, the bibliometrix package (Aria & Cuccurullo, 2017) for the R software (R Core Team, 2022) was used.

Data retrieved from bibliographic databases may contain duplicate records or registration errors, which required pre-processing. In addition, the queries used could retain documents without adherence to the focus of the investigation. Thus, the titles were read. In cases where it was not possible to validate the adherence of the document to the scope of the study using this criterion, the abstracts of the documents were read.

In the end, the database had 3,116 documents (Table 1) from 745 sources (journals, books, conferences, etc.), with 4,594 unique authors and 5,631 keywords.

Table 1. Data description

Description		Nº Documents
	Scopus	1.981
(+)	Web of Science	2.164
(=)	**Subtotal [1]**	**4.145**
(-)	Duplicates	911
(=)	**Subtotal [2]**	**3.234**
(-)	Error[a]	0
(-)	Scope[b]	118
(=)	**Total**	**3.116**

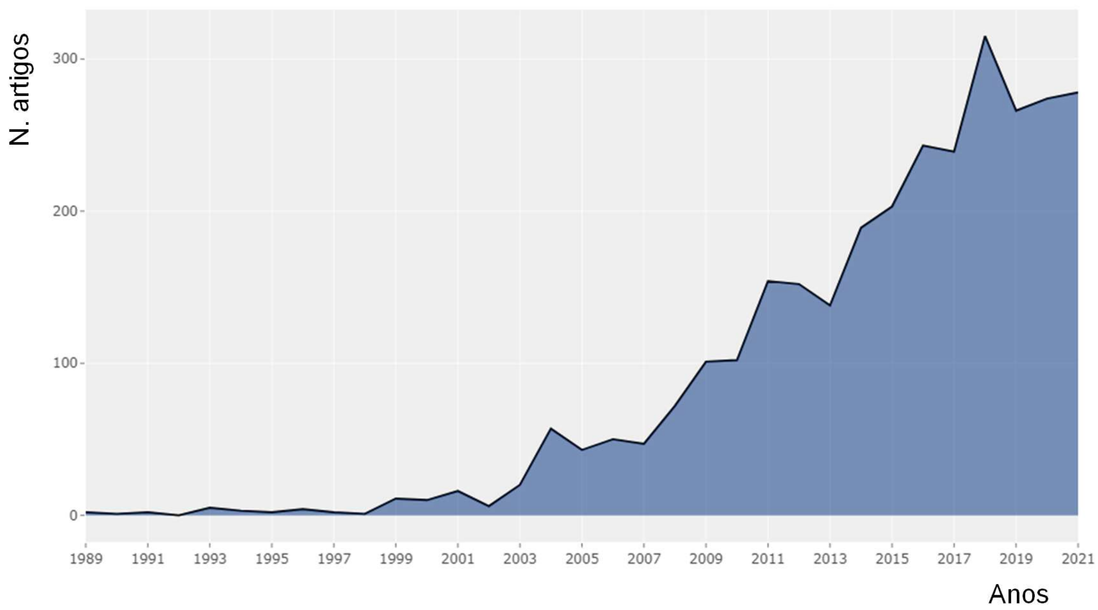
[a] error that implies the registration of duplicate documents
[b] based on titles and/or abstracts of documents

Source: authors (research data).

Results

The number of annual publications on international entrepreneurship, from 1989 to 2021, is illustrated in Figure 2. It was decided to carry out this analysis by limiting the data set to 2021, in order to avoid misleading the reader into a sharp drop in 2022, since data were collected in June 2022.

Figure 2. Scientific production (1989 – 2021)

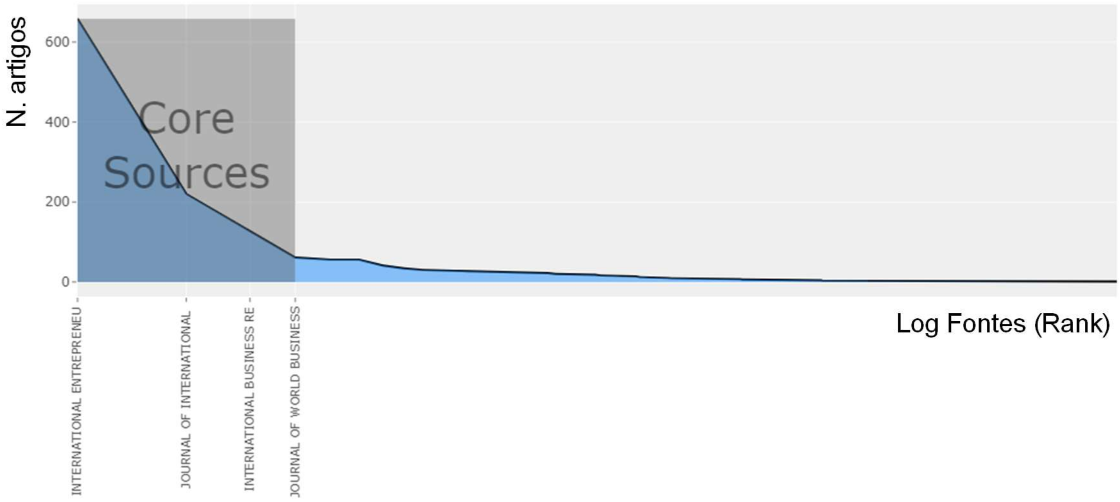


Source: authors (research data)

Agreeing with Coviello and Jones (2004) and Servantie, Cabrol, Guieu and Boissin (2016), it was considered that the extensive amount of publications on IE (1989-2022) began with the article by McDougall (1989), although the result of the search in the databases yielded two works prior to McDougall's: that of Weaver (1987) and Borner (1984). The latter comprises a theoretical article published in German addressing characteristics of the market, whereas the former deals with local entrepreneurship (Ireland) rather than IE (the focus of this study). Thus, Weaver's and Borner's documents were not included in the database.

For the entire period considered (1989-2022), 745 sources were identified. According to Bradford's law, only four are core sources in the area whereas the area highlighted in gray is responsible for 1/3 of the scientific production (Figure 3).

Figure 3. Bradford's law (1989 – 2022)



Source: authors (research data)

Bradford's Law proposes that authors tend to send their productions to the source (e.g. journal) where they see the document published. Thus, a nucleus of more productive sources in the area of knowledge is established. The journals identified are: International Entrepreneurship and Management Journal with 658 (20%) articles, Journal of International Entrepreneurship with 220 (7%) articles, International Business Review with 127 (4%) articles, and Journal of World Business with 61 (2%) articles. These journals thus formed the core of sources that proved to be productive for the circulation of studies of IE, especially the first two, which together accounted for more than 1/4 of the period's production.

In other words, Bradford's law assumes that after publishing some articles on a new topic in some journals, these same journals will polarize production on this new topic for a while and, in parallel, other journals will start publishing the first articles on the same topic. With the consolidation of the new theme, a gravitational core of journals that publish more on this new theme will then emerge. In this way, these four journals, more specifically the first two, function as sources through which other authors come into contact with certain publications, dialogue with them and where they tend to submit their own papers.

Resuming the discussion of Figure 2, after reading the initial work on IE by McDougall (1989), we arrived at the seminal article of Oviatt and McDougall (1994), considered a landmark in the research on IE (Baier-Fuentes et al., 2018; Nave & Ferreira, 2022). The authors defined International New Ventures (INV) as commercial organizations that seek to obtain competitive advantages through the use of resources and the sale of products in different countries from their very beginnings. With this, the starting point for the development of research in the area of IE was established.

Thus, the previously referenced period from 1989 to 1994 can be considered as the preamble to the analysis carried out in this study, in which, subsequently, three periods were analysed and represented by the three thematic maps obtained from the bibliometric procedures applied in this work. The first thematic map covers the period from 1995 to 2004; the second map goes from 2005 to 2014, and the third thematic map covers the period from 2015 to 2022.

The rationale for selection of these periods can be questioned. They were determined to be considered landmarks in IE research because of the following reasons. In the case of the first period, it begins after the publication of the work that inaugurated the development of research on the subject. The period comprising the time interval between the year after its publication and 2004 considers the influence of the study in question on the work of Oviatt and McDougall (1994).

Regarding the period for the second thematic map (2005-2014) which corresponds to nine years of publications, it presents a new milestone in the research of the IE theme with Oviatt and McDougall's (2005) update to the definition of INV (discussed in the map). Finally, the most recent period considers that from 2015 until the moment of production of this work, that is, 2022.

Thematic map: 1995 to 2004

Based on the definition given by Oviatt and McDougall (1994) for INV, it can be noted that research on IE began to be more directed towards the individual, in this case, the entrepreneur. Several aspects were considered by researchers among which is the formation of INV (McDougall, Shane, & Oviatt, 1994), regarding these questions:

1. 1st question: who are the founders of INV? To which the authors respond that these founders are individuals who see opportunities to establish ventures that operate beyond national borders. They are aware of the possibilities of combining resources from different markets because of the skills – networks, knowledge – they have developed from their previous activities;

2. 2nd question: why do these entrepreneurs choose to compete internationally and not just in their countries? Because they recognize that they must create international business skills from the moment the venture is formed. Otherwise, the venture may become dependent

on the domestic skills development path, and the entrepreneur will find it difficult to change strategic direction when international expansion eventually becomes necessary;

3. 3rd question: what forms their international business activities? They prefer to use hybrid structures, that is, alliances and strategic networks for their international activities as a way to overcome the usual lack of resources in the beginning of their expansion (McDougall et al., 1994).

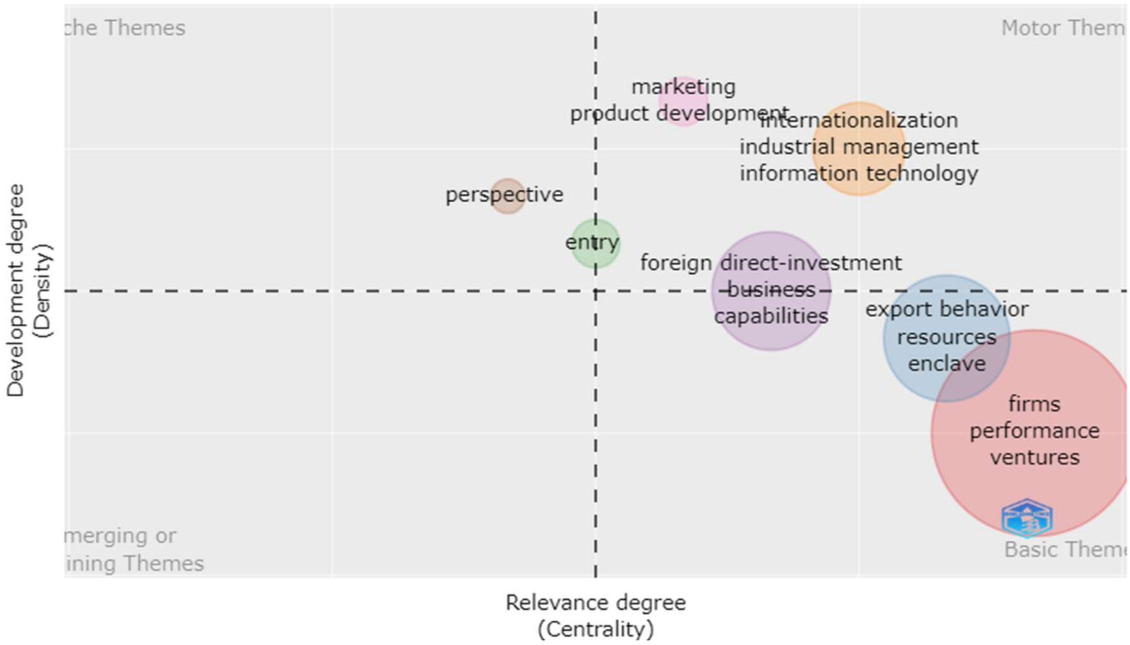
Other aspects addressed in the surveys were ways of entering new markets (Burgel & Murray, 2000; Zahra, Ireland, & Hitt, 2000), cultural aspects (Thomas & Mueller, 2000), knowledge and learning in internationalization (Autio, Sapienza, & Almeida, 2000), among others. Also, within this period, Knight and Cavusgil (1996) published their work on BG companies, small companies with the ability to develop technological products and expand internationally more quickly. The aforementioned authors published, in 2004 their recognized work on innovation, organizational capabilities, and the born-global firm, addressing important factors such as the innovative culture and capabilities observed in BG which help to explain why these companies manage to conquer foreign markets quickly (Knight & Cavusgil, 2004).

Coviello and Jones (2004) state that the large amount of research that emerged in the IE area was characterized by the inconsistent use of measures and definitions of key variables, such as size and age of companies. It was McDougall and Oviatt (2000) themselves who called for clearer directions in methodological terms in relation to research on IE.

According to Keupp and Gassmann (2009), research has focused, with some exceptions, mainly on the following issues: the propensity of small and young companies to internationalize; how small new ventures penetrate markets and/or how to survive in the market; the demographic and cognitive characteristics of individuals or groups of entrepreneurs and their actions in the course of the company's internationalization.

When we look at Figure 4 with Thematic Map 1 covering 127 documents, we see that, on the lower right side of the axis, in which the basic and transversal research themes of the period in question are concentrated, “company performance” appears as a main theme, followed by aspects such as “behaviour” and “resources”.

Figure 4. Thematic map 1. 1995-2004.



Source: authors (research data)

On the upper right side are the driving themes of the period with “internationalization”, “management” and “technology” as central themes. To a lesser extent, "marketing" and "product development" also appear on that side of the axis. Other aspects that also stand out on the upper right are those that are divided between the driving and basic framework – “foreign direct investments” and “capabilities” –, which suggest these themes are both considered basic in research on IE and convert into engine-themes.

On the upper left side of the axis, we see that the peripheral theme is “perspectives” and, divided between peripheral theme and motor theme, “input form” appears, meaning that the latter theme is on the way to becoming a theme. IE search engine in the period of this thematic map.

On the lower left side, which corresponds to emerging or declining themes, research themes are not observed, which can be understood by the still initial period of the research, in which basic themes and motors guided the works that, later, would give way to themes emerging and in decline according to the advancement of studies in the area.

Observing the results, we show the five most cited documents for the period (38% of the total citations) comprising Thematic Map 1 in Table 2 – for which we used the number of citations as a proxy for the relevance of the documents.

Table 2. Most cited studies in Map 1.

Document	Citations	Journal

Knight e Cavusgil (2004)	1.380	Journal of International Business Studies
Madsen e Servais (2017)	1.048	International Business Review
McDougall e Oviatt (2000)	832	Academy of Management Journal
Knight e Cavusgil (1996)	699	Advances in International Marketing
Sharma e Blomstermo (2003)	500	International Business Review

Source: authors (research data).

In the case of the work by McDougall and Oviatt (2000), given the greater participation of smaller companies in international business, the authors analysed the intersection of two research areas that were linked to the study of IE: international business and entrepreneurship. This vision made it possible to approach and better understand smaller companies that ventured internationally, as well as their managers/entrepreneurs, drawing more attention from researchers and, also, making the course of research turn more towards these last two, and no longer exclusively for big companies, as it was before the INV irruption.

Smaller companies that decided to internationalize did so very quickly, even from their inception. This was the case with BG. Precisely the other four studies mentioned among the most cited in this map deal with these companies and how they achieved good results in terms of their internationalization, going against traditional models of internationalization in stages (Johanson & Vahlne, 1977). The term born global was proposed by Rennie (1993) and brought up for discussion by Knight and Cavusgil (1996), right after the seminal work of Oviatt and McDougall (1994) on INV.

Subsequently, Madsen and Servais (2017) addressed BG by contrasting them with the traditional model of internationalization. Sharma and Blomstermo (2003) approached the subject from a network perspective to understand the good performance of these companies in the international market when using the knowledge obtained in their networks before the international venture. Knight and Cavusgil (2004), in their widely recognized work, address BG innovating by analysing relevant aspects that contribute to the positive performance that these companies achieve when internationalizing, namely: an innovative culture, knowledge and capabilities.

Thematic Map 2 refers to the period from 2005 to 2014 and the themes that stood out in this period.

Thematic map: 2005 to 2014

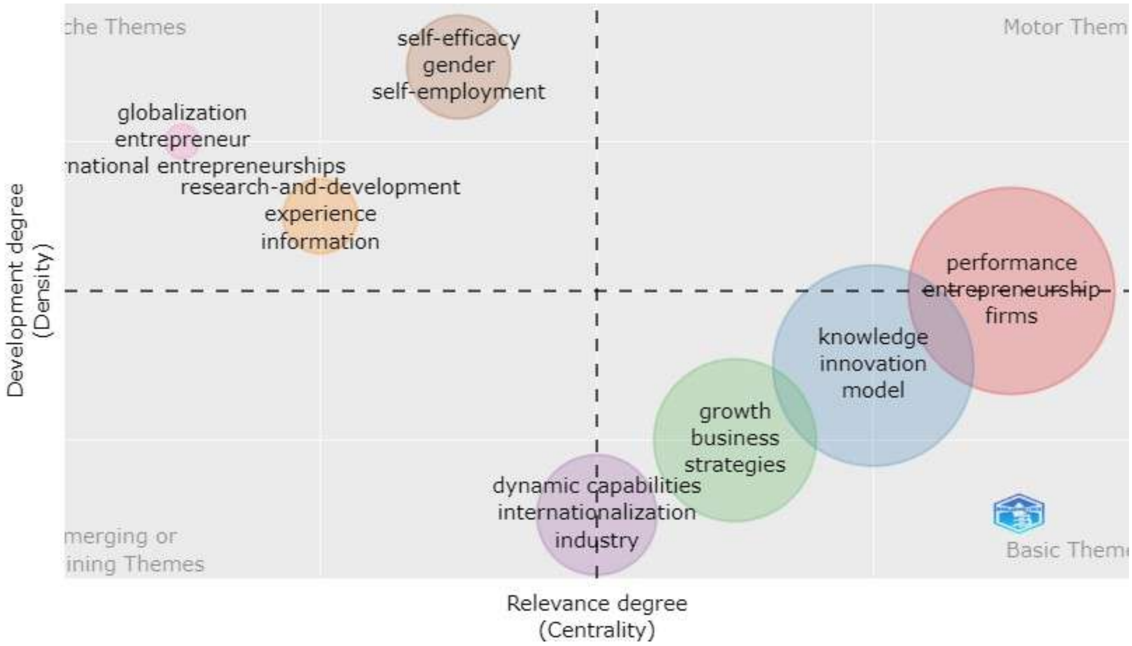
Thematic Map 2 covers the period from 2005 to 2014 and has 1,042 documents, showing a notable increase in the production of works compared to Thematic Map 1 of Oviatt and McDougall (2005). The authors propose an updated definition for IE considering several forces that influenced the speed with which companies internationalized. According to them, international entrepreneurship is a combination of innovative and proactive behaviour and risk-seeking that crosses national borders and is intended to create value in organizations. Also, according to these authors, international entrepreneurship has evolved from focusing on New Ventures to contemplating corporate entrepreneurship, starting to consider, in this definition, the behaviour of individuals, groups and organizations.

Figure 5 with Thematic Map 2 presents changes compared to Thematic Map 1. We see that new themes have emerged, and others have shifted as research on IE increases and evolves.

From the central axis, we see that the theme “performance” continues to dominate but now focused on the performance of entrepreneurship and divided between basic themes and driving themes of this map. Also, in basic themes and with equal relative relevance, the themes “knowledge”, “innovation” and “model”, followed by “growth” and “business strategies” appear. Another theme that appears in this map is “dynamic capabilities”, considered as ‘capabilities’ only in Map 1. It should be noted that “dynamic capabilities” appears divided between a basic theme and an emerging theme, allowing us to deduce that, after its appearance in research on IE, this theme tended to become one of the strong themes of the area.

Finally, on the upper left side of the axis and with a certain similarity in the relevance of the map, as peripheral themes there are: “self-efficacy”, “gender”, “self-employed worker”, “research and development”, “experience”, “information”, “globalization”, “entrepreneur” and “international enterprise”.

Figure 5. Thematic map 2. 2005-2014.



Source: authors (research data).

It should be noted that this map does not register emerging or declining themes or driving themes, except for those already informed and divided between two axis themes – basic and motor, in the case of "performance", and emerging and basic, in the case of "dynamic capabilities", "internationalization" and "industry".

We present the most cited documents for the period comprising Thematic Map 2 in Table 3. As the number of individual citations of each document does not exceed 2%, we adopted as a criterion for this selection the documents with at least 1% of the total citations of the period, which total seven documents and 8% of the total number of citations.

Table 3. Most cited studies in Mapa 2.

Document	Citations	Journal
Oviatt e McDougall (2005)	930	Entrepreneurship Theory and Practice
Jones, Coviello e Tang (2011)	621	Journal of Business Venturing
Coviello (2006)	611	Journal of International Business Studies
Zhou, Wu e Luo (2007)	601	Journal of International Business Studies
Rialp A., Rialp J. e Knight (2005)	583	International Business Review
Zahra (2005)	580	Journal of International Business Studies
Jones e Coviello (2005)	487	Journal of international Business Studies

Source: authors (research data).

As in Thematic Map 1, when we observe the most cited works in the period that corresponds to this map, we see that, in the case of the study by Oviatt and McDougall (2005), in addition to being considered a milestone in research on IE, it is also the work that receives the most citations within this map. It is worth mentioning that Oviatt and McDougall brought an updated definition for the IE. Jones, Coviello and Tang (2011) reviewed the production on IE between 1989 and 2009 and stated that, ontologically, research on IE focuses on three themes: entrepreneurial internationalization, international comparisons of entrepreneurship, and comparisons of entrepreneurial internationalizations.

Coviello (2006) highlights the importance of networks in companies that seek to internationalize from the early stages. Zhou, Wu and Luo (2007) also highlight the importance of networks, in the case of the later in relation to small and medium-sized companies. These authors argue that a company's local social networks play a mediating role in internationalization and its performance. In addition, that this mediating mechanism is identified through three benefits: knowledge about international market opportunities, guidance and experiential learning, and trust and solidarity.

Rialp A., Rialp J. and Knight (2005), in a review of 38 papers covering the period from 1993 to 2003, offer suggestions for future research, one of them related to a better definition of companies with internationalization processes from their initial stages, understanding that the period addressed by these authors was initial when we consider IE as a research area, presenting itself as more heterogeneous at that time. In fact, looking at Thematic Maps 1 and 2, we can see the diversity of themes and the changes between them from one period to another.

Zahra's (2005) work analyses the proposal made by Oviatt and McDougall (1994) and the advances made in research on IE based on this seminal work. Zahra (2005) states, that much of the proposal of the work by Oviatt and McDougall (1994) remains as originally proposed while allowing new possibilities to expand research on IE to other topics and areas. One of these areas was cognitive psychology, which, according to Zahra (2005), researchers have used to better understand the behaviour of founders of new international ventures in relation, for example, to how they recognize opportunities.

The work by Jones and Coviello (2005) proposes conceptual models for IE, in which the authors assert that, at the time, research on IE was an emerging area, and it was necessary to direct research in a unified manner. Thus, the authors, from the area of internationalization and entrepreneurship, obtained insights for the formulation of models, following a logic of entrepreneur behaviour based on time.

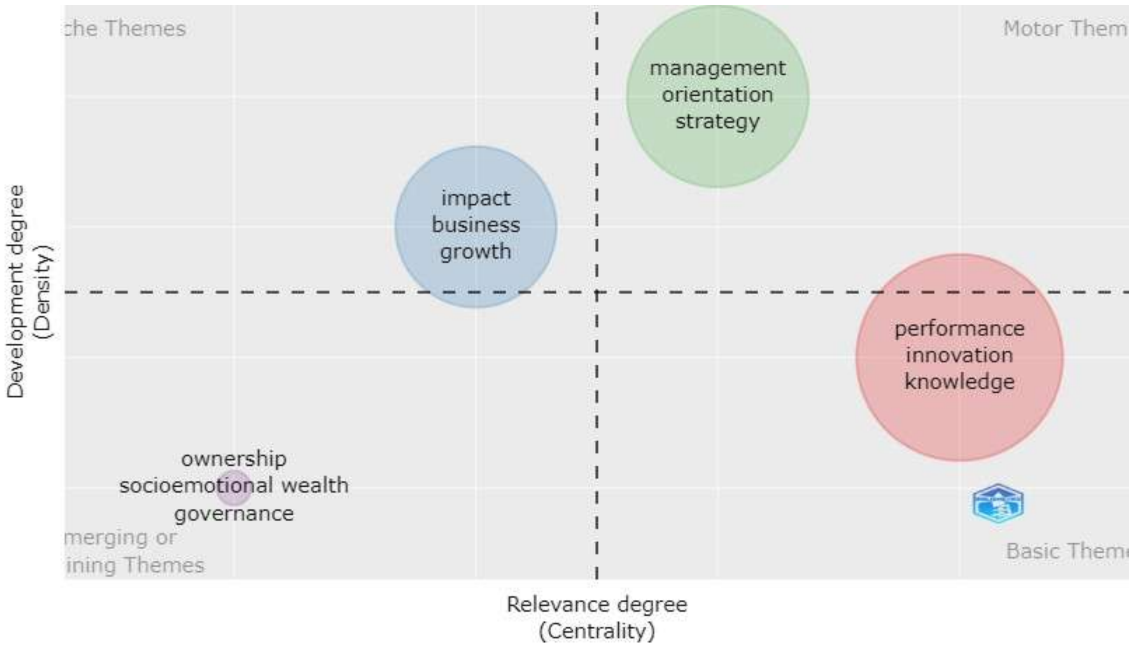
There is work within this period that makes a new contribution to defining IE. Zahra, Newey and Li (2014) define IE as the recognition, training, evaluation and exploitation of opportunities beyond national borders to create new businesses, models and value solutions, which include financial, environmental, social and economic aspects.

A point worth mentioning in this definition is that it encompasses companies of all sizes, in addition to those that have internationalized since their inception, such as BG, and established companies that seek to expand by taking advantage of opportunities to undertake internationally. In this sense, there is an alignment with the definition of Oviatt and McDougall (2005) when they state that the focus of being in New Ventures started to contemplate corporate entrepreneurship, now considering in this definition the behaviour of individuals, groups and organizations.

Thematic Map 3: 2015 to 2022

Thematic Map 3 presents the last period analysed by this study, which runs from 2015 to 2022. This period contains 1,934 published documents, a considerable increase in relation to the two previous periods. Research on IE by now would have evolved and expanded enough to be considered a research area (Servantie et al., 2016; Zucchella, 2021). Figure 6 below shows Thematic Map 3.

Figure 6. Thematic map 3. 2015-2022.



Source: authors (research data).

Figure 6 shows certain changes compared to the previous map. Advances in research and contributions in the area led to some themes being consolidated and others disappearing. As we look at the basic themes on the lower right side of the central axis of the figure, we see that, again, “performance” is the main theme. The difference is that in Map 3 performance is associated with innovation and knowledge while in Map 2 performance was associated with entrepreneurial companies and in Map 1 with companies still considered as ventures by the authors. The performance would later be absorbed by the updated vision of the IE (Oviatt & Mcdougall, 2005).

On the top right, under driving themes, are “management”, “entrepreneurial orientation” and “strategy”, three themes that are related if we think about the way companies face and develop in the international market. Dynamic capabilities, a theme present in the previous map, can influence the strategy and way of managing an organization, as well as provide a more effective way of seeking and exploring new opportunities, but not guaranteeing the success of the company (Zahra, Sapienza, & Davidsson, 2006). Continuing with the driving themes, we see that “impact”, “business” and “growth” appear. In the case of impact, this theme so far did not appear among the investigated themes.

The themes that appear on the lower left side of the axis, which correspond to emerging or declining themes, are: “ownership”, “socio-emotional wealth” and “governance”. In this case, we can understand that these themes are emerging, since they had not appeared on the maps until now.

The most cited documents for this six-year period are presented in Table 4, in which the same criteria applied to the selection of the period of Thematic Map 2 were used (i.e., documents with at least 1% of the total citations). Using these criteria, five documents were retained, totalling 7% of the total citations.

Table 4. Most cited studies in Map 3.

Document	Citations	Journal
Liñán e Fayolle (2015)	456	International Entrepreneurship and Management Journal
Cavusgil e Knight (2015)	378	Journal of International Business Studies
Davidsson (2015)	373	Journal of Business Venturing
Paul, Parthasarathy e Gupta (2017)	273	Journal of World Business
Terjesen, Hessels e Li (2013)	242	Journal of Management

Source: authors (research data).

The systematic review by Liñán and Fayolle (2015) focuses on the theme of entrepreneurial intentions, in which five main areas of research are identified: model for entrepreneurial intentions, personal level variables, entrepreneurial education, context and institutions, and entrepreneurial process. These authors claim that research on entrepreneurial intentions is increasing and evolving rapidly.

Cavusgil and Knight (2015) reflect on BG companies and their recognized and already mentioned 2004 work on innovation, organizational capabilities, and the born-global firm. The authors analyse exporting companies by integrating issues of marketing, entrepreneurship and capabilities. According to Cavusgil and Knight, currently, BG companies are abundant internationally; for this reason, the authors propose that topics still without answers be addressed, such as the future of BG, as they mature over time, as well as that companies that decide to remain active locally should be studied.

Davidsson's work (2015) addresses the topic of entrepreneurial opportunities. The author states that this topic has grown rapidly since 2000 and proposes a new contextualization for further research on the topic. Davidsson mentions three constructs for this new approach to opportunities: external enablers, company ideas and confidence in the opportunity. In the work of Paul, Parthasarathy and Gupta (2017), some of the barriers that small and medium-sized enterprises (SMEs) face in their internationalization are presented. The authors separate these barriers into internal and external and propose some guidelines for future research in relation to the theoretical context and in methodological terms.

In the study by Terjesen, Hessels and Li (2013), another systematic review in this period, the authors carried out an analysis between countries addressing four levels: individual, company, industry and country. These authors highlight the heterogeneity in relation to IE observed in different countries and how the results are explained in relation to the performance of companies, countries, considering the economic growth and cultural aspects of these countries. In addition, the authors state that the literature comparing IE between countries is still fragmented with some substantial gaps related to content, theory and methodology. Among the suggestions by Terjesen et al. (2013) is the inclusion of the following aspects: institutions, culture, resource-based view, cost of economic transactions, economic growth and human capital.

It is worth highlighting in the Thematic Map 3, the appearance, now as a driving theme, of “dynamic capabilities”, which together with “management” and “strategy”, can be seen as related to the themes addressed by the most cited studies in this period. These themes are entrepreneurial intentions (Liñán & Fayolle, 2015) and opportunities (Davidsson, 2015). In fact, dynamic capabilities have contributed to the existence of a large number of BGs in several countries today (Cavusgil & Knight, 2015), understanding that these dynamic capabilities contribute in terms of entrepreneurial intention and identification of opportunities.

Discussion

This study considered the publication of McDougall (1989) as an initial work in the field of IE, and the study by Oviatt and McDougall (1994) as a seminal work that started the development and growth of research in this area. Based on this context, a bibliometric analysis was carried out that gave rise to the three thematic maps, namely: Thematic map 1, covering the period of publications 1995-2004; Thematic map 2, covering the period 2005-2014; Thematic map 3, covering the period 2015-2022. Each thematic map was determined based on: in the case of map 1, seminal work in the area of IE by Oviatt and McDougall (1994), of map 2, work by Oviatt and McDougall (2005), considered a milestone in research on IE with its theoretical contribution and redefinitions that were adopted from it, and finally, from map 3, which considers the period closest to the date of this research.

It is worth remembering that this analysis considered all publications identified in these periods, not discriminating by type of publication (e.g., only articles) and periods. The total number of works observed in the three periods was 3,103 publications and divided as follows: 127 works published in the period of Thematic Map 1; 1,042 works published in the period of Thematic Map 2 and 1,934 works published for the period of Thematic Map 3.

Regarding the first map and initial period of research on IE, we see that, based on the challenge made by Oviatt and McDougall (1994) in relation to the divergent form of internationalization of INV, that is, faster when compared to the traditional internationalization in stages by Johanson and Vahlne (1977), other works were added. Several authors addressed the issue of speed and the way in which some companies entered international markets (Autio et al., 2000; Burgel & Murray, 2000; Zahra et al., 2000).

Another important approach that emerged during this period was that of BG companies, which also reached international markets very quickly and with the capacity to develop technological products (Knight & Cavusgil, 1996; Madsen & Servais, 2017; Oviatt & Mcdougall, 1999; Sharma & Blomstermo, 2003). According to Figure 4, the period of the Thematic Map 1 was marked by the dominance of studies addressing the performance and form of entry of companies in international markets, based on the definition given by Oviatt and McDougall (1994) for INV. Within the beginner production in relation to the quantity and theoretical and methodological definitions for the IE area, the work of Coviello and Jones (2004) appears, in which the authors state that the research that emerged in the IE area had as a characteristic the inconsistency in the use of measures and definitions of variables that these authors considered key, such as company size and age.

Later, and already within Thematic Map 2, Oviatt and McDougall (2005) proposed a more updated definition for IE. A change can be noted here in research in the area, in which IE begins by defining, perhaps leaving the concept of New Ventures behind. In fact, the authors stated that IE has gone from being an area focused on New Ventures companies to considering corporate entrepreneurship that encompasses individuals, groups and organizations.

In the period of Thematic Map 2, the themes concentrated mostly on those considered basic by the analysis. The performance theme continued to have greater representation, as in Thematic Map 1, along with entrepreneurial companies and knowledge. Furthermore, when thinking about the performance of companies, some authors highlighted the importance of networks (Coviello, 2006; Zhou et al., 2007). This importance can be reflected both when entering a new market, through the knowledge acquired before entering and facilitating this process, and through the knowledge that companies can acquire already operating in the international market.

This observation leads us to another, related to the themes that began to be identified in Thematic Map 1, as capabilities, and gained more relevance in the later map, starting to be considered as dynamic capabilities. It is precisely these dynamic capabilities that, in part, make companies like BG internationalize more quickly (Knight & Cavusgil, 2004).

Advancing to the next period of Thematic Map 3, there is a greater concentration of themes and always with greater participation of the performance theme. In this map, in addition to performance, the themes of innovation and knowledge continue to have a strong representation and, together with them, the themes that acquire greater relevance, positioning themselves as driving themes, are management, entrepreneurial orientation and strategy. In this sense, it is understood the importance of works that in previous periods addressed these aspects and that in the period of Thematic Map 3 are reflected.

This is the case of the authors who addressed the internationalization of BG companies and how these companies, despite the scarcity of resources, made use of the formerly called capabilities, now understood as dynamic capabilities, to obtain good performances when it comes to reaching international markets. (Knight & Cavusgil, 2004). In the period of this last map, we can understand that dynamic capabilities are reflected as a strong tool for companies to face the international market. When we talk about companies, we consider all company sizes and lifetimes, as proposed by Zahra et al. (2014), which even include social and environmental aspects to a new way of seeing IE. Along the same lines, Cavusgil and Knight (2015) state that BG companies are a trend, considering as BG companies of all sizes and with diverse bases of resources and knowledge.

Here it is worth making an observation regarding the type of companies considered in research on IE. We observed that in the period of Thematic Map 1, that is, at the beginning of the research, the IE was born from an antagonistic view of traditional internationalization models (Oviatt & McDougall, 1994). The discussion took place in relation to the speed with which INV reached the international market, even suffering from a lack of resources, which was not the case for large multinational companies, until that moment the focus of research on the internationalization of companies. The same context occurred for the BG companies (also of a smaller size), which, despite the lack of resources and short time of existence, had the ability to quickly internationalize using their capabilities, mainly to develop products with advanced technology (Knight & Cavusgil, 2004).

In the period of Thematic Map 3, we see that larger companies are considered when it comes to IE (Zahra et al., 2014; Cavusgil & Knight, 2015). This new scenario can be understood by the need for adaptation and competitiveness that companies face. In other words, if in the past we saw that internationalization was no longer an exclusive feature of large companies, currently it is these large companies that are apparently seen as those that try to take advantage of the opportunities that the market offers and are now embraced by research on IE. In this sense, dynamic capabilities, a culture of innovation and the ability to learn new knowledge that enable good performance by companies, whether small, medium or large, acquire greater relevance.

Thus, and before continuing to the final part of this work, we summarize the findings related to the questions that were formulated at the beginning of this study:

• What are the central themes of production in the IE area?

According to the results of the three thematic maps, it is observed that the theme that dominated the surveys in all periods was the performance of companies in the IE. This theme was accompanied with similar representativeness by the themes of innovation, knowledge, entrepreneurial companies, entrepreneurial orientation, management, strategy and model in Maps 2 and 3, and by exporting behaviour in Map 1. The theme that also deserves to be highlighted is dynamic capabilities, which began being considered in Thematic Map 1 as capabilities to gain more relevance in the following map and starting to be considered dynamic capabilities. Currently, and based on Thematic Map 3, the most representative themes of research on IE are “performance”, “innovation”, “knowledge”, “management”, “entrepreneurial orientation” and “strategy”.

• What are the emerging issues within IE?

The emerging themes highlighted are performance, entrepreneurial orientation, entrepreneurship, impact and management.

Research on IE has already surpassed three decades and, despite already being considered a research area (Servantie et al., 2016), there are authors who claim that there are still important gaps in research on the subject (Terjesen et al., 2013) , as well as those who ensure IE is still a heterogeneous area in its production (Etemad, Gurau, & Dana, 2021), or in need of more depth in certain aspects (Zucchella, 2021).

In this sense, we understand that the results and discussion of this work allow us to make an important contribution to the IE area. The first is the cognitive structure of the theme presented, and which was allowed by the methodological approach of thematic mapping adopted here. This approach differs from some studies in the area cited here – e.g., Keupp and Gassmann (2009) and Servantie et al. (2016) –, with similar objectives and each with their contributions.

The delivery of this study can be understood as different from most bibliometric works in the field of IE, which, normally, as pointed out by Baier-Fuentes et al. (2018), present, in line with their objectives, descriptive statistics of publications in the field, and it was not possible for us to find other works with the methodological approach of thematic mapping in this study.

In addition, we chose to use the two largest databases in the area of applied social sciences (Scopus and Web of Science) to have greater breadth than if only one database was used – e.g., the Web of Science, as is the case of Nave and Ferreira (2022). Thus, the findings of this study add to those of the others, contributing to the state of the art of the IS.

As such we advance in foundation for the area for the construction of future theoretical and empirical studies, favouring critical analysis "on existing knowledge to study it, learn it, evaluate it or even modify it" (Patriotta, 2020, p. 1, our translation). The results of this study are presented in panels through each of the thematic maps revealing contributions to a better understanding of the development of research on IE in each of the periods covered. In the case of Thematic Map 1, one of the points that can be highlighted is that, from the seminal work of Oviatt and McDougall (1994), several research possibilities originated. This point was also highlighted by Zahra (2005), in which, in addition to this highlight, the author identified a connection between research on IE and the area of behavioural psychology to understand entrepreneur behaviour in international ventures.

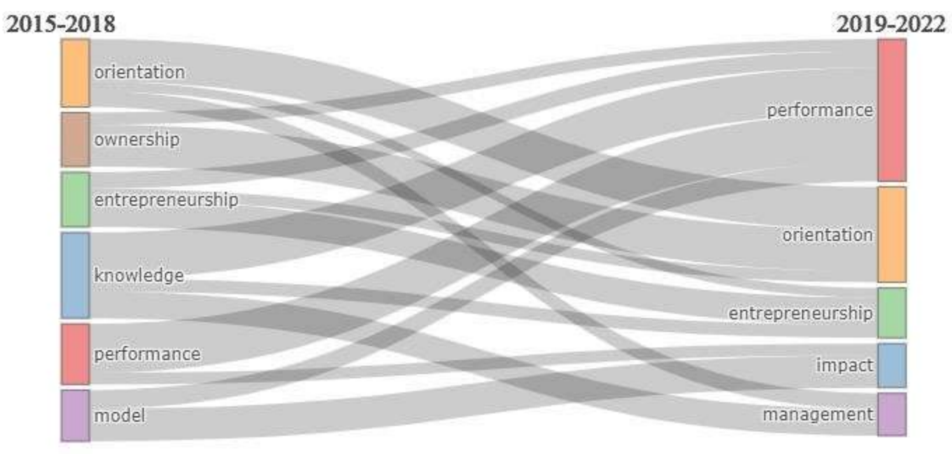
With Thematic Map 2, it was possible to verify the progress in research on IE, both in number of publications and in topics addressed from their development since Map 1. In this second period, and according to Oviatt and McDougall (2005), a study which was a milestone in the IE research, it is noteworthy that the IE shifted from having a focus on New Ventures to seeing corporate entrepreneurship, encompassing individuals, groups and organizations. Finally, in Thematic Map 3, the importance of themes such as dynamic capabilities was highlighted when dealing with entrepreneurs and companies when undertaking internationally, as well as with regard to their performance.

It can also be understood that the root of the high number of publications in the third map (research on IE) is heterogeneous, an observation also made by authors with publications within this period, including (Etemad et al., 2021). It is from these contributions, as well as those mentioned in each thematic map, that this study proposes a research agenda that can serve as a guide for new work in the area of IE.

Finally, it was possible to highlight the importance of themes such as dynamic capabilities, as well as the current scope of the IE concept in terms of types and sizes of companies. Topics that, as is the case of dynamic capabilities, are highly studied nowadays, but can be even more linked to IE. Thus, we believe in the necessary coverage that these and other topics presented in the proposed research agenda should have so as to advance the area of IE.

Figure 7 shows the tendency for new topics to be addressed by authors. We see that, in the case of the orientation theme, a displacement is produced to influence the orientation themes (continued), entrepreneurship and management. In this case, we understand that, based on an entrepreneurial orientation and its management, companies can develop new strategies, products, etc., have new business perspectives to definitively improve their performance (Teece, 2007).

Figure 7. Emerging themes.



Source: authors (research data).

In the case of the ownership theme, this influences the performance and entrepreneurial orientation theme. Then there is the entrepreneurship theme which influences its own continuity, that of the entrepreneurial orientation theme and that of the most representative theme within the emerging ones: performance. Subsequently, we see the theme of knowledge, which contributes to the themes of performance, entrepreneurship and management.

Next comes the performance theme, which provokes its own continuity and the emergence of the impact theme. Finally, there is the model theme, which influences the continuity of the performance theme and the emergence of the impact theme. It is worth noting here an alignment of emerging themes and those that continue their development with the clusters mentioned by Nave and Ferreira (2022), mainly with the clusters networks and international business opportunities, characteristics and motivations of the entrepreneur and stimuli and processes of internationalization. The fourth cluster mentioned by the authors, institutional environments, is included in the research agenda that this article proposes for its deepening.

Therefore, it is observed that the themes emerging from the last thematic map analysed in this study and in order of relevance are: performance (continued), orientation (understood as entrepreneurial), entrepreneurship (continued), impact and management. It is based on these themes and the results of this study that the following research agenda is proposed:

1. Approach the performance theme, unifying it with the impact theme. It is necessary to have more evidence regarding the impact on the company in terms of learning and knowledge, financial, networking, etc. In this sense, in relation to performance, Ferreras-Méndez, Fernández-Mesa and Alegre (2019) warn about the importance of knowledge and strategies in exporting companies and about how the absorption or learning capacity of these companies affects their performance in the international market. Regarding the impact, when undertaking internationally, and looking at the individual and organizational levels, when dealing with programs or actions that seek to improve the performance of international entrepreneurs, for example, typical methodological approaches to impact assessment can be used, such as difference in differences, discontinuous regression and synthetic control (Cunninghan, 2021). That is, the impact theme also gains contours that go beyond the theme and advance on the method. In addition, evidence is needed at the local level comparing companies from a given country, as well as international evidence comparing different countries and contexts, as suggested by Paul et al. (2017);

2. With regard to entrepreneurial orientation and entrepreneurship, we propose to deepen the investigation into what are the triggers for an entrepreneurial orientation and what

are the actions at an institutional level (e.g., governments) to foster an international entrepreneurial orientation and culture. In this sense, Ortiz-Rojo (in press) presents two dimensions with variables that affect the internationalization of SMEs, in which one of these variables is precisely related to the promotion of the internationalization of companies through public policy, to better explore this aspect on how a culture of innovation and export could be established in companies;

3. With regard to management, more contribution is expected in relation to the application of new knowledge when it comes to creating strategies, products, networks, new approaches, etc. We suggest that studies deepening the analysis on dynamic capabilities can help in this sense;

4. Research on the development and application of dynamic capabilities can help in understanding the performance, learning and future of companies that undertake internationally.

In the case of these last two suggestions, it is highlighted that the approach of dynamic capabilities points to the importance of incorporating the dynamism of the environment to the determination of competitive advantage; being the way in which organizations react to the dynamism of the environment – whether through behaviours, processes or other capabilities – that allow the reconfiguration of the capabilities of organizations, leading them to reach new configurations to obtain a sustainable competitive advantage (Lacruz, Cunha, Moura, & Oliveira, 2019).

In this context, Pisano (2017) proposes a model for future research when it comes to dynamic capabilities and how to identify and select these capabilities for a company's competitive performance. According to the aforementioned author, future studies using the proposed model would help in understanding, for example, issues related to the challenges that companies face when it comes to developing new specific or general capabilities for the market.

5. Empirical contributions in relation to the decision to participate in the international market of established companies acting locally. It is expected to know what makes certain companies, after acting locally, decide to undertake internationally (adaptation, competitiveness, learning, etc.). Based on the study of Zahra et al. (2014), in which the authors in their updated definition for IE incorporate companies already established in the market and of all sizes, new possibilities arise to understand how and why companies decide to undertake internationally;

6. Contribute with more evidence in relation to companies that export non-technological products, that is, more traditional products. In the study by Cavusgil and Knight (2015), among

the topics proposed for future research, are those related to the future of BG companies, as well as companies with slow internationalization processes. Those that sell more traditional or non-technological products normally fall into this second type of company (Ortiz-Rojo, in press). In this sense, new insights on companies that are not classified as BG, but decide to undertake internationally with non-technological products, will help the understanding of entry strategies, performance and the future of these companies.

Conclusions

In view of the volume of documents in the world production on IE, it was decided to carry out a bibliometric analysis, in particular using the thematic mapping technique. In terms of the performance of the IE area, it is observed that it is a research area that has evolved and grown a lot, and from the second period there was a considerable increase in publications, going from 127 in the first period to 1,042 in the second.

This increase remained constant, reaching 1,934 in the third and last period analysed. In addition, it should be noted that, according to Bradford's Law, four journals concentrate 1/3 of the production on IE in the total period analysed, namely: International Entrepreneurship and Management Jornal, Journal of International Entrepreneurship, International Business Review and the Journal of World Business.

Regarding the mapping analysis, three thematic maps representing the periods 1995-2004, 2005-2014 and 2015-2022 were presented. The themes that stand out the most and are most representative in the research on IE are: performance of companies in IE, innovation, knowledge, enterprising companies, entrepreneurial orientation, management, strategy, model and export behaviour.

Considering the results that show the thematic maps and the evolution in the IE research, the themes that are presented as emerging or with continuity are: performance, entrepreneurial orientation, entrepreneurship, impact and management.

This work makes a relevant contribution to research on the IE, bringing thematic maps of different periods that help to understand not only the state of the art of each time frame in the area in question, but also, and perhaps more representatively, about its contribution, the thematic evolution of the cognitive structure of the IE field. Along with this, the considerable effort of this study to contemplate all the production carried out on IE since the study considered as initial in the area allows us to offer, in addition to the descriptive statistics normally present in studies of systematic reviews of the literature (Baier-Fuentes et al., 2018), a research agenda based on themes that deserve attention from the results that emerged in the study. This research agenda is aligned with the efforts made by other authors in the field of IE and we understand that, theoretically speaking, they will be able to guide and subsidize new research on the subject.

This study has limitations common to systematic reviews of the literature, such as the heterogeneity of the analysed studies, resulting from the strategy of avoiding non-coverage bias, including grey literature (e.g., articles published in proceedings), and the possible bias of publication, that is, the tendency in scientific publications of positive evidence to have a greater chance of being published than negative ones, making the comparative analysis biased.

We hope that the contributions made by this study can serve as a guide for the advancement and better understanding of a relevant and dynamic topic such as international entrepreneurship.

References

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. Journal of Informetrics, 11(4), 959-975. doi:10.1016/j.joi.2017.08.007

Autio, E. (2005). Creative tension: The significance of Ben Oviatt's and Patricia McDougall's article 'toward a theory of international new ventures'. Journal of International Business Studies, 36, 9-19. doi:10.1057/palgrave.jibs.8400117

Autio, E., Sapienza, H. J., & Almeida, J. G. (2000). Effects of age at entry, knowledge intensity, and imitability on international growth. Academy of Management Journal, 43(5), 909-924. doi:10.2307/1556419

Baier-Fuentes, H., Merigó, J. M., Amorós, J. E., & Gaviria-Marín, M. (2018). International entrepreneurship: A bibliometric overview. International Entrepreneurship and Management Journal, 15(2), 385-429. doi:10.1007/s11365-017-0487-y

Brookes, B. C. (1969). Bradford's law and the bibliography of science. Nature, 24, 953-956.doi:10.1038/224953a0

Burgel, O., & Murray, G. C. (2000). The international market entry choices of start-up companies in high-technology industries. Journal of International Marketing, 8(2), 33-62. doi:10.1509/jimk.8.2.33.19624

Cavusgil, S. T., & Knight, G. (2015). The born global firm: An entrepreneurial and capabilities perspective on early and rapid internationalization. Journal of International Business Studies, 46(1), 3-16. doi:10.1057/jibs.2014.62

Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2011). An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field. Journal of Informetrics, 5(1), 146- 166.

doi:10.1016/j.joi.2010.10.002

Coviello, N. E. (2006). The network dynamics of international new ventures. Journal of International Business Studies, 37(5), 713-731. doi:10.1057/palgrave.jibs.8400219

Coviello, N. E., & Jones, M. V. (2004). Methodological issues in international entrepreneurship research. Journal of Business Venturing, 19(4), 485-508. doi:10.1016/j.jbusvent.2003.06.001

Cunninghan, S. (2021). Causal inference: The mixtape. New Haven: Yale University Press.

Davidsson, P. (2015). Entrepreneurial opportunities and the entrepreneurship nexus: A re-conceptualization. Journal of Business Venturing, 30(5), 674-695. doi:10.1016/j.jbusvent.2015.01.002

Etemad, H., Gurau, C., & Dana, L. (2021). International entrepreneurship research agendas evolving: A longitudinal study using the Delphi method. Journal of International Entrepreneurship, 20(1), 29-51. doi:10.1007/s10843-021-00292-w

Ferreras-Méndez, J. L., Fernández-Mesa, A., & Alegre, J. (2019). Export performance in SMEs: The importance of external knowledge search strategies and absorptive capacity. Management International Review, 59(3), 413-437. doi:10.1007/s11575-019-00379-6

Fisch, C., & Block, J. (2018). Six tips for your (systematic) literature review in business and management research. Management Review Quarterly, 68(2), 103-106. doi:10.1007/s11301-018-0142-x

Johanson, J., & Vahlne, J. E. (1977). The internationalization process of the firm: A model of knowledge development and increasing foreign market commitments. Journal of International Business Studies, 8(1), 23-32. doi:10.1057/palgrave.jibs.8490676

Jones, M. V., & Coviello, N. E. (2005). Internationalisation: conceptualising an entrepreneurial process of behaviour in time. Journal of International Business Studies, 36(3), 284-303. doi:10.1057/palgrave.jibs.8400138

Jones, M. V., Coviello, N., & Tang, Y. K. (2011). International entrepreneurship research (1989-2009): A domain ontology and thematic analysis. Journal of Business Venturing, 26(6), 632-659. doi:10.1016/j.jbusvent.2011.04.001

Keupp, M. M., & Gassmann, O. (2009). The past and the future of international entrepreneurship: A review and suggestions for developing the field. Journal of Management, 35(3), 600-633. doi:10.1177/0149206308330558

Knight, G. A., & Cavusgil, S. T. (1996). The born global firm: A challenge to traditional internationalization theory. Advances in International Marketing, 8, 11-26.

Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born-global firm. Journal of International Business Studies, 35(2), 124-141. doi:10.1057/palgrave.jibs.8400071

Knight, G. A., & Liesch, P. W. (2016). Internationalization: From incremental to born global.

Journal of World Business, 51(1), 93-102. doi:10.1016/j.jwb.2015.08.011

Lacruz, A. J., Cunha, E. A., Moura, R. L., & Oliveira, M. P. V. (2019). Project management office in the non-governmental organization as a driver of sustainable competitive advantage: A dynamic capabilities approach. In M. Peris-Ortiz, J. Ferreira, & J. M. Merigó (Eds.), Knowledge, innovation and sustainable development in organizations: A dynamic capabilities perspectives (pp. 23-37). Cham: Springer.

Liñán, F., & Fayolle, A. (2015). A systematic literature review on entrepreneurial intentions: Citation, thematic analyses, and research agenda. International Entrepreneurship and Management Journal, 11(4), 907-933. doi:10.1007/s11365-015-0356-5

Madsen, T. K., & Servais, P. (2017). The internationalization of born globals: An evolutionary process? In P. Buckley (Ed.), International business (pp. 421-443). London: Routledge.

McDougall, P. P. (1989). International versus domestic entrepreneurship: New venture strategic behavior and industry structure. Journal of Business Venturing, 4(6), 387-400. doi:10.1016/0883-9026(89)90009-8

McDougall, P. P., & Oviatt, B. M. (2000). International entrepreneurship: The intersection of two research paths. Academy of Management Journal, 43(5), 902-906. doi:10.2307/1556418

Mendes-Da-Silva, W. (2019). Contribuições e limitações de revisões narrativas e revisões sistemáticas na área de negócios. Revista de Administração Contemporânea, 23(2), 1-11. doi:10.1590/1982-7849rac2019190094

McDougall, P. P., Shane, S., & Oviatt, B. M. (1994). Explaining the formation of international new ventures: The limits of theories from international business research. Journal of Business Venturing, 9(6), 469-487. doi:10.1016/0883-9026(94)90017-5

Nave, E., & Ferreira, J. J. (2022). A systematic international entrepreneurship review and future research agenda. Cross Cultural & Strategic Management, 29(3), 639-674. doi:10.1108/CCSM-11-2021-0204

Ortiz-Rojo, R. (in press). Variables affecting the internationalisation of small and medium sized companies. International Journal of Business and Globalisation.

Oviatt, B. M., & McDougall, P. P. (1999). A framework for understanding accelerated international entrepreneurship. In B. M. Oviatt & P. P. McDougall, Research in global strategic management (pp. 23-40). Bingley: Emerald Group Publishing Limited.

Oviatt, B. M., & McDougall, P. P. (2005). Defining international entrepreneurship and modeling the speed of internationalization. Entrepreneurship theory and practice, 29(5), 537-553. doi:10.1111/j.1540-6520.2005.00097.x

Oviatt, B. M., & McDougall, P. P. (1994). Toward a theory of international new ventures. Journal of International Business Studies, 25(1), 45-64. doi:10.1057/palgrave.jibs.8490193

Paul, J., Parthasarathy, S., & Gupta, P. (2017). Exporting challenges of SMEs: A review and future research agenda. Journal of World Business, 52(3), 327-342.

doi:10.1016/j.jwb.2017.01.003

Patriotta, G. (2020). Writing impactful review articles. Journal of Management Studies, 57(1), 1272-1276. doi:10.1111/joms.12608

Pisano, G. P. (2017). Toward a prescriptive theory of dynamic capabilities: Connecting strategic choice, learning, and competition. Industrial and Corporate Change, 26(5), 747-762. doi:10.1093/icc/dtx026

R Core Team (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/.

Rennie, M. W. (1993). Born global. The McKinsey Quarterly, (4), 45-53.

Rialp, A., Rialp, J., & Knight, G. A. (2005). The phenomenon of early internationalizing firms: What do we know after a decade (1993-2003) of scientific inquiry? International Business Review, 14(2), 147-166. doi: 10.1016/j.ibusrev.2004.04.006

Servantie, V., Cabrol, M., Guieu, G., & Boissin, J. (2016). Is international entrepreneurship a field? A bibliometric analysis of the literature (1989-2015). Journal of International Entrepreneurship, 14(2), 168-212. doi.org/10.1007/s10843-015-0162-8

Sharma, D. D., & Blomstermo, A. (2003). The internationalization process of born globals: A network view. International Business Review, 12(6), 739-753. doi: 10.1016/j.ibusrev.2003.05.002

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), 1319-1350. doi: 10.1002/smj.640

Terjesen, S., Hessels, J., & Li, D. (2013). Comparative international entrepreneurship: A review and research agenda. Journal of Management, 42(1), 299-344. doi:10.1177/0149206313486259

Thomas, A. S., & Mueller, S. L. (2000). A case for comparative entrepreneurship: Assessing the relevance of culture. Journal of International Business Studies, 31(2), 287-301. doi:10.1057/palgrave.jibs.8490906

Zahra, S. A. (2005). A theory of international new ventures: a decade of research. Journal of International Business Studies, 36(1), 20-28. doi:10.1057/palgrave.jibs.8400118

Zahra, S. A. (2021). International entrepreneurship in the post Covid world. Journal of World Business, 56(1), 101143. doi:10.1016/j.jwb.2020.101143

Zahra, S. A., & George, G. (2002). International entrepreneurship: The current status of the field and future research agenda. In M. A. Hitt, R. D. Ireland, S. M. Camp, D. L. Sexton (Eds.), Strategic entrepreneurship: Creating a new mindset (pp. 253-288). New Jersey: Blackwell.

Zahra, S. A., Ireland, R. D., & Hitt, M. A. (2000). International expansion by new venture firms: International diversity, mode of market entry, technological learning, and performance.

Academy of Management Journal, 43(5), 925-950. doi:10.2307/1556420

Zahra, S. A., Newey, L. R., & Li, Y. (2014). On the frontiers: The implications of social entrepreneurship for international entrepreneurship. Entrepreneurship Theory and Practice, 38(1), 137-158. doi:10.1111/etap.12061

Zahra, S. A., Sapienza, H. J., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. Journal of Management Studies, 43(4), 917-955. doi:10.1111/j.1467-6486.2006.00616.x

Zhou, L., Wu, W., & Luo, X. (2007). Internationalization and the performance of born-global SMEs: The mediating role of social networks. Journal of International Business Studies, 38(4), 673-690. doi:10.1057/palgrave.jibs.8400282

Zucchella, A. (2021). International entrepreneurship and the internationalization phenomenon: Taking stock, looking ahead. International Business Review, 30(2), 101800. doi:10.1016/j.ibusrev.2021.101800

Notes

1. According to Brookes (1969), Bradford's law establishes that ordering journals in a decreasing order of productivity of articles on a given subject makes it possible to establish divided clusters, so that the number of journals (n) in each cluster (core and subsequent zones) is proportional to 1: n: n2.

3 SECOND ARTICLE: The impact of Public Policies: evaluating an Export Promotion Program on fostering exports at the municipal level

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Abstract
This study aims to evaluate the potential impact of an Export Promotion Program (EPP) from the perspective of dynamic capabilities theory. We used panel data approach with secondary data and several statistical techniques. Our analysis revealed no statistically significant variance in export performance between the municipalities that took part in the EPP and those that did not. The inclusion of lagged dependent variables and placebo group tests further confirmed the findings of no impact. We suggest that policymakers consider refining the execution of EPP by incorporating learning and feedback mechanisms to ensure long-term impact, which could influence future program adaptations.

Keywords: Public policies, Impact evaluation, Dynamic capabilities, Export promotion programs, Competitiveness

INTRODUCTION

Public policies (PP) are developed to drive the economic and social development of countries (King & Rebelo, 1990; Reinert, 1999; Acemoglu et al., 2014). As such, they are understood as a set of guidelines aimed at addressing a public problem, which are materialized through instruments such as programs (e.g., poverty eradication programs, present in countries such as Kenya, China and Argentina – e.g., Ayoo, 2022), laws (e.g., racial laws, present in countries such as India, Brazil, Canada and Australia – e.g., Hernández, 2019) among others.

PPs are understood as a process developed in phases (agenda setting, policy formulation, decision making, implementation, evaluation and closure) known as the PP cycle (Jann & Wegrich, 2017). Although this cycle has been criticized for being simplistic and linear (Weible & Sabatier, 2018), it has become practically a consensus to describe the policy process as a whole (Jann & Wegrich, 2017).

For Gertler et al. (2016), PPs are scant evaluated, with managers still focusing on controlling input delivery rather than achieving results and impact. Export Promotion Programs (EPPs) are one of the fields lacking impact evaluation studies (Ortiz-Rojo & Lacruz, 2023). Furthermore, export promotion is considered a priority in PPs in developed and developing countries (Leonidou et al., 2011), resulting in a considerable increase in the number of EPPs globally (Srhoj et al., 2023).

Alongside the lack of impact evaluations in the literature on EPP, there is still a fragmentation and diversity of results (Freixanet, 2022), not necessarily reporting statistically significant or non-statistically significant impacts of a given EPP, but sometimes inconclusive results. It is observed that these results are related to several objectives linked to EPP components and not to the EPP, as a whole, in relation to its impact on exports (cf. Srhoj et al., 2023). For example, Geldres-Weiss and Carrasco-Roa (2016) report a positive but not significant impact of the EPP on the exports of assisted companies. Cruz (2014) concluded that the EPP analysed had a positive effect on the probability of assisted companies starting to export; that is, the results of this study are related to the intention of companies and not to the eventual impact of the EPP on companies' exports.

Other evidence includes Leonidou et al. (2011), who state that the association between EPP and export performance is not directly achieved by improving the company's resources and international capabilities. In the case of support for small and medium-sized enterprises (SMEs), which are the majority benefiting from EPP, Catanzaro and Teyssier (2020) identified contributions to their export capabilities and risk management practices.

Comi and Resmini (2020) concluded that EPP positively affected both the propensity to export and the intensity of exports of assisted companies. Traiyarach and Banjongprasert (2022) concluded that the EPP analysed had a positive impact on its relationship with export competitiveness, but as in Leonidou et al. (2011), not on the relationship between EPP and export performance, where a mediation between these constructs was found.

After the start of exports, what Atkin et al. (2017) called learning through exports could occur through information flows and contribute to improving technical efficiency in companies. In this context, this study aims to evaluate the potential impact of a Brazilian export promotion program on the exports from companies in participating municipalities in the program. To this end, we apply Propensity Score Matching (PSM) and Difference in Differences (DiD) techniques. This evaluation of the program under study provides robust empirical evidence for the literature on EPP, particularly regarding the impact of EPPs, as well as contributing to the field of PP impact evaluation.

In addition, reliable and relevant information contributes to this program and efforts to enhance companies' exports and competitiveness. We approached these topics through the lens of Dynamic Capabilities (DC) (Teece et al., 1997), pursuing to understand the ability of participants in the evaluated program to identify opportunities and threats and to adapt opportunities that can contribute to enhancing their competitiveness through the improvement, combination, protection or reconfiguration of companies' assets when facing the international scenario (Teece, 2007).

In this regard, public policies typically rely on the cooperation of their beneficiaries to achieve their intended objectives (Schneider & Ingram, 1990). However, this is not always the result observed (Gertler et al., 2016), perhaps the lack of cooperation is related to citizens' perceptions of public organisations (Jensen & Piatak, 2024). Therefore, it is essential to gain a deeper understanding of how companies engage with the implementation of the program's recommended actions. In this sense, reflect on how managers and companies can contribute to the company generating competitive advantages (Teece, 2007, 2018).

In the theoretical contribution of this study, it is understood that PP and DC have been seldom addressed and, when addressed, with a different focus. For example, from the perspective of the necessary DC for the public sector, aiming at the formulation and implementation of PP for innovation (Kattel & Mazzucato, 2018), or governments facing moments of crisis (Mazzucato, Qobo & Kattel, 2022). Therefore, the combination of the lenses of PP and DC allows us to go beyond understanding the impact of a given PP. Furthermore, it makes it possible to understand how the eventual impact could reverberate, for example, in the competitiveness of companies and survival rate in the market. PP and DC together allow analyses on identifying or adapting opportunities and their improvement or combination in companies in the export processes, whether isolated or jointly.

In addition to identifying how these processes occur, it is possible to highlight the fundamental role that a PP can play. Furthermore, this study facilitates analyses of the DC eventually acquired by the company, which, on the one hand, enables its learning and, on the other, its influence on its business model (Teece, 2018). Along with this, this study contributes to studies on EPP in general, and more specifically with relevant information for the formulators and decision-makers of the evaluated program, enabling adjustments or the inclusion of actions that allow its advancement in the role it plays in supporting exports.

DYNAMIC CAPABILITIES

This study seeks to contribute to the reflection on how the evaluated program can increase the competitiveness of companies in general and, more specifically, when facing an international and dynamic scenario (Teece, 2007, 2018). In this context, it is estimated that the theoretical lens of DC makes this analysis possible, since DC are defined as the company's abilities to integrate, build and reconfigure internal and external competencies to face rapidly changing environments (Teece et al., 1997).

For Teece (2007), the formation of DC can be analysed based on the ability to identify and shape opportunities and threats, to adapt to opportunities, and to maintain competitiveness through the improvement, combination, protection and, when necessary, the reconfiguration of the company's tangible and intangible assets. DCs are generated from the company's learning and within a cycle that evolves in stages, in which the starting point for each cycle can be an existing problem or a new challenge arising from an external influence that combines with the company's information, thus stimulating creativity (Zollo & Winter, 2002). Moreover, capabilities' formation may be guided by the interaction, collaboration and network at supra national macro, mezzo and micro levels of companies (Mushangai, 2023).

Learning in organizations is produced within a framework containing four subprocesses: intuition, interpretation, integration and institutionalisation, at the individual, group and organizational levels (Crossan, Lane & White, 1999). In this sense, Zollo and Winter (2002) argue that DCs arise from the co-evolution of a process of accumulating tacit experiences with the articulation of explicit knowledge and the codification of activities. In this, the level of knowledge of the manager/entrepreneur (Matusik & Heeley, 2005) acquires notable relevance. Indeed, managers need to be involved in developing and testing conjectures about emerging technological and marketplace trends. They should also refine new business models and coordinate the necessary resources inside and outside the organisation (Teece, 2023).

Furthermore, their ability to integrate, build and reconfigure internal and external capabilities in the company is of utmost importance (Teece et al., 1997). DCs vary between companies, and the choices made by managers play a fundamental role in these differences (Pisano (2017; Zahra, Sapienza & Davidsson, 2006). Therefore, it is expected that there will be differences between companies in relation to how certain contents are used (Zollo & Winter, 2002) to face market dynamism and eventually improve competitiveness (Teece, 2007), as well as in the formation of new learning (Crossan, Lane & White, 1999).

Thus, it is understood that, on the one hand, it is crucial to know the impact of certain PP and, on the other, to address related aspects that can later contribute to the competitiveness of companies (Eisenhardt & Martin, 2000). In this context, it is worth mentioning two purposes for PP assessment: accountability, which refers to ensuring that the actions implemented result in developmental outcomes; and learning, which aims to provide evidence for the selection and design of plausible interventions to be effective in fostering results of interest (White & Raitzer, 2017). Impact evaluation can answer questions about the difference a policy makes with its application, and which program designs are most effective for one or more specific, quantifiable results (White & Raitzer, 2017).

PUBLIC POLICY ASSESSMENT

Studies in the field of PP have increased considerably (Fisher et al., 2017). Proof of the notoriety of research in the field of PP is the 2021 Nobel Prize in Economics, awarded to authors David Card, Joshua D. Angrist and Guido W. Imbens for their methodological contribution to the analysis of causal relationships (The Nobel Prize, 2021). Weible and Sabatier (2018) define PP as deliberate decisions – actions and non-actions – of a government or equivalent authority, directed towards specific objectives.

The origin of PP analysis arose from two main reasons: the desire for a better understanding of the policy formulation process and the need to provide policymakers with relevant and reliable knowledge about economic and social problems (Weible & Sabatier, 2018). Harold Lasswell is considered the founder of this field with his idea of a multidisciplinary approach to PP in a post-World War II scenario (Fisher et al., 2017). Based on Lasswell's work, policies seem to be understood as a process that develops in six phases and within a framework known as the PP cycle (Jann & Wegrich, 2017).

In the agenda setting phase (1), a problem is recognized that requires intervention and should be included in the public agenda by the corresponding entities. In the formulation (2) and decision-making (3) phases, the identified problems, proposals and demands are transformed into government programs. Objectives are defined, and actions are taken to achieve such goals. In the implementation phase (4), put succinctly, it refers to executing the already defined policy. In the evaluation (5) and closure (6) phases, evaluation is not only associated with the final stage of the cycle, but it can also end in the finalization of the applied policy (closure) or with a redefinition of this in the agenda (De Marchi et al., 2016; Jann & Wegrich, 2017).

Regarding the phase specifically aligned with the focus of this study, that is, evaluation, it is understood that research in this area began in the United States in the 1960s (Jann & Wegrich, 2017). It later spread to the Organization for Economic Co-operation and Development (OECD) countries in a scenario of welfare state interventionism (Pierson, 1995). Therefore, evaluation became a subdiscipline within the field of PP that focused its efforts on expected results and unexpected consequences of policies (Jann & Wegrich, 2017).

In this context, from the 1990s onwards, quantitative analyses gained more adhesion due to greater ease in dealing with complex models and large amounts of data that began to offer some software that allowed statistical analyses to be performed (Yang, 2017). The evaluation of PPs involves obtaining all the relevant information to assess their impact and subsequently reporting the results to the process of these PPs (Wollmann, 2017). In this study, we seek to infer that participation in the EPP evaluated as a cause of a possible change in the exports of the municipalities of the companies that participate in this program. However, it is not uncommon for the information that should be relevant and concrete regarding results not to be so (Fisher et al., 2017).

In fact, for Gertler et al. (2016), PPs or programs that seek certain changes are barely evaluated, with managers still focusing on controlling the delivery of inputs of a given program and not on the result and impact achieved. In this sense, the approach that leverages the value of evidence-based decision-making has been highlighted (Abadie et al., 2023), as well as new techniques for evaluating the impact of PPs, such as the synthetic control technique (Abadie, 2021). It is also worth highlighting the influence political incentives can have on the results and information provided by a given PP assessment, manifesting as biased information or a poor definition of objectives (Jann & Wegrich, 2017). These are the reasons why self-assessments have been highly contested.

EXPORT PROMOTION

Changes have been observed in macroeconomic intervention policies toward a focus on micro-level assistance programs that promote exports, mainly in SMEs. As a result, the number of export promotion agencies has increased considerably globally in the last 20 years (Srhoj et al., 2023).

Promoting exports is one of the priorities of export promotion agencies, mainly due to the benefits it brings in job creation, generating new income for the public coffers through taxes and enabling higher economic growth and living standards (Leonidou et al., 2011). Thus, governments seek to establish export promotion programs to develop mechanisms that can provide the necessary resources, generally focused on SMEs, to compete successfully in the international market (Comi & Resmini, 2020).

In the context of increasing EPP, the literature has been fragmented and contradictory (Freixanet (2022). Perhaps this fragmentation and contradiction in a diversity of results could be understood as part of the process of consolidation and evolution of a given area of study, as already demonstrated in thematic mapping studies (cf. Ortiz-Rojo & Lacruz, 2023).

In the literature on EPP, inconclusive results can be identified in empirical contributions using statistical causal inference techniques (cf. Srhoj et al., 2023). Geldres-Weiss and Carrasco-Roa (2016), who assessed the impact of an EPP on companies' exports using the DiD and PSM techniques, report a result of a positive but not significant impact of the EPP on companies' exports. Furthermore, this positive but insignificant result is also present in other studies. In fact, one of the works cited by Geldres-Weiss and Carrasco-Roa (2016) with a positive but not significant impact is Faroque and Takahashi (2015), who used the hierarchical regression technique to search for both direct and moderating effects in the model, as reported in that study, they followed a different path from studies that seek direct impacts of EPP on the performance of companies' exports, for which the use of causal inference techniques would be necessary.

Cruz (2014) analysed the effect of an export promotion agency (the same agency that created the EPP evaluated here) and concluded that there was a positive effect on the probability of companies starting to export. Thus, it is understood that the results of this study are related to the intention of companies and not to the eventual impact on companies' exports.

Export promotion agencies appear to be most effective when they can help circumvent barriers abroad associated with a broad portion of the export product package (Lederman et al., 2010). Analysing promotion agencies from several countries, Lederman et al. (2010) found a significant positive effect of these agencies on per capita exports. However, statistical caveats are reported for this result, such as endogeneity. Traiyarach and Banjongprasert (2022), using the structural equation modelling technique, concluded that EFP has no direct effect on export performance, but rather a mediating effect on the relationship between EPP and the export performance of companies. For Traiyarach and Banjongprasert (2022), promotion actions such as export training and participation in trade fairs, among others, are not sufficient to directly impact export performance and need to be complemented by companies' capabilities. Leonidou et al. (2011), also applying the structural equation modelling technique, state that the association between EPP and export performance is not directly but achieved by improving the company's resources and capabilities to operate internationally. If used correctly, EPP assistance is an external resource that helps companies alleviate their deficiencies (e.g., human resources, marketing) and, ultimately, can contribute to their export performance.

Regarding SMEs specifically, there is evidence that EPPs contribute to their export capabilities and risk management practices, positively influencing their international performance. These capabilities allow the company to develop specific organizational strategies that will be the basis of international performance (Catanzaro & Teyssier, 2020). Still, on SMEs, Comi and Resmini (2020) identified that micro and small companies were the most favoured by the assistance provided by EPP.

Table 1 illustrates studies carried out over the last decade that used techniques for causal inference in which the diversity of results mentioned before can be observed. Also, it presents studies cited in the review conducted by Srhoj et al. (2023) that were published until 2020, in conjunction with more recent studies that we introduced into the discussion. We understand that this diversity is related to different types of objectives outlined by the studies in which different effects are investigated about components of the EPP and not necessarily specifically to the impact of a given EPP.

Table 1. Studies using causal inference techniques

Authos	County	Technic	Finding
Boutortand Franssn (2023)	The Netherlands	PSM and Fixed effect	The study concludes that mission participation increases the chance of market entry via goods exports or imports and FDI by 5.4, 5.8 and 2.3% points, respectively, while trade in services is not affected.
Cin and Choe (2022)	Korea	Fixed effect	EPPs have positive significant effects on SMEs exports. SMEs export activities are significantly encouraged by R&D investment and capital intensity but not obviously by labour productivity.
Dvoulety et al. (2021)	Czech Republic	PSM and DiD	The study concludes that there are improvements in all evaluated indicators for microenterprises two years after the end of the programme and only minor positive effects of subsidies for larger enterprises.
Makioka (2021)	Japan	PSM and Fixed effect	Results show that attending trade fairs has positive effects on export status. Furthermore, attending a trade fair induces firms to outsource their market research activity.
Van den Berg (2021)	The Netherlands	PSM	The study suggests that participants are more likely to become permanent exporters than beginning exporters who did not receive support from the program.
Williams and Capps Jr. (2020)	Norway	Fixed effect	About 10% of industry profits were due to generic export promotion, yielding an industry profit benefit-to-cost ratio of 5.9.
Comi and Resmini (2020)	Italy	Fixed effect Matching and DiD	A positive effect of EPPs on export propensity and intensity has been found. The effects are larger for services classified as “promotional” (e.g. participation at international trade fairs and exhibitions) than for “technical assistance and counselling.” Activities or “information and knowledge specific provision” services (e.g., participation in economic mission abroad).

Defever et al. (2020a)	Pakistan	PSM and OLS	Both policies had a positive effect on total exports. Neither policy positively impacted firms' number of export products nor the number of export destinations.
Defever et al. (2020b)	Nepal	PSM and OLS	The EPP did not have a robust positive effect on total exports. On the other hand, the effect was robust in encouraging firms to export CISE products to new markets.
Girma et al. (2020)	China	Generalised PSM	The direct effect of subsidies on the probability of exports being always positive was found. The effect is increasing for firms in clusters with low levels but diminishes for high levels of subsidisation.
Chavez et al. (2020)	Peru	PSM and DiD	Treated firms experienced a lower decline in exports, a 22p. p. higher export growth rate and a lower export exit probability, that is reduced exit probability by 0.09 p. p in the crisis (2009–2010).
Srhoj and Walde (2020)	Croatia	Matching and DiD	The export grant scheme induces additionality on firm performance but with no effects on employment and mixed findings for TFP. Technology-oriented grants have consistent and significant effects compared to commercialisation activities (e.g., subsidising consulting for markets abroad and trade fairs).
Agarwal et al. (2018)	Sweden	PSM and DiD	There is no effect on employment, value-added, and value-added per employee, but there are positive effects on export status and value. Authors find effects to be most vital for firms of smaller size. Effects are also pronounced for first time users and in service sectors.
Akgündüz et al. (2018)	Turkey	PSM and DiD	The results indicate receiving firms exhibit higher exports and sales (65,19%). Treatment group firms appear to become larger after receiving rediscount credits compared to the matched control firms as their number of employees rises. The firms that entered the programme in 2012 differ from the average exporting firm. Exporting firms may already be more likely to benefit from the programme.
Karoubi et al. (2018)	France	Matching	EPPs increase firm export intensity by 16.27% and its probability of turning to exports by roughly 25%. The impact of public support holds for the services sector but disappears for industrial firms.
Kim et al. (2018)	Vietnam	Two-stage least squares (IV)	The results show that providing information did not encourage unproductive firms to engage in exporting activity. Large firms were more likely to start exporting directly to foreign buyers shortly after the seminars; however, these effects disappeared two years later.
Munch and Schaur (2018)	Denmark	PSM and DiD	Export promotion facilitates entry into export markets and the continuation of export

			activity across all types of firms. The effects are the largest for small firms.
Atkin et al. (2017)	Egypt	Randomized Controlled Trial (RCT)	A positive effect on profits and quality and a negative effect on output per hour have been found. The authors argue for learning-by-exporting whereby exporting improves technical efficiency.
Breinlich et al. (2017)	United Kingdom	Randomized Controlled Trial (RCT)	The authors find providing information on exports has an asymmetrical effect on perceived exporting benefits, perceived export barriers, and actual export behaviour.
Broocks and Van Biesebroeck (2017)	Belgium	PSM	A positive effect of EPP on the probability of extra-EU export market entry.
Cassey and Cohen (2017)	United States	PSM and DiD	The results display that firm participation in an export assistance programme increases firm-level employment fleetingly, but not in subsequent periods, i.e. the employment effects of the policy are short lived and disappear after at most two quarters. There is no statistically significant impact of programme participation on long-term employment.
Van Biesebroeck et al. (2016)	Belgium and Peru	PSM and OLS	The firms that received export promotion support during the crisis performed better. They more likely remained active in export markets and exported higher volumes than control firms.
Cadot, Fernandes et al. (2015)	Tunisia	Propensity score weighted regression	Positive short-run effects on intensive and extensive export margins, but no effects after three years have been found. The results indicate heterogeneous effects on size classes, positively impacting export levels for medium-sized firms only.
Mion and Muuls (2015)	United Kingdom	PSM; Heckman selection model	There is strong evidence that using EPP services positively affects firms' goods export performance along the intensive and extensive margins and across different markets and groups of firms. The impact of EPP support spans both new exporters and current exporters.
Rincón-Aznar et al. (2015)	United Kingdom	PSM and DiD	EPP support positively impacted turnover growth and had a more modest impact on labour productivity, but none on employment expansion. Support is positively linked with firm survival and improvement in the total value of a firm's exports, the value of turnover of its subsidiaries abroad or a combination of the two.
Van Biesebroeck et al. (2015)	Canada	DiD with fixed effects	Statistically significant effect of EPP on export within product-destination already served by firms. Still, no effect was found for expanding the number of products or markets they serve.

Source: Based on Srhoj et al. (2023, p. 55-71).

One notable aspect is that once companies begin exporting, they may experience additional successes linked to their export activities, identified by Atkin et al. (2017) as learning through exporting. This learning would occur partly through information flows, contributing to improving technical efficiency in companies. Thus, the following research hypothesis is established:

H_1: EPPs positively impact exports of participant municipalities.

METHOD

Design and Empirical Context

This study used a panel data approach and employed several techniques to infer the possible causal effect of the EPP evaluated. The PSM technique was applied to address the counterfactual problem, while DiD Regression was used for causal inference (i.e., inferring participation in the Export Qualification Program (PEIEX) as a cause of a possible change in exports from the municipalities of companies participating in the program).

Information about PEIEX was gathered from the limited literature found on the program (e.g., Dornelas & Carneiro, 2018; Cruz et al., 2018) and on the websites of the Brazilian Trade and Investment Promotion Agency (ApexBrasil), which created the program, as well as PEIEX itself. Due to the scarce literature on the program under evaluation, managers of some PEIEX operational centres were contacted to obtain more information about the program.

From this analysis, it is understood that the program is offered by Apex-Brasil and aims to enable companies with little or no export culture to begin an export process in a planned and safe manner (ApexBrasil, 2023). PEIEX is implemented in all regions of the country (cf. Appendix 1). This implementation is achieved through partnerships between Apex-Brasil and institutions such as Universities, Technology Parks, Research Support Foundations, or Industry Federations. The program's implementing entities, or operational centres, are responsible for implementing the program to qualify companies.

Companies are served by professionals specialized in foreign trade who guide entrepreneurs on how to enter the international market (ApexBrasil, 2023). Regarding the service itself, the program states that "PEIEX services are provided by the operational centre team based on visits to companies: the first visit aims to measure export potential; the second visit is when the PEIEX extension technician diagnoses the business to identify the company's level of readiness for export. Based on the information gathered, the PEIEX centre team prepares a work plan to implement the requirements necessary for export" (ApexBrasil, 2023). It is worth highlighting that the methodology for implementing the program's activities follows a syllabus containing 28 topics that are established by APEX-Brasil (cf. Appendix 2).

We emphasize that, when it comes to demands or actions suggested to entrepreneurs by PEIEX operational centres, these are not always prioritized by companies. In addition, the PEIEX extension technician are unable to prove the implementation of the program's suggestions. Dornelas and Carneiro (2018) highlighted PEIEX's support to participating companies and drew attention to the issue related to the preparation of those responsible for serving companies participating in the program. These authors state that those who provide the service should have more specialized knowledge regarding export processes.

On the other hand, obtained information with technicians responsible for serving the companies participating in the program, revealed that there are not few unprepared companies, which consequently affects the international enterprise as a whole and in that sense, it prompts reflection on how companies are selected to participate in the program (Moynihan et al., 2022). It is important to note that APEX-Brasil evaluates the program, consisting of a satisfaction survey applied to the companies that benefit from the program, and the operational centres do not have access to these results.

Information from the III National Meeting of PEIEX in 2022 highlights that, by the end of that year, PEIEX should have reached the figure of 2,200 companies served. In addition, it is reported that the program had 300 extension professionals responsible for serving the companies, of which 70% were micro and small and 30% were medium and large companies starting their export processes (ApexBrasil, 2022a). In addition, the program has existed for 18 years and has already served 25,000 companies that have never exported or have little export culture (ApexBrasil, 2022b, p. 5).

It can be said that the implementation of PEIEX is based on the topics mentioned before. The operational centres prepare materials to be addressed with the participating companies, and each operational centre is responsible for formulating materials and training companies, always following the stipulations of PEIEX, that is, the topics established by ApexBrasil. Subsequently, in 3 stages, the companies are individually served by extension technicians to arrive at the formulation of the export plan that each company receives as a product resulting from the service and training provided by the operational centres.

During the service or because of the export plan, the company could be referred to one of the partners in the operational centres that are part of the PEIEX network in the corresponding region. This referral aims to complement some specific topic or need of the company in relation to the desired export process. Therefore, it is understood that the PEIEX program aims to train companies for export through the transfer of content in its methodology, with a support network of national and regional partners, and it is up to the companies, after being trained, to decide whether and when to export.

Data collection

Data on Brazilian exports by state between 2011 and 2023 were collected (in April 2024) from the Comex Stat portal of the Brazilian Ministry of Industry, Foreign Trade and Services. These data were analysed at the municipal level, together with the database with the municipalities participating in PEIEX provided by ApexBrasil and data obtained from the portal of the Brazilian Institute of Geography and Statistics (IBGE). Given the lack of individual-level data (i.e., company level), we opted for secondary data at the municipal level, from the agency that created the program. The database provided by ApexBrasil contained data from 2008 to 2023, not covering the entire period of existence of the program and with variations in the number of participating municipalities.

In addition, data from all municipalities participating in PEIEX were cross-referenced with Brazilian export data from the Comex Stat portal to define the sample with complete export data for those municipalities participating in the program.

Data analyses

The PSM technique was used to address the formation of control and placebo groups, while DiD Regression was used for causal inference. To strengthen the impact evaluation's results, a second counterfactual was created to apply a placebo test (i.e., with a fake treatment group).

In order to better assess the regression results, the following conditions were verified: i) the assumption of parallel trend, using the Wald test; ii) linearity of the residuals, by visual analysis of the residuals x adjusted values; iii) absence of multicollinearity problems between predictors, by the Variance Inflation Factor (VIF); iv) normality of residuals, by the Shapiro-Wilk test; v) absence of influential values in the residuals, by the Cook distance; vi) homoscedasticity of residuals, by the Breusch-Pagan test; and vii) independence of residuals, by the Breusch-Godfrey test. The data were processed in the R software (R Core Team, 2022).

Sample and Variables

The time frame of 2012–2023 was used since, in this period, it would be possible to obtain a more symmetrical sample about the period designated as intervention and for later application of the DiD regression, that is, 2017-2019.

The sample was formed by 692 Brazil's municipalities participating and not participating in PEIEX and divided into six groups by municipality: (1) control group before the change; (2) control group after the change; (3) treatment group before the change; and (4) treatment group after the change; (5) placebo group (i.e., sham treatment) before the change; and (6) placebo group after the change. Table 2 displays the variables.

Table 2. Variables

Source	Variable	Type	Operationalisation	PSM	DiD Regression
Comex Stat portal (2024)	nl(Exports)	Dependent	Export natural logarithm (years 2012 to 2023)		X
Comex Stat portal (2024)	nl(Lagged Exports $_{years-1}$)	Control	Lagged export natural logarithm (year – 1) (years 2011 a 2022)		X
IBGE (2024)	State	Control	State	X	
IBGE (2024)	GDP	Control	Municipal GDP in 2017	X	
IBGE (2024)	GDP (pc)	Control	Municipal GDP per capita in 2017	X	
IBGE (2024)	Population	Control	Municipal population in 2017	X	
---	Pandemic	Control	Dummy 0: Without Pandemic period 1: With Pandemic period (2020 and 2021)		X
ApexBrasil (2024)	Group	Independent	Dummy 0: Control Group 1: Treatment Group and Placebo Group	X	X
---	Time	Independent	Year		X
---	Interaction term	Moderator	Group x Time		X

Note. GDP: Gross Domestic Product. PSM: Propensity Score Matching. DiD: Differences in Differences regression.

Source: authors

For the processing of the DiD Regression, considering five predictors (three independent variables and two control variables), significance level of 0.05, statistical power of 0.8 and effect size of 0.15 – considered medium, according to Cohen's scale (1988) – a minimum sample size of 92 observations was estimated. The sample was made up of the treatment, control and placebo groups, containing 151 observations each (therefore higher than the minimum determined).

RESULTS

Propensity Score Matching

The control and placebo groups were defined using the Genetic matching approach (which presented the best match among the 20 variations made). Tables 3 and 4 display the groups and outcomes of applying the PSM technique.

Table 3. Propensity score matching (Descriptive)

Sample	Control Group	Treatment Group	Placebo Group
Total	692	151	541
Paired	151	151	151
No Paired	340	0	222
Discarded	201	0	168

Source: authors

Table 4. Propensity score matching

Variables	**Control Group**			**Placebo Group**		
	Strictly standardized mean difference	*Variance ratio*	*Cumulative distribution function*	*Strictly standardized mean difference*	*Variance ratio*	*Cumulative distribution function*
FUAC	0.0000	-	0.0000	0.0000	-	0.0000
FUAL	0.0000	-	0.0000	0.0000	-	0.0000
FUAM	0.0000	-	0.0000	0.0000	-	0.0000
FUAP	0.0000	-	0.0000	0.0000	-	0.0000
FUBA	0.0000	-	0.0000	0.0000	-	0.0000
FUCE	0.0000	-	0.0000	-0.0586	-	0.0066
FUDF	0.0816	-	0.0066	0.0816	-	0.0066
FUES	0.0000	-	0.0000	0.0000	-	0.0000
FUGO	0.0000	-	0.0000	-0.8165	-	0.0662
FUMA	0.0000	-	0.0000	0.0000	-	0.0000
FUMG	0.0339	-	0.0066	-1.0849	-	0.2119
FUMS	0.0000	-	0.0000	0.0000	-	0.0000
FUMT	0.0000	-	0.0000	0.0000	-	0.0000
FUPA	0.0000	-	0.0000	0.0000	-	0.0000
FUPB	0.0000	-	0.0000	0.0000	-	0.0000
FUPE	0.0000	-	0.0000	0.0000	-	0.0000
FUPI	0.0000	-	0.0000	0.0000	-	0.0000

FUPR	0.0000	-	0.0000	-0.2957	-	0.0662
FURJ	0.0000	-	0.0000	0.0000	-	0.0000
FURN	0.0000	-	0.0000	0.0000	-	0.0000
FURO	0.0000	-	0.0000	0.0000	-	0.0000
FURR	0.0000	-	0.0000	0.0000	-	0.0000
FURS	0.0273	-	0.0132	0.7787	-	0.3775
FUSC	0.0000	-	0.0000	0.0000	-	0.0000
FUSE	0.0000	-	0.0000	-0.2623	-	0.0199
FUSP	-0.0566	-	0.0265	-0.0283	-	0.0132
FUTO	0.0000	-	0.0000	0.0000	-	0.0000
GDP	0,2159	89,0456	0,0961	0.2380	132.6777	0.0855
GDPpc	0,0961	1,4294	0,0296	0.2401	6.6642	0.0556
Population	0,2297	52,5752	0,0976	0.2378	24.7137	0.0722

Source: authors

For the strictly standardized mean difference, a value close to 0 is expected; the same criterion applies to the cumulative distribution function. Regarding the variance ratio, values close to 1 are expected. It is worth mentioning that the results demonstrated a better adjustment of the control group compared to the result obtained for the placebo group – but at acceptable levels.

Having carried out the necessary procedures to define the control and placebo groups, we moved on to the stage of applying the DiD technique to assess the impact of the program in question.

Differences in Difference

Initially, the assumption of parallel trends in the groups was tested using the Wald test, in which it was not possible to reject the null hypothesis for both groups: treatment x control p-value = 0.12; placebo x control p-value = 0.07, thus allowing us to assume a parallel trend between the groups.

Since we could not assume the absence of autocorrelation of the residuals using the Breusch-Godfrey test (p-value < 0.05), we chose to process regressions for robust White standard errors. No outstanding multicollinearity problems (VIF < 10) or influential values (Cook's Distance < 1) were identified. It was possible to assume homoscedasticity of the residuals (p-value > 0.05), but not their normality (p-value < 0.05). Table 5 shows the result of the robust DiD regression analysis.

Table 5. Robust DiD regression (2012-2023)

Models	1 Regression Treatment x Control	2 Regression Treatment x Control with Lagged dependent variable	3 Regression Placebo x Control	4 Regression Placebo x Control with Lagged dependent variable
Intercept	17.25896***	0.64187***	17.252867***	0.532249***
ln(Lagged Export $_{years-1}$)	-	0.95949***	-	0.966485***
Time	0.15913	0.11165***	0.189515	0.115013***
Group	0.61860***	0.05885	-0.110254	0.042332
Pandemic	-0.04960	0.07546*	-0.008848	0.022025
Time x Group	0.01211	-0.03534	0.108003	-0.044386
R^2	0.01595	0.9362	0.002578	0.9299
R^2 adjusted	0.01486	0.9361	0.001475	0.9298

Source: authors

Signif. codes: 0 '***' 0.001 '**' 0.01 '*'
Note: R^2 = coefficient of determination. R^2 adjusted = adjusted coefficient of determination.

In Table 6, the impact of PEIEX on exports of municipalities involved in the program was not supported. This was because the coefficient of the interaction term (Time x Group) was not statistically significant (p-value > 0.05). Additionally, when considering lagged variables and conducting placebo tests for robustness, the initial hypothesis was still not supported, which further confirms the study's findings.

DISCUSSION AND IMPLICATIONS

This study assessed the potential impact of an export promotion program. Furthermore, it was possible to compare the results of this study with the limited literature on PEIEX, as well as discuss, considering the DC (Teece et al., 1997), the learning of companies participating in the program and based on this, how to build their DC, with the potential to positively influence performance in international markets. The results of the study did not support the research hypothesis that PEIEX has a positive impact on the exports of municipalities participating in the program. In this context, it is worth mentioning that the impact evaluation carried out here contemplated a specific period and a sample defined from that period.

Furthermore, aware of the lack of application of robust techniques in evaluations specifically of EPP (Geldres-Weiss & Carrasco-Roa, 2016), the techniques used were those recommended by the literature specializing in impact evaluation, in which various approaches and combinations of techniques were employed to strengthen the assessment made and confirm the result (Albouy, 2004; Khandker et al., 2009, White & Raitzer, 2017; Gertler et al., 2016).

This does not mean that in the future, at a different time, an impact of PEIEX may be evidenced. We might assume that our finding of no impact could be attributed to an evaluation conducted in the initial stages of the program. However, according to information from ApexBrasil, in 2022, the program completed 18 years of existence and had already assisted 25,000 enterprises that had never exported or had limited experience with exports (ApexBrasil, 2022a).

Regarding the implementation of the program, it is important to remember aspects that deserve attention concerning the participation of technicians from the operational centres, the mastery of the content for the implementation of the activities, and the commitment of the entrepreneurs in carrying out the activities (Dornelas & Carneiro, 2018;). Precisely, aspects such as the level of knowledge and preparation of the companies, the mastery of the content of the program's executors, as well as the commitment of the initiative's beneficiaries (Jensen & Piatak, 2024), acquire relevance and invite us to better reflect on its implementation in terms of learning that enables the creation of DC (Zollo & Winter, 2002).

Leonidou et al. (2011) state that improving companies' resources and capabilities is necessary to establish a direct relationship between the use of EPP and the companies' performance in international markets. Similarly, Traiyarach and Banjongprasert (2022) assert that export promotion actions are not sufficient to directly impact on export performance directly and need to be complemented by companies' capabilities.

Theoretical Implications

The objective of PP as an EPP is to promote exports (Leonidou et al., 2011; Srhoj et al., 2023), and the case of PEIEX is no different; it seeks to encourage companies to start an export process in a planned and safe manner. In PEIEX, the goals established for each operational centre are the result of market studies carried out by ApexBrasil, in which, depending on the region and capacity of the operational centres, the goal varies between 100 and 200 companies per program cycle. We are not aware of these market studies, but in this context, it is worth considering some of the problems that may hinder achieving the goals established by ApexBrasil.

This is the difficulty in showing entrepreneurs the benefits of the program. In this sense, a lack of understanding on the part of companies makes it difficult for an external agent, such as the evaluated program, to identify and combine information with that which the company has, thus being able to stimulate creativity and learning (Crossan, Lane & White, 1999).

We understand that these aspects could be better worked on and aligned before implementing a PP or EPP, in which a theory of Change, formulated jointly with stakeholders, would be relevant support (White & Raitzer, 2017). The theory of change is a statement that explains how the resources being provided (such as funds, people, and changes in regulatory or policy environment) lead to the intended outcomes and impacts. The theory outlines the steps in the causal chain and the underlying assumptions that need to be in place for the theory to work as expected.

Regarding the resources that the operational centres have for implementing the program, it would be interesting to consider the level of knowledge of the manager/entrepreneur (Matusik & Heeley, 2005) as an input, assuming the premise that there are differences between companies (Pisano, 2017) in terms of knowledge and potential for creating DC (Zahra, Sapienza & Davidsson, 2006).

In other words, it is deepening or adapting the analysis carried out by the program evaluated in stages 1 and 2 of its implementations to capture the different levels of knowledge of the beneficiaries. The product resulting from the program's implementation is understood to be the export plan, as well as the generation of knowledge and qualification. These reports are in line with the findings of Dornelas and Carneiro (2018) and Cruz et al. (2018), regarding the training provided by the program in the areas of Strategic Management, Human Capital, Finance and Costs, Sales and Marketing, Foreign Trade, and Product and Manufacturing.

However, to what extent is this knowledge generated and incorporated in the participating companies, which can allow the creation of DC (Teece et al., 1997) and contribute to the competitiveness of companies? These are aspects that EPP can address in general and specifically by PEIEX. The implementation and evaluation stages of each program would be appropriate times to seek such answers, not only with a satisfaction survey but with an action and monitoring plan that verifies the level of implementation of the program's actions that favour learning and the creation of DC in companies.

This study contributes theoretically to the field of PP, specifically to impact evaluation by incorporating the DC lens into the discussion.

Practical implications

Information about the program's methodology was limited to the areas in which it was implemented, its overall purposes, or the stages in which the methodology was implemented (ApexBrasil, 2022a, 2023). In this study, it was possible to understand that the program's methodology covers 28 topics related to foreign trade and the export process. These topics are addressed in the activities developed in each service with the companies and depending on the needs of each one.

In the evaluation of the program and agreement with White and Raitzer (2017) on the two purposes for the PP evaluation, accountability and learning, it is understood that the evaluation consists of a satisfaction survey to which the program implementation managers do not have access. Thus, it is deduced that the evaluation is a satisfaction survey carried out by ApexBrasil and that the operational centres do not have detailed knowledge of the evaluation results.

It is worth mentioning that the managers consulted perceive the program's results positively. This perception aligns with the positive results of EPP in developed and developing countries (Lederman et al., 2010). Therefore, it can be understood that no more rigorous evaluation applies specific techniques for assessing the impact of PP, such as those that allow statistical inferences of causality to be made (White & Raitzer, 2017; Gertler et al., 2016).

Thinking about possible improvements for the program, the lack of publicity for the program to help entrepreneurs adhere to it stands out, since it is understood that the program is not sufficiently well-known among companies, nor is its creator agency. Furthermore, the issue of the disparity in knowledge between companies is highlighted, which reinforces what was previously suggested regarding the review and deepening of the initial stages of the program's implementation to recognize companies' capabilities, considering that the majority of EPP beneficiaries are SMEs, precisely those that lack the most resources (Comi & Resmini, 2020).

Therefore, we believe that there are points that could be analysed and improved when considering the possibility of companies participating in the program facing and adapting to the international market, as well as in this process, aiming for the integration, construction and reconfiguration of internal and external competencies to face, in line with the objective of PEIEX, a dynamic international environment (Teece et al., 1997). Furthermore, once companies export, in addition to the knowledge and potential to create capabilities obtained in the EPP, companies can continue to learn through exporting (Atkin et al., 2017).

Thus, the relevance of the existence of the program evaluated here is evident, especially when it comes to supporting smaller companies to face and remain in the international market through the transfer of knowledge that enables learning and the creation of DC, which can enable the good performance of these companies (Ortiz-Rojo & Lacruz, 2023).

This study contributes to the advancement of the PEIEX program, which we hope can be used in future editions and other development initiatives, whether in EPP or elsewhere. Furthermore, it is expected that these contributions will have the potential to subsequently impact the competitiveness of companies.

CONCLUSIONS

We assessed the impact of a Brazilian EPP on the exports of municipalities of companies that participated in this program. Secondary data with exports by municipality were analysed, covering the period from 2012 to 2023. It was found that municipalities participating in PEIEX showed no statistically different export performance compared to non-participating municipalities. It is worth noting that this result does not allow us to conclude that the program had no effect. Even if the companies that took part in the program increased their exports during the analysed period, the evaluation does not definitely prove that PEIEX caused this increase.

Furthermore, in this situation of a possible increase in exports of municipalities participating in the program in the period analysed, it could have been marginal, which is why the impact evaluation also does not support a different result. It is also worth noting that the result of no impact relates to the level of analysis of municipalities. Therefore, the availability of data necessary to assess the impact of PEIEX at the company level is of utmost importance for future studies. PEIEX is considered an initiative that should continue and that can also be improved. Based on the analysis of this study, we make some suggestions that are consistent with one of the objectives of PP assessments, which is to provide relevant information to PP formulators, in this case, to EPP.

We believe it is necessary to consider including tools such as Theory of Change to plan the execution of program actions better and thus better monitor their development in each operational centre (White & Raitzer, 2017). In addition, efforts should be made to raise awareness among potential participants about the benefits that participation in the program can bring in relation to company learning and the creation of competences to face the global market.

Furthermore, it is necessary to increase efforts in the initial stages of program implementation to identify the capabilities of the beneficiary companies and especially their managers. It is understood that these efforts in the initial stages may impact the effective implementation of the recommended actions for companies, which is a critical point, and it is the managers, and ultimately people, who decide whether to implement the recommended action.

Precisely for this reason, it is necessary to work towards monitoring the program's activities and, before that, to know the real potential of each manager to capture, incorporate, implement and adapt, if necessary, the company's routines. This makes it possible to achieve the program's objective and ensure that companies enter the global market in a better prepared manner and eventually become more competitive.

This study was not without limitations. The period defined for the impact evaluation is directly related to the data provided by the agency that created PEIEX. Another limitation was the analysis carried out at the municipal level due to the data available. It is recommended that future impact evaluations of PEIEX be carried out, if possible, with an analysis at the company level, understanding that the program continues and increases in number of beneficiaries. This would favour the possibility that, with more years of operation of PEIEX and with a focus not only on the delivery of the benefit, but also on the impact of the program, a possible impact attributable to the program and not to other factors could be identified.

This study paves the way for new analyses and approaches, such as: in an impact evaluation context and from the company's perspective, analysing DC when it comes to identifying opportunities, or how these opportunities are adapted, and on the improvement and combination of opportunities in companies aiming at improving competitiveness and learning, to mention some possibilities.

REFERÊNCIAS

Abadie, A., Agarwal, A., Imbens, G., Jia, S., McQueen, J., & Stepaniants, S. (2023). *Estimating the Value of Evidence-Based Decision Making*. arXiv preprint https://arXiv:2306.13681

Abadie, A. (2021). Using synthetic controls: Feasibility, data requirements, and methodological aspects. Journal of Economic Literature, 59(2), 391-425. https://doi.org/10.1257/jel.20191450

Acemoglu, D., Gallego, F. A., & Robinson, J. A. (2014). Institutions, human capital, and development. Annual Review of Economics, 6(1), 875-912. https://doi.org/10.1146/annurev-economics-080213-041119

Albouy, D. (2004). Program evaluation and the difference in difference estimator (Econometrics laboratory - Economics 131 – Section notes). Available in https://eml.berkeley.edu/~webfac/saez/e131_s04/diff.pdf

ApexBrasil. (2023). Programa de Qualificação para Exportação – PEIEX. Available in https://portal.apexbrasil.com.br/qualifique-sua-empresa-peiex/

ApexBrasil. (2022a). Exportações para todos: III Encontro Nacional do PEIEX reúne equipes de todo Brasil. Available in https://apexbrasil.com.br/br/pt/conteudo/noticias/exportacoes-para-todos--iii-encontro-nacional-do-peiex-reune-equ.html

ApexBrasil. (2022b). Ensaio PEIEX 2022/ApexBrasil. Brasília: ApexBrasil, 2022.

Atkin, D., Khandelwal, A. K., & Osman, A. (2017). Exporting and firm performance: Evidence from a randomized experiment. The Quarterly Journal of Economics, 132(2), 551-615. https://doi.org/10.1093/qje/qjx002

Ayoo, C. (2022). Poverty reduction strategies in developing countries. In P. de Salvo & M. Vaquero Piñeiro (Eds.), Rural Development - Education, Sustainability, Multifunctionality (pp. 17-57). IntechOpen. https://doi.org/10.5772/intechopen.101472

Boutorat, A., & Franssen, L. (2023). Economic missions and firm internationalization: evidence from the Netherlands. Review of World Economics, 159(3), 787-826. https://doi.org/10.1007/s10290-022-00482-1

Catanzaro, A., & Teyssier, C. (2021). Export promotion programs, export capabilities, and risk management practices of internationalized SMEs. Small Business Economics, 57(3), 1479-1503. https://doi.org/10.1007/s11187-020-00358-4

Cin, B. C., & Choe, K. H. (2022). Analyses of the Effects of Government Export Promotion Programs on Export Performance: Empirical Evidence for Small and Medium-Sized Enterprises in Korea. Journal of Korea Trade, 26(5), 39-55. https://doi.org/10.35611/jkt.2022.26.5.39

Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences (2 Ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

Comex Stat. (2024). Official system for extracting statistics on Brazilian foreign trade in goods. Available in https://comexstat.mdic.gov.br/en/home

Comi, S., & Resmini, L. (2020). Are export promotion programs effective in promoting the internalization of SMEs?. Economia Politica, 37(2), 547-581. https://doi.org/10.1007/s40888-019-00170-8

Crossan, M. M., Lane, H. W., & White, R. E. (1999). An organizational learning framework: From intuition to institution. Academy of Management Review, 24(3), 522-537. https://doi.org/10.2307/259140

Cruz, M. (2014). Do export promotion agencies promote new exporters? (IDB Working Paper Series 508). Available in http://dx.doi.org/10.18235/0011636

Cruz, M., Bussolo, M., & Iacovone, L. (2018). Organizing knowledge to compete: Impacts of capacity building programs on firm organization. Journal of International Economics, 111, 1-20. https://doi.org/10.1016/j.jinteco.2017.12.001

De Marchi, G., Lucertini, G., & Tsoukiàs, A. (2016). From evidence-based policy making to policy analytics. Annals of Operations Research, 236(1), 15-38. https://doi.org/10.1007/s10479-014-1578-6

Dornelas, B. F., & Carneiro, J. M. T. (2018). A multi-perspective examination of export promotion programs: the case of Peiex by Apex-Brasil. Revista Ibero-Americana de Estratégia, 17(2), 50-61. https://doi.org/10.5585/riae.v17i2.2562

Dvouletý, O., Blažková, I., & Potluka, O. (2021). Estimating the effects of public subsidies on the performance of supported enterprises across firm sizes. Research Evaluation, 30(3), 290-313. https://doi.org/10.1093/reseval/rvab004

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

Freixanet, J. (2022). Export promotion programs: A system-based systematic review and agenda for future research. Journal of World Business, 57(4), 101344. https://doi.org/10.1016/j.jwb.2022.101344

Geldres-Weiss, V. V., & Carrasco-Roa, J. A. (2016). Impact evaluation of national export promotion programs on export firms using contrast groups. International Journal of Export Marketing, 1(1), 77-95. https://doi.org/10.1504/IJEXPORTM.2016.076846

Gertler, P. J., Martínez, S., Premand, P., & Rawlings, L. B. (2016). Impact Evaluation in Practice. World Bank Publications.

Hernández, T. K. (2019). Latin American racial equality law as criminal law. Latin American and Caribbean Ethnic Studies, 14(3), 348-358. https://doi.org/10.1080/17442222.2019.1661971

Brazilian Institute of Geography and Statistics (2024). Population. Available in https://www.ibge.gov.br/en/statistics/social/population?lang=en-GB

Jann, W., & Wegrich, K. (2017). Theories of the policy cycle. In F. Fischer & G. J. Miller (Eds.), Handbook of public policy analysis (pp. 69-88). Routledge. https://doi.org/10.4324/9781315093192-12

Jensen, C., & Piatak, J. (2024). Public Service Motivation and Trust in Government: An Examination Across the Federal, State, and Local Levels in the United States. The American Review of Public Administration, 54(2), 107-118. https://doi.org/10.1177/02750740231200449

Kattel, R., & Mazzucato, M. (2018). Mission-oriented innovation policy and dynamic capabilities in the public sector. Industrial and Corporate Change, 27(5), 787-801. https://doi.org/10.1093/icc/dty032

Khandker, S. R., Koolwal, G. B., & Samad, H. A. (2009). Handbook on impact evaluation: quantitative methods and practices. World Bank Publications. https://doi.org/10.1596/978-0-8213-8028-4

King, R. G., & Rebelo, S. (1990). Public policy and economic growth: developing neoclassical implications. Journal of Political Economy, 98(5, Part 2), S126-S150. https://doi.org/10.1086/261727

Lederman, D., Olarreaga, M., & Payton, L. (2010). Export promotion agencies: Do they work?. Journal of Development Economics, 91(2), 257-265. https://doi.org/10.1016/j.jdeveco.2009.09.003

Leonidou, L. C., Palihawadana, D., & Theodosiou, M. (2011). National export-promotion programs as drivers of organizational resources and capabilities: effects on strategy, competitive advantage, and performance. Journal of International Marketing, 19(2), 1-29. https://doi.org/10.1509/jimk.19.2.1

Makioka, R. (2021). The impact of export promotion with matchmaking on exports and service outsourcing. Review of International Economics, 29(5), 1418-1450. https://doi.org/10.1111/roie.12548

Matusik, S. F., & Heeley, M. B. (2005). Absorptive capacity in the software industry: Identifying dimensions that affect knowledge and knowledge creation activities. Journal of Management, 31(4), 549-572. https://doi.org/10.1177/0149206304272293

Mazzucato, M., Qobo, M., & Kattel, R. (2022). Building state capacities and dynamic capabilities to drive social and economic development: The case of South Africa. In Qobo, M., Soko, M., Xenia Ngwenya, N. (Eds). The Future of the South African Political Economy Post-COVID 19 (pp. 43-74). Cham: Springer. https://doi.org/10.1007/978-3-031-10576-0_3

Moynihan, D., Giannella, E., Herd, P., & Sutherland, J. (2022). Matching to categories: Learning and compliance costs in administrative processes. Journal of Public Administration Research and Theory, 32(4), 750-764. https://doi.org/10.1093/jopart/muac002

Mushangai, D. (2023). Dynamic capabilities: Axiomatic formation of firms' competitive competencies. Social Sciences & Humanities Open, 8(1), 100654. https://doi.org/10.1016/j.ssaho.2023.100654

Ortiz-Rojo, R. A., & Lacruz, A. J. (2023). International Entrepreneurship: Thematic Mapping and Research Agenda Proposal. Organizações & Sociedade, 30, 301-328. https://doi.org/10.1590/1984-92302023v30n0010EN

Pierson, P. (1995). Fragmented welfare states: Federal institutions and the development of social policy. Governance, 8(4), 449-478. https://doi.org/10.1111/j.1468-0491.1995.tb00223.x

Pisano, G. P. (2017). Toward a prescriptive theory of dynamic capabilities: connecting strategic choice, learning, and competition. Industrial and Corporate Change, 26(5), 747-762. https://doi.org/10.1093/icc/dtx026

R Core Team (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/.

Reinert, E. S. (1999). The role of the state in economic growth. Journal of Economic Studies, 26(4/5), 268-326. https://doi.org/10.1108/01443589910284903

Sabatier, P. A. (2007). Theories of the Policy Process. Routledge. https://doi.org/10.4324/9780367274689

Srhoj, S., Vitezić, V., & Wagner, J. (2023). Export boosting policies and firm performance: Review of empirical evidence around the world. Jahrbücher für Nationalökonomie und Statistik, 243(1), 45-92. https://doi.org/10.1108/01443589910284903

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), 1319-1350. https://doi.org/10.1002/smj.640

Teece, D. J. (2018). Business models and dynamic capabilities. Long Range Planning, 51(1), 40-49. https://doi.org/10.1016/j.lrp.2017.06.007

Teece, D. J. (2023). The evolution of the dynamic capabilities framework. In Adams, R., Grichnik, D., Pundziene, A., Volkmann, C. (Eds.), Artificiality and sustainability in entrepreneurship, (pp. 113-129). Springer. https://doi.org/10.1007/978-3-031-11371-0_6

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. Strategic Management Journal, 18(7), 509-533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

The Nobel Prize. (2021). Press release. https://www.nobelprize.org/prizes/economic-sciences/2021/press-release

Traiyarach, S., & Banjongprasert, J. (2022). The impact of export promotion programs on export competitiveness and export performance of craft products. Journal of Marine Science and Engineering, 10(7), 892. https://doi.org/10.3390/jmse10070892

Van den Berg, M. (2021). Free lunch or vital support? Export promotion in The Netherlands. Applied Economic Analysis, 30(90), 213-228. https://doi.org/10.1108/AEA-07-2020-0094

Weible, C. M., & Sabatier, P. A. (Eds.). (2018). Theories of the policy process. Routledge. https://doi.org/10.4324/9780429494284

White, H., & Raitzer, D. A. (2017). Impact evaluation of development interventions: A practical guide. Asian Development Bank.

Williams, G. W., & Capps Jr, O. (2020). Generic promotion of Norwegian whitefish exports. Journal of International Food & Agribusiness Marketing, 33(2), 123-151. https://doi.org/10.1080/08974438.2020.1752876

Wollmann, H. (2017). Policy evaluation and evaluation research. In F. Fischer & G. J. Miller (Eds.), Handbook of public policy analysis (pp. 419-428). Routledge. https://doi.org/10.4324/9781315093192-39

Yang, K. (2017). Quantitative Methods for Policy Analysis. In F. Fischer & G. J. Miller (Eds.), Handbook of Public Policy Analysis (pp. 375-394). Routledge. https://doi.org/10.4324/9781315093192-36

Zahra, S. A., Sapienza, H. J., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. Journal of Management Studies, 43(4), 917-955. https://doi.org/10.1111/j.1467-6486.2006.00616.x

Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. Organization Science, 13(3), 339-351. https://doi.org/10.1287/orsc.13.3.339.2780

Appendix 1 - PEIEX Program Extension in Brazil – 2023

	Northern Region	
State	***City***	***Executing Entity***
AP	Macapá	PCT-GUAMÁ
PA	Belém	PCT-GUAMÁ
TO	Palmas, Araguaína e Gurupi	FAPTO
	Northeast Region	
State	***City***	***Executing Entity***
AL	Maceió	SENAC-PE
BA	Salvador, Feira de Santana, Vitória da Conquista, Ilhéus, Luis Eduardo Magalhães	IEL/ Bahia
CE	Fortaleza	FIEC
PB	João Pessoa	FAPESQ
PE	Recife	SENAC-PE
RN	Natal	UNIPOTIGUAR
SE	Aracajú	IEL/BAHIA
	Southeast Region	
State	***City***	***Executing Entity***
ES	Vitória	FINDES
	Linhares	FINDES
MG	Belo Horizonte e Juiz de Fora, Uberlândia, Varginha	FIEMG, UNIS
RJ	Rio de Janeiro	PUC RJ
SP	Campinas, São Paulo, Ribeirão Preto	FACAMP, FECAP, Supera Parque
	Central-West Region	
State	***City***	***Executing Entity***
MS	Campo Grande e Dourados	UCDB
MT	Cuiabá	UNISELVA
	Southern Region	
State	***City***	***Executing Entity***
PR	Curitiba, Cascavel, Londrina, Maringá	Fundação Araucária, UNIOESTE, UNICESUMAR
RS	Porto Alegre, Caxias do Sul	UNISINOS, MICROEMPA
SC	Blumenau, Florianópolis,	FURB, INAITEC, UNIVALI,

	Itajaí, Joinville, Criciúma, Chapecó, São Miguel do Oeste, Joaçaba	UNESC, UNOESC

Source: from Apexbrasil (2023)

Appendix 2. PEIEX methodology topics

Topics	
1. Tax classification	15. Customs clearance
2. Market prospecting	16. Mandatory procedures and documents
3. Market selection criteria	17. International contracts
4. Trade agreements and their benefits	18.Risks and guarantees in international operations
5. How to be found by international clients and how to find them	19. Receiving remittance from abroad
6. Negotiation and relationship with international clients	20. Exchange operations
7. Product and packaging suitability	21. Export financing
8. International registration of trademarks and patents	22. Trade promotion events
9. International distribution	23. Introduction to Indirect Export
10. INCOTERMS	24. How to work with indirect export
11. International shipping and insurance	25. Responsibility of the parties in indirect export
12. Tax incentives	26. Indirect export marketing
13. Special customs regimes	27. Indirect export - operational aspects I
14. Price formation	28. Indirect export - operational aspects II

Source: Based on Apexbrasil (2023) and contact with program technicians

4 THIRD ARTICLE: Educating for Sustainable Global Entrepreneurship: Assessing Entrepreneurial Intentions, Global Competence, and Sustainability in Emerging Professionals

Ramón Andrés Ortiz-Rojo

Adonai José Lacruz

Abstract

This study investigates how educational environments shape emerging professionals' readiness for sustainable global entrepreneurship by examining the direct and indirect relationships among entrepreneurial intentions, global competence, and sustainability dimensions. Specifically, it explores how undergraduate students' entrepreneurial intentions influence economic, social, and environmental sustainability, as well as the dimensions of global competence—self-awareness, intercultural communication, and global knowledge—while accounting for the moderating role of geopolitical context. Using partial least squares structural equation modelling (PLS-SEM), the analysis reveals that entrepreneurial intention exerts a direct positive effect on all three sustainability dimensions and on all facets of global competence. Moreover, the findings highlight two key indirect effects: a positive effect of entrepreneurial intention on the social dimension of sustainability through students' intercultural communication dimension of global competence, and a positive effect of entrepreneurial intention of future professionals on the environmental dimension of sustainability through students' self-awareness dimension of global competence. These results underscore the importance of integrating global competence development into entrepreneurship education, suggesting that pedagogical strategies such as intercultural virtual exchange can enhance students' preparedness for sustainable entrepreneurial practice. By bridging entrepreneurial mindset, global awareness, and sustainability values, this study contributes to both theoretical discourse and practical approaches in educating future professionals for the challenges of global entrepreneurship.

Keywords: Entrepreneurial intentions, Sustainability, Global competence, Sustainable Global Entrepreneurship, Higher Education Institutions.

1. Introduction

Today, sustainability stands as one of the foremost global concerns (Kennedy et al., 2024), making it crucial to understand how future professionals are equipped to address this issue. More specifically, it is necessary to understand how the entrepreneurial intention (EI) of future professionals and their Global Competences (GC) can contribute to the sustainability of the planet.

The global concern over sustainability is further emphasized when examining the progress report of the Sustainable Development Goals (SDG) established by the United Nations (UN) (UNDP, 2024). In such report, it is stated that just 17% of the SDG targets are on track. In light of this, entrepreneurship could play a pivotal role as a facilitator or driver for development and economic growth, given its potential for creating new jobs, fostering innovation and empowering companies to be more competitive (Naudé, 2008; Block et al., 2017; Barba-Sanchez et al., 2022; Maheshwari et al., 2023).

Among researchers, there is an increase interest in studying the EI of undergraduate students (e.g., Liñan et al., 2011; Jena, 2020). These EI are regarded as a state of consciousness that precedes actions, directing the attention towards a goal, such as starting a business (Moriano et al., 2012). In that regard, according to Maheshwari et al. (2023), most of the studies addressing the EI of students have relied on the human behaviour predictive power of the Theory of Planned Behaviour (TPB) (Ajzen, 1991). Intentions are considered the best predictor of a given behaviour (Liñan et al., 2011; Fini et al., 2009).

Authors have addressed EI within the context of students' EI in universities. Mostly with a focus on the important role of entrepreneurial education (Liñan et al., 2011; Zhang et al., 2014; Zhang et al., 2015; Jena, 2020; Boubker et al., 2021; Cui & Bell, 2022; Almeida et al., 2026). Also, in some cases, adding cultural aspects (Moriano et al., 2012), the area of studies (Nguyen et al., 2021) and entrepreneurial capacity (Do Nguyen & Nguyen, 2023) to the analysis.

A growing interest in studying the environmental aspect (Barba-Sanchez et al., 2022), a sustainable entrepreneurship (Belz & Binder, 2017), and the Sustainable Entrepreneurial Intentions (SEI) (Lopes et al., 2023) is perceived and has been incorporated into research on students' EI. However, when it comes to analysing EI, sustainability and GC, to the best of our knowledge, there is a lack of studies addressing these concepts together. Moreover, a lack of studies is even more evident when it comes to the possible indirect effects through GC dimensions in the relationship between EI and the dimensions of sustainability concept, that is, its economic, social and environmental aspects (Elkington, 1998). We believe GC is an important aspect to be addressed when it comes to EI and sustainability, since GC of individuals (new professionals) could make them think and take responsible actions toward sustainability and collective well-being (OECD, 2018), which could be enacted locally (Ortiz-Rojo et al., 2025; Jooste and Heleta, 2016) through their EI.

Additionally, we argue that the effect of GC on the dimensions of sustainability could be moderated by geopolitical aspects. Specifically, we argue that GC varies depending on the region where a given person lives (Dados & Connell, 2012). This is because the GC mindset of a person, is influenced by the environment in different ways (Dogan et al., 2021; Pain et al., 2010; de Paulo & de Andrade, 2022; Steyaert & Katz, 2004), making the effect of GC on sustainability' dimensions, stronger or weaker.

So as to address a global concern like sustainability, from the perspective of the ones who will play a key role in society in the future, a global approach such as GC should be used. Thus, in this study, we seek to contribute not only by incorporating the sustainable and geopolitical aspects to the discussion, but also, in the case of sustainability, the concept as a whole and understood as Triple Bottom Line (TBL) in the literature (Elkington, 1998).

TBL covers the economic, social and environmental aspects of sustainability (Purvis et al., 2019) and in this study is aimed to analyse the direct and indirect effects in the relationship between EI, GC and these three dimensions of sustainability and the moderated (by a geopolitical aspect) effect in the relationship between the dimensions of GC and sustainability dimensions. To this end, we applied the Structural Equation Modelling technique to analyse data obtained from undergraduate students. Results of this study contribute empirically to the field of EI demonstrating direct and indirect effects of EI on GC and on sustainability dimensions. Additionally, we included the moderating role of the geopolitical aspect of geographic location when analysing the effect of GC into sustainability dimensions. With these contributions we pave the way for a broader discussion including scholars and police makers about a Sustainable Global Entrepreneurship including new professionals' EI, their GC and sustainability.

2. Literature review and hypothesis formulation

2.1 Entrepreneurial Intention and Sustainability

Entrepreneurship is seen as a driver of economic growth and development, it has the potential to create jobs, foster innovation and enable companies to be competitive (Naudé, 2008; Block et al., 2017; Maheshwari et al., 2023). Additionally, entrepreneurship can be observed in several areas of study (Naudé, 2008), and within its scope, it is also defined in different ways. Ratten (2023) reports 34 types of entrepreneurships, including: International Entrepreneurship; Digital Entrepreneurship; Creative Entrepreneurship; Entrepreneurship in Education and Social Entrepreneurship.

In this context, EI as an area of studies has attracted the attention of researchers and being understood as a significant predictor of the action of becoming an entrepreneur (e.g., Zhang et al., 2014). There is also a consensus that when it comes to investigating EI, the TPB is the most used (Maheshwari et al., 2023). The EI would be related to a state of consciousness that precedes an action and directs attention to a goal such as starting a business (Moriano et al., 2012). In this sense, the TPB has shown that it can predict and explain human behaviour in specific contexts considering the attitude towards behaviour, the perceived behavioural control and the social norms (Ajzen, 1991).

Several authors have contributed to the field of EI studies. Liñan et al. (2011), using factorial regression, highlighted the important role that education should play in encouraging EI among undergraduate students. Zhang et al. (2014), using the Tobit regression technique, reinforced the importance of entrepreneurial education in fostering EI in universities. Zhang et al. (2015), using the structural equation technique, concluded that, unlike many studies using the TPB, there was no significant effect of students' entrepreneurial attitude on their EI.

By incorporating the mediating effect of students' entrepreneurial capacity into the model, Do Nguyen and Nguyen (2023) reinforce what the literature presents regarding the relevance of entrepreneurial education as a promoter of EI among students. Boubker et al. (2021) states that there is a statistically significant relationship between management student's entrepreneurship education, attitude towards entrepreneurship and EI.

Jena (2020), in addition to analysing the relationship of the TPB constructs, also incorporates the entrepreneurial environment variable and the control variables gender and family experience with entrepreneurship. In the latter, it shows a significant effect on the relationship between attitude, education and EI.

Authors have addressed the theme of EI in university contexts generally associated with the role of the university in fostering entrepreneurial education that can be reflected in students' EI. Some inclusions have been made by authors to analyse cultural aspects in students' EI (Moriano et al., 2012), mediating (Do Nguyen & Nguyen, 2023) or moderating effects (Nguyen et al., 2021), within the same scenario, that is, students' EI in the university context.

When entrepreneurship and sustainability are coupled, literature has shown that authors often approach these themes primarily from an environmental perspective (Schaltegger & Wagner, 2011). For example, Barba-Sánchez et al. (2022) conducted a study whose results indicated that when the environment influences students' attitudes, there is an indirect effect on their entrepreneurial intention. In this study, sustainability is framed through the TBL (Elkington, 1998), which encompasses the economic dimensions – which considers the company performance projection; the social dimension– considering opportunities and conditions the company will offer-, and the environmental dimensions – considering ecological behaviours (Sabino, et al., 2024).

There is an emergence interest in studying sustainable entrepreneurship (Belz & Binder, 2017), as well as, and more specifically, SEI (Lopes et al., 2023). The study of Lopes et al.

(2023), using the TPB and drawing on sustainability-oriented entrepreneurial intentions, proposed to add the risk-taking propensity, perceived creativity, and proactive personality determinants that can be antecedents to the constructs of TPB. Romero-Colmenares and Reyes-Rodriguez (2022) found that SEI were influenced by TPB dimensions and positively influenced by the altruistic values of individuals, the education for sustainable entrepreneurship and the belief that individuals had of themselves to achieve goals.

Truong et al. (2022) analysed the dimensions of the TPB, along with the roles of education and family support. The latter two factors were found to contribute significantly to attitudes toward sustainable entrepreneurship. Vuorio and Fellnhofer (2017) examined the drivers of entrepreneurial intentions in sustainable entrepreneurship, concluding that attitudes toward sustainability are positively influenced by altruism, while perceived entrepreneurial desirability is driven by both intrinsic and extrinsic rewards. From this review emerge our first hypotheses:

Direct effects of EI on the dimensions of sustainability:

H1a: the entrepreneurial intention of future professionals has a positive effect on the economic dimension of sustainability.

H1b: the entrepreneurial intention of future professionals has a positive effect on the social dimension of sustainability.

H1c: The entrepreneurial intention of future professionals has a positive effect on the environmental dimension of sustainability.

2.2 Global Competence

New professionals who face the challenges influenced by the global context must be both aware of and equipped with the necessary GC for their development in such an environment. One of these challenges is sustainability, which encompasses the economic, social and environmental aspects of the concept (Elkington, 1998).

Regarding the agenda established by the UN with 17 SDG, according to The Sustainable Development Goals Report 2024, only 17% of the SDG targets are on track. Besides, nearly half are showing minimal or moderate progress, and progress on over one third has stalled or even regressed (United Nations, 2024). Therefore, the role that future professionals will play in this global scenario is crucial.

Global Competence is defined as “a multidimensional capacity. Globally competent individuals can examine local, global and intercultural issues, understand and appreciate different perspectives and world views, interact successfully and respectfully with others, and take responsible action toward sustainability and collective well-being" (OECD, 2018. p. 4).

In GC studies, there is an overlap in meaning between GC and other terms such as intercultural competence, global perspective, global awareness, and global citizenship, indicating that a unified definition of GC is still under development (Jiaxin et al., 2024). Indeed, another definition for GC and perhaps closer to university environment than OECD's one, is Morais and Ogden (2011), who state within a model for measuring global citizenship, that GC is related to having an open mind and actively seeking to understand others in terms of their cultural norms and expectations, and along with this leveraging this knowledge to interact, communicate and work effectively outside one's own environment.

Viewing GC as global citizenship, authors consider it as a utopia and think that what is needed is to foster local actions towards global citizenship for higher education institutions (HEI) to contribute more globally (Ortiz-Rojo et al., 2025). In the same line, Jooste and Heleta (2016) state that higher education, in promoting global citizenship do not offer anything new because they continue to incentive social responsibility, and good critical thinking skills, alongside with knowledge, awareness, and care for global issues.

The promotion of GC in HEI has been associated with actions linked to the internationalisation processes of universities, including academic mobility initiatives (Massaro, 2022; Ortiz-Rojo & Finardi, 2022; Ortiz-Rojo & Lacruz, In Press), internationalisation at home programmes (Ortiz-Rojo & Finardi, 2022; Ortiz-Rojo & Lacruz, In Press), providing international courses and employing professors with international experiences (Jiaxin et al., 2024).

When it comes to analysing GC and EI, to the best of our knowledge, there is a lack of studies addressing both concepts together, even more when thinking about a possible indirect effect of GC in the relationship between EI and sustainability. Zhang et al (2022) understanding GC as academic mobility (Ortiz-Rojo & Finardi, 2022; Ortiz-Rojo & Lacruz, In Press), concluded that entrepreneurship education, government support, and global competence can significantly influence entrepreneurial behaviour of international students indirectly through the serial double mediating effect. Authors have also found that in the case of mandatory study abroad programmes, students can seek their global citizenship identities (Kishino & Takahashi, 2019).

We then argued that, given sustainability is a global concern and considering the role that future professionals will play in this context, it requires a global approach to be analysed.

Thus, the following hypothesis with the three dimensions of GC (Self-awareness, Intercultural communication and Global knowledge) are formulated:

Direct effects of EI on GC dimensions:

H2a: the entrepreneurial intention of future professionals has a positive effect on the self-awareness dimension of global competence.

H2b: the entrepreneurial intention of future professionals has a positive effect on the intercultural communication dimension of global competence.

H2c: the entrepreneurial intention of future professionals has a positive effect on the global knowledge dimension of global competence.

Indirect effects of EI on the economic dimension of sustainability through GC dimensions:

H3a: there is an indirect effect of entrepreneurial intentions of future professionals through students' self-awareness on the economic dimension of sustainability.

H3b: there is an indirect effect of entrepreneurial intentions of future professionals through students' intercultural communication on the economic dimension of sustainability.

H3c: there is an indirect effect of entrepreneurial intentions of future professionals through students' global knowledge on the economic dimension of sustainability.

Indirect effects of EI on the social dimension of sustainability through GC dimensions:

H4a: there is an indirect effect of entrepreneurial intention of future professionals through students' self-awareness on the social dimension of sustainability.

H4b: there is an indirect effect of entrepreneurial intention of future professionals through students' intercultural communication on the social dimension of sustainability.

H4c: there is an indirect effect of entrepreneurial intention of future professionals through students' global knowledge on the social dimension of sustainability.

Indirect effects of EI on the environmental dimension of sustainability through GC dimensions:

H5a: there is an indirect effect of entrepreneurial intention of future professionals through students' self-awareness on the environmental dimension of sustainability.

H5b: there is an indirect effect of entrepreneurial intention of future professionals through students' intercultural communication on the environmental dimension of sustainability.

H5c: there is an indirect effect of entrepreneurial intention of future professionals through students' global knowledge on the environmental dimension of sustainability.

2.3 Moderating effect of geopolitical aspects

Geopolitics is a complex and multifaceted concept that has evolved over time in response to historical changes. It encompasses issues related to territory, power, peace, resource exploitation, and other factors that affect nations and their inhabitants (Flint, 2021). Geopolitics also involves the divisions and impacts between regions of the world, whether positive or negative.

One concept that may help to identify some of these divisions is the Global North and Global South (Dados & Connell, 2012). The Global North refers to regions such as Europe and North America (the United States and Canada), while the Global South encompasses low-income and marginalized regions—politically or culturally—such as Latin America, Asia, Africa, and the Middle East (Dados & Connell, 2012). One area of study where the Global North/South concept has been applied is education, where differences among countries have also been analysed (Ortiz-Rojo et al., 2025).

It is out of the scope of this study to address all the complexity of a wide concept such as geopolitics, but rather to look at aspects like differences among regions when it comes to economic issues (Dogan et al., 2021), peoples' feelings regarding embedded aspects within geopolitics, as terrorism (Pain et al., 2010), hunger in less favoured countries (de Paulo & de Andrade, 2022), and about how geopolitics could affect also entrepreneurship (Steyaert & Katz, 2004).

Thus, in this research, the geopolitics concept is understood in terms of the location where a given person— in our study, students— lives, which has the potential to influence how they perceive the world and, in turn, affect their GC. One way to identify this geopolitical influence is through the widely used Human Development Index (HDI), which is a common measure of human development (UNDP, 2024).

In few words, the location where a student lives can influence the way this student understands and faces, in our study, sustainability. Bearing this in mind, the following hypothesis are established.

Moderating effect of geopolitical location on the relationship between GC dimensions and the economic dimension of sustainability:

H6a: the effect of students' self-awareness on the economic dimension of sustainability is moderated by the students' geopolitical location.

H6b: the effect of students' intercultural communication on the economic dimension of sustainability is moderated by the students' geopolitical location.

H6c: the effect of students' global knowledge on the economic dimension of sustainability is moderated by the students' geopolitical location.

Moderating effect of geopolitical location on the relationship between GC dimensions and the social dimension of sustainability:

H7a: the effect of students' self-awareness on the social dimension of sustainability is moderated by the students' geopolitical location.

H7b: the effect of students' intercultural communication on the social dimension of sustainability is moderated by the students' geopolitical location.

H7c: the effect of students' global knowledge on the social dimension of sustainability is moderated by the students' geopolitical location.

Moderating effect of geopolitical location on the relationship between GC dimensions and the environmental dimension of sustainability:

H8a: the effect of students' self-awareness on the environmental dimension of sustainability is moderated by the students' geopolitical location.

H8b: the effect of students' intercultural communication on the environmental dimension of sustainability is moderated by the students' geopolitical location.

H8c: the effect of students' global knowledge on the environmental dimension of sustainability is moderated by the students' geopolitical location.

3. Materials and methodology

In order to analyse the relationship between EI, the 3 dimensions of sustainability and GC dimensions we apply the Partial Least Squares Structural Equation Modelling technique (Hair et al., 2021) and process the data in the R software.

3.1 Data collection and sample

A survey using a 5-point Likert scale was conducted in November and December 2024 with undergraduate students in Brazil. The final sample consisted of 328 valid responses out of a total of 671 questionnaires received. Invalid responses included incomplete questionnaires, those missing the attention control question, and those that were not from undergraduate students.

The minimum sample size, considering 7 latent variables, 32 manifest variables (i.e., items), significance level of 0.05, statistical power of 0.8 and effect size of 0.15 - considered medium, by Cohen grading (1988) – was estimated at 170 observations, using the online application Free Statistics Calculators (Soper, 2023). Thus, the sample size meets the estimated minimum sample: 328 > minimum sample: 170.

In order to minimize possible effects of primacy and recency, the order of the questions was randomized (Gershberg & Shimamura, 1994). As well as, for assessing any possible common variance bias resulting from the application of the same online self-administered questionnaire (Chang, Witteloostuij & Eden, 2010), the one-factor Harman test was applied in Jamovi software.

Additionally, the questionnaire was pre-tested with 12 respondents (i.e., 7% of the estimated minimum sample) to identify possible inaccuracies. There was just 1 observation regarded to a specific word in a question from the Intercultural Communication dimension of GC (IC2). Then, an adjustment was made, and the 12 responses of the pre-test participants were delated. Also, to verify the respondent's attention while the questionnaire was answered, the option with the number 3 was asked to be selected in between of the 2 first blocks of questions. Table 1 presents some features of the sample.

Table 1. Sample of the study

Description		Frequency	Relative frequency
Age	Less than 24	155	47%
	Between 24 and 29	68	21%
	Between 30 and 35	41	13%
	Between 36 and 41	26	8%
	Between 42 and 47	21	6%
	Between 48 and 53	9	3%
	54 and above	8	2%
Gender	Male	178	54%
	Female	148	45%
	Prefer not to answer	2	< 1%
Geopolitical location (Brazilian states)	Bahia	8	2%
	Ceará	3	< 1%
	Espírito Santo	237	72%
	Goiás	19	6%
	Mato Grosso do Sul	9	3%
	Minas Gerais	38	12%
	Pará	1	< 1%
	Pernambuco	3	< 1%
	São Paulo	10	3%

Previous entrepreneurship studies	Yes	128	39%
	No	200	61%

Source: authors

3.2 Scales and Data analysis

To build our model we used the following validated scales: for EI (Jena, 2020), for economic sustainability, social sustainability and environmental sustainability (Sabino et al., 2024), for GC dimensions (Morais & Ogden, 2011) and for evaluating the moderating effect of geopolitical aspect (geographical location) in the relationship between GC dimensions and the 3 dimensions of sustainability, we used the HDI, which measures a country's health, education and standard of living (UNDP, 2024).

Structural equation modelling technique was applied to estimate path coefficients for the proposed relationships in the model. Regarding the indirect effects on economic sustainability, social sustainability and environmental sustainability, we applied bootstrapping method. To evaluate the moderating effects of geopolitical location, we used the HDI index of each Brazilian state obtained in the Instituto Brasileiro de Geografia e Estatística' website (IBGE, 2024) as a continuous variable.

It is important to note that in order to enhance model clarity, mitigate potential multicollinearity issues, and accurately capture both direct and indirect effects among the dimensions (Kline, 2023), we chose to evaluate the constructs' dimensions separately.

Table 2 presents the research model of this study. Figures 1, 2 and 3 show the proposed theoretical model relation.

Table 2. Research model

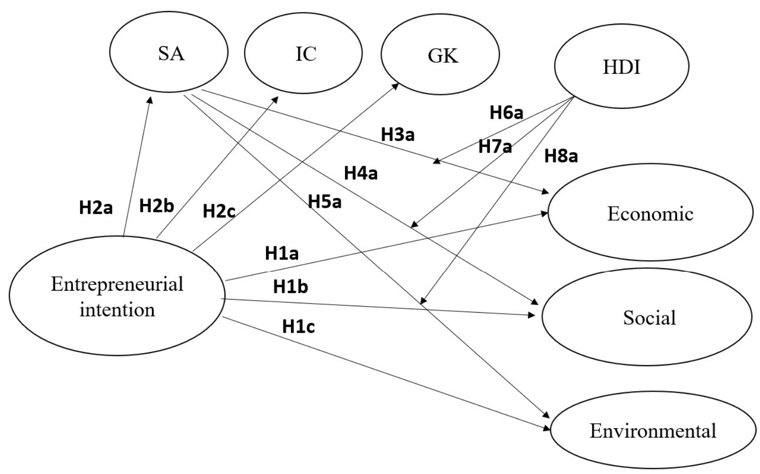
Constructs	Index number	Scale	Source
Entrepreneurial intention (Reflective)	7	Likert (5 points)	Jena (2020)
Self-awareness (Reflective)	3	Likert (5 points)	Morais and Ogden (2011)
Intercultural communication (Reflective)	3	Likert (5 points)	
Global Knowledge (Reflective)	3	Likert (5 points)	
Economic sustainability (Reflective)	5	Likert (5 points)	Sabino et al. (2024)
Social sustainability (Reflective)	5	Likert (5 points)	
Environmental sustainability (Reflective)	5	Likert (5 points)	
Gender	1	Dummy	-

(One single item– Control)			
Previous entrepreneurship knowledge (Single item– Control)	1	Dummy	-
Age (age group item – Control)	3	Dummy	-
International entrepreneurial desire (5 points)	1	Ordinal	-
Geopolitical location (HDI Brazilian states)	1	Continuous	IBGE (2024)

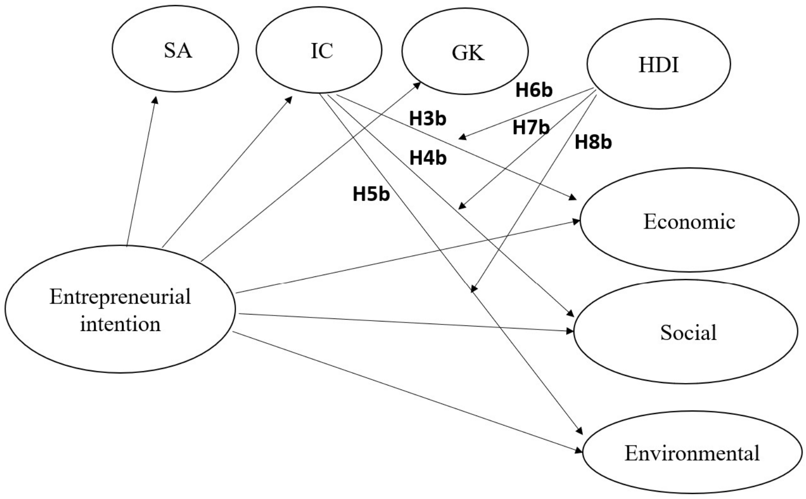
Source: authors

The research model is presented in Figure 1 (for greater clarity, the model has been divided into three parts A, B and C). Figure 1. Model with direct, moderator effects and indirect effects through SA dimension.

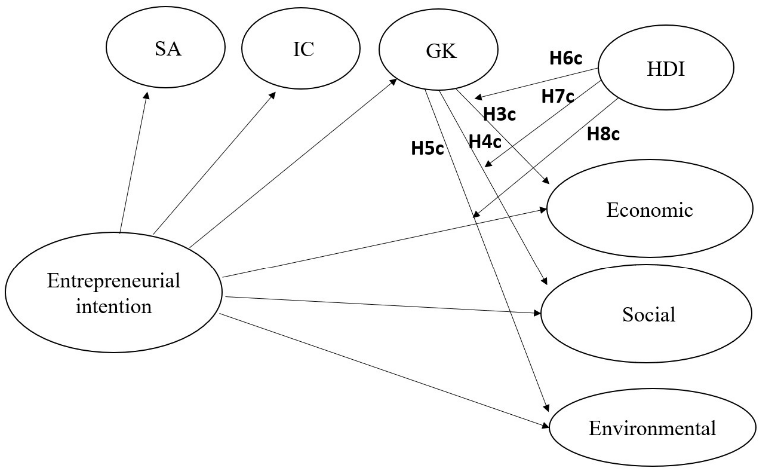
Part A of the research model



Part B of the research model



Part C of the research model



Source: authors

4. Results and discussion

Firstly, through Harman's single-factor test, the result for the total variance extracted by one factor was 0.27%, which is less than 0.50%, indicating that common method bias was discarded. Additionally, it is important to highlight that the presence of outliers in the data was effectively ruled out using Cook's distance (D < 1).

4.1 Measurement model

In this exploratory study, the research model is composing of reflective constructs. Therefore, the reliability of indicators, the reliability of internal consistency, and the convergent and discriminant validity were assessed (Hair et al., 2021). Following what's recommended by the literature, the Cronbach's Alpha and Dillon-Goldstein's Rho were validated. Recommended Cronbach's Alpha values in exploratory research should be above 0.60 (Hair et al., 2019). For Rho reliability values between 0.60 and 0.70 are considered acceptable in exploratory research, and values between 0.70 and 0.90 range from satisfactory to good (Hair et al., 2021; Sanchez, 2013). Regarding the eigenvalue analysis, the first eigenvalues are much larger than 1 and greater than the second eigenvalue, which is taken as evidence of a unidimensional block of indicators (Sanchez, 2013). Convergent validity was validated observing the Average Variance Extracted (AVE), where values at least of 0.50 are expected for validation. As for discriminant validity, Fornell Larcker criterion – where the shared variance between all model constructs should not be larger than their AVEs (Hair et al., 2021) and cross loading criterion – where the indicator loading should be higher in its construct compared to others - were used. Discriminant validity was confirmed in both procedures.

Nonetheless, it must be informed that during the validation procedure of the indicator's reliability, it was observed just one loading bellow the recommended value by Hair et al. (2021), that is 0.40. Specifically in the social sustainability construct (SOCS5). Therefore, we eliminated this indicator from the construct and processed the model again, confirming after eliminating it, better results in the internal consistency of the SOCS construct. Table 3 presents the measurement model validation and Table 4 presents Fornell Larcker criterion values for discriminant validation among constructs.

Table 3. Measurement model validation

Constructs	Internal consistency reliability			Convergent validity
	Cronbach's alpha	Dillon-Goldstein's Rho	1st and 2nd eigenvalues	AVE
Entrepreneurial Intention (EI)	0.871	0.902	4.02 - 1.19	0.573
Self-Awareness (SA)	0.700	0.834	1.88 - 0.68	0.627

Intercultural Communication (IC)	0.637	0.805	1.74 - 0.73	0.579
Global Knowledge (GK)	0.634	0.804	1.74 – 0.71	0.575
Economic Sustainability (ECS)	0.887	0.917	3.45 – 0.52	0.690
Environmental Sustainability (ENS)	0.884	0.913	3.43 – 0.88	0.677
Social Sustainability (SOCS)	0.871	0.912	2.89 – 0.61	0.723

Note: n= 328.
Source: authors

Table 4. Fornell Larcker (discriminant validation)

	ECS	EI	ENS	GK	IC	SA	SOCS
ECS	0.831						
EI	0.478	0.757					
ENS	0.380	0.213	0.823				
GK	0.198	0.176	0.326	0.758			
IC	0.180	0.246	0.155	0.404	0.761		
SA	0.208	0.246	0.443	0.627	0.338	0.792	
SOCS	0.551	0.480	0.344	0.153	0.260	0.157	0.850

The elements on the diagonal (bold) represent the square root of the variance shared between the constructs and their measures (AVE). The values below the diagonal are the correlations between the constructs.
Source: authors

4.2 Structural model

Regarding control variables, the following were included in the structural model: Age (3 dummy by range of age), gender (dummy), previous studies on entrepreneurship (dummy) and the desire to be an international or local entrepreneur (ordinal). Before evaluating structural relations in the model, collinearity was examined using latent variables scores to calculate the Variance Inflation Factor (VIF). No problems of collinearity were observed since all VIF values were lower than 5 (Hair et al., 2019).

As for the explanatory capacity of the model, the R2 explains the variation in endogenous variables caused by exogenous variables in the model. The R2 ranges from 0 to 1, where according to Cohen (1988), values are considered substantial (0.26), moderated (0.13) and weak (0.02). Additionally, it is important to consider the context of the research, because a low value such as 0.10, could be considered satisfactory in some areas (Hair et al., 2019). In our study, the coefficients of determination indicated the variation explained by each construct as follows: ECS explains 26.5% (R2=0.265), ENS explains 26.8% (R2=0.268), SOCS explains 31.7% (R2=0.317), GK explains 3.1% (R2=0.031), IC explains 6.1% (R2=0.061) and SA explains 6% (R2=0.060).

The significance and relevance of the path coefficients were also evaluated by carrying out a bootstrapping procedure with 5.000 subsamples to obtain more accurate estimates. Some of the significant positive relationships observed in the model were: between EI and economic sustainability (path coefficient 0.460; p-value < 0.000), environmental sustainability (path coefficient 0.145; p-value < 0.006) and social sustainability (path coefficient 0.447; p-value < 0.000). The same significant positive relationship was evidenced in the relationship between EI and SA (path coefficient 0.246; p-value < 0.000), IC (path coefficient 0.246; p-value < 0.000) and GK (path coefficient 0.176; p-value < 0.006). Table 5 presents all the coefficients and p-value of the structural model.

Table 5. Structural model validation

Relationships	Path
To operate internationally -> ECS	0.062
To operate internationally -> ENS	0.032
To operate internationally -> SOCS	0.025
Dummy female=1 -> ECS	0.203
Dummy female=1 -> ENS	0.373*
Dummy female=1 -> SOCS	0.088
Dummy-range 2 and 3=1- opposite=0 -> ECS	-0.052
Dummy-range 2 and 3=1- opposite=0 -> ENS	-0.021
Dummy- range 2 and 3=1- opposite=0 -> SOCS	-0.312*
Dummy- range 4 and 5=1 - opposite =0 -> ECS	0.058
Dummy- range 4 and 5=1 - opposite =0 -> ENS	0.269
Dummy- range 4 and 5=1 - opposite =0 -> SOCS	-0.478*
Dummy- range 6 and 7=1 - opposite =0 -> ECS	-0.089
Dummy- range 6 and 7=1 - opposite =0 -> ENS	-0.028
Dummy- range 6 and 7=1 - opposite =0 -> SOCS	-0.767*
EI -> ECS	0.460*
EI -> ENS	0.145*
EI -> GK	0.176*
EI -> IC	0.246*
EI -> SA	0.2468
EI -> SOCS	0.447*
State -> ECS	-0.050
State -> ENS	0.059
State -> SOCS	-0.073
GK -> ECS	0.103
GK -> ENS	0.128
GK -> SOCS	0.061
IC -> ECS	0.038
IC -> ENS	-0.013
IC -> SOCS	0.129*
Previous_entrepreneurship_DUMMY_Yes=1 -> ECS	0.094
Previous_entrepreneurship_DUMMY_Yes=1 -> ENS	-0.169

Previous_entrepreneurship_DUMMY_Yes=1 -> SOCS	0.108
SA -> ECS	0.003
SA -> ENS	0.306*
SA -> SOCS	0.023
State x IC -> ECS	-0.001
State x IC -> ENS	-0.036
State x IC -> SOCS	0.083
State x GK -> ECS	0.101
State x GK -> ENS	-0.004
State x GK -> SOCS	0.012
State x SA -> ECS	-0.045
State x SA -> ENS	0.004
State x SA -> SOCS	-0.023
Specific indirect effects	
EI -> IC -> ECS	0.009
EI -> SA -> ENS	0.075*
EI -> GK -> ECS	0.018
EI -> IC -> ENS	-0,003
EI -> GK -> ENS	0.023
EI -> SA -> SOCS	0.006
EI -> IC -> SOCS	0.032*
EI -> GK -> SOCS	0.011
EI -> SA -> ECS	0.001

* Significant at the 0.05 level
Source: authors

4.3 Discussion

This study aimed to analyse the relationship between future professionals' EI, the dimensions of sustainability (economic, social and environmental), and GC dimensions (self-awareness, intercultural communication and global knowledge). Also, it was analysed the moderating effect of the geopolitical location in the relationship between GC and sustainability. We theorized that the EI of future professionals has a positive effect on the three dimensions of sustainability. Likewise, that the EI of future professionals has a positive effect on the three dimensions of GC. Additionally, that there are indirect effects of EI of future professionals on the three dimensions of sustainability through student's GC and, the effects of GC dimensions on sustainability dimensions could be moderated by a geopolitical aspect. The later, because GC could vary depending on the region where the students live.

Considering that theorisation and the hypothesis established in this study, we decided to address the global concern of sustainability from the perspective of the ones who will play a key role in society in the short future. To continue with the discussion, Table 6 presents the hypothesis of this study and whether they were supported.

Table 6. Hypothesis of the study

Hypothesis	Supported
H1a: the entrepreneurial intention of future professionals has a positive effect on the economic dimension of sustainability	Yes
H1b: the entrepreneurial intention of future professionals has a positive effect on the social dimension of sustainability	Yes
H1c: The entrepreneurial intention of future professionals has a positive effect on the environmental dimension of sustainability	Yes
H2a: the entrepreneurial intention of future professionals has a positive effect on the self-awareness dimension of global competence	Yes
H2b: the entrepreneurial intention of future professionals has a positive effect on the intercultural communication dimension of global competence	Yes
H2c: the entrepreneurial intention of future professionals has a positive effect on the global knowledge dimension of global competence	Yes
H3a: there is an indirect effect of entrepreneurial intentions of future professionals through students' self-awareness on the economic dimension of sustainability	No
H3b: there is an indirect effect of entrepreneurial intentions of future professionals through students' intercultural communication on the economic dimension of sustainability	No
H3c: there is an indirect effect of entrepreneurial intentions of future professionals through students' global knowledge on the economic dimension of sustainability	No
H4a: there is an indirect effect of entrepreneurial intention of future professionals through students' self-awareness on the social dimension of sustainability	No
H4b: there is an indirect effect of entrepreneurial intention of future professionals through students' intercultural communication on the social dimension of sustainability	Yes
H4c: there is an indirect effect of entrepreneurial intention of future professionals through students' global knowledge on the social dimension of sustainability	No
H5a: there is an indirect effect of entrepreneurial intention of future professionals through students' self-awareness on the environmental dimension of sustainability	Yes
H5b: there is an indirect effect of entrepreneurial intention of future professionals through students' intercultural communication on the environmental dimension of sustainability	No
H5c: there is an indirect effect of entrepreneurial intention of future professionals through students' global knowledge on the environmental dimension of sustainability	No
H6a: the effect of students' self-awareness on the economic dimension of sustainability is moderated by the students' geopolitical location	No
H6b: the effect of students' intercultural communication on the economic dimension of sustainability is moderated by the students' geopolitical location	No
H6c: the effect of students' global knowledge on the economic dimension of sustainability is moderated by the students' geopolitical location	No
H7a: the effect of students' self-awareness on the social dimension of sustainability is moderated by the students' geopolitical location	No
H7b: the effect of students' intercultural communication on the social dimension of sustainability is moderated by the students' geopolitical location	No
H7c: the effect of students' global knowledge on the social dimension of sustainability is moderated by the students' geopolitical location	No
H8a: the effect of students' self-awareness on the environmental dimension of sustainability is moderated by the students' geopolitical location	No
H8b: the effect of students' intercultural communication on the environmental dimension of sustainability is moderated by the students' geopolitical location	No
H8c: the effect of students' global knowledge on the environmental dimension of sustainability is moderated by the students' geopolitical location	No

Source: authors

All the hypothesis considering direct effects of EI on both, the dimensions of sustainability and the dimensions of GC were supported. Regarding hypothesis considering indirect effects, H4b and H5a were supported. As for moderator hypothesis, none of them was supported.

In this study, it was possible to confirm the important role played by students' EI to potentially contribute to sustainability and to the GC of these new professionals. This is consistent with other studies that highlight the role of HEI in entrepreneurship and fostering EI among students (Liñan et al., 2011; Zhang et al., 2014; Cui & Bell, 2022; Almeida et al., 2026) and with the TPB itself (Ajzen, 1991). In our sample, the EI of future professionals positively affected the GC of those who see the world in a given way and then also positively affected the three aspects of the global concern of sustainability.

Therefore, it can be expected that these future professionals, through their EI, might contribute to sustainability, either by starting their own businesses (Moriano et al., 2012) or through their roles within existing companies (Naudé, 2008; Block et al., 2017). Regarding their GC, it can be expected that the EI of these future professionals could influence the formation of GC when absence or the reinforcement of them.

From the results, we can also understand that there is an indirect effect of EI through GC on two of the dimensions of sustainability, that is, social and environmental dimensions. Specifically, these indirect effects were observed through the intercultural communication dimension of GC (H4b) and self-awareness dimension (H5a) respectively, reinforcing the importance of actions in universities fostering aspects like intercultural communication and global issues.

One possibility for achieving this is by incorporating global topics and intercultural virtual exchange activities in courses curricula (Ortiz-Rojo & Finardi, 2022; Ortiz-Rojo & Lacruz, In press), particularly in relation to students' EI. This inclusion can contribute not only to the intercultural communication aspect, but also to students' self-awareness and global knowledge, enhancing their ability to address sustainability challenges (Massaro, 2022; Ortiz-Rojo & Lacruz, In Press; Jiaxin et al., 2024). In this context, new professionals could become more aware of the opportunities that the global scenario offers for their EI, such as innovations for addressing environmental concerns, and the potential of these innovations to support sustainability.

In contrast, no indirect effect was observed in the economic dimension of sustainability trough none of the GC dimensions. This finding suggests that, in our sample, the GC mindset of future professionals may not have been broad enough to fully capture the complexity of sustainability aspects. Specifically, it was not possible to demonstrate that students perceived economic issues in relation to the SA, IC, and GK aspects of GC.

Therefore, while the direct effects of students' EI on the dimensions of sustainability observed in our sample may indicate potential students' future behaviours (Ajzen, 1991), the absence of indirect effects through GC suggests that these future behaviours could be hindered. This may also suggest that the GC mindset of future professionals may not be sufficiently developed to effectively support the realisation of those behaviours. It is also worth to mention that altruistic students' values may not affect their EI when regarded to the economic aspect of sustainability (Romero-Colmenares & Reyes-Rodriguez, 2022; Vuorio & Fellnhofer, 2017).

These results warrant attention, especially when considering the definition of GC (OECD, 2018) and the less-than-promising outcomes in achieving the UN's SDG (United Nations, 2024), which, as of now, seem unlikely to be reached. Indeed, education for entrepreneurship (Cui & Bell, 2022; Almeida et al., 2026) should be complemented with more education for GC through local actions to better develop GC in future professionals (Ortiz-Rojo et al., 2025).

Regarding no moderating effects found in the study, the sample was formed by students from a country located in the global south (Dados & Connell, 2012), Brazil. It was expected that students with different realities would see the world in different ways. It was not possible to capture those differences, we believe, since the differences in HDI between states within the same country are not significant enough.

A different scenario might have been observed if the sample had consisted of students from two different countries, which we couldn't obtain data from. Specifically, contrasting data from the Global North and Global South, where living conditions differ (UNDP, 2024), could influence students' GC, their worldview, and, consequently, their future behaviours regarding sustainability.

In addition to examining the effects of EI on GC and sustainability dimensions, analysing EI in different contexts could reveal how societal factors, such as the geopolitical context (e.g., country or city), influence entrepreneurship (Steyaert & Katz, 2004) as a whole, and more specifically, the EI of future professionals. As demonstrated by Barba-Sanchez et al. (2022), the environmental aspect indirectly influenced students' EI. Therefore, since society and the environment have the power to influence EI, analysing samples from different countries could also reveal students' GC may be embedded in their EI, for instance, regarding economic issues (Dogan et al., 2021).

5. Conclusions

By analysing the relationship between future professionals' EI, the dimensions of sustainability (economic, social, and environmental), and GC dimensions (self-awareness, intercultural communication, and global knowledge), we were able to demonstrate both direct effects of EI on GC and sustainability dimensions, and indirect effects of EI through the intercultural communication and self-awareness dimensions of GC on the social and environmental dimensions of sustainability.

The findings of this study provide valuable empirical evidence for the fields of entrepreneurship, EI, GC, and sustainability. They also offer insight into the role of HEI in equipping future professionals. Through their EI, and by taking advantage of market opportunities, such as new innovations and job creation, these professionals can contribute to the global concern of sustainability across its economic, social, and environmental dimensions.

For instance, their EI could be materialized in markets where innovative sustainable solutions are needed. Additionally, in addition to fostering EI among students, approaches such as intercultural virtual exchanges, where GC can be created and reinforced, should be considered in HEI. Given the crucial role of education in both EI and GC, we believe that academics and policymakers should work towards fostering a "Sustainable Global Entrepreneurship".

This study is not without limitations. Our sample consisted of students from a single country. Future research could apply our model to data from multiple countries, exploring the proposed relationship among construct and the moderating role of the geopolitical aspect, such as geographical location. Ideally, the sample would include countries with different realities, as seen in the Global North and Global South, where varying standards of living could influence how students—future professionals—perceive the world. This, in turn, may affect their behaviour, contributing to economic development and sustainability.

References

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211.

Almeida, D. C., Afonso, P., Ferreira, L. P., & Soares, A. M. (2026). Exploring the longitudinal impact of entrepreneurial education on entrepreneurial competences and intentions: evidence of an asymmetric polarization effect. The International Journal of Management Education, 24(1), 101291.

Barba-Sánchez, V., Mitre-Aranda, M., & del Brío-González, J. (2022). The entrepreneurial intention of university students: An environmental perspective. European Research on Management and Business Economics, 28(2), 100184.

Belz, F. M., & Binder, J. K. (2017). Sustainable entrepreneurship: A convergent process model. Business Strategy and the Environment, 26(1), 1–17.

Block, J. H., Fisch, C. O., & Van Praag, M. (2017). The Schumpeterian entrepreneur: A review of the empirical evidence on the antecedents, behaviour and consequences of innovative entrepreneurship. Industry and Innovation, 24(1), 61–95.

Boubker, O., Arroud, M., & Ouajdouni, A. (2021). Entrepreneurship education versus management students' entrepreneurial intentions: A PLS-SEM approach. International Journal of Management Education, 19(1), 100450.

Chang, S.-J., van Witteloostuijn, A., & Eden, L. (2010). Common method variance in international business research. Journal of International Business Studies, 41, 178–184.
Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Lawrence Erlbaum Associates.

Cui, J., & Bell, R. (2022). Behavioural entrepreneurial mindset: How entrepreneurial education activity impacts entrepreneurial intention and behaviour. The International Journal of Management Education, 20(2), 100639.

Dados, N., & Connell, R. (2012). The global south. Contexts, 11(1), 12–13.

de Paulo Gewehr, L. L., & de Andrade, J. B. S. O. (2022). Geopolitics of hunger: Geopolitics, human security and fragile states. Geoforum, 137, 88–93.

Do Nguyen, Q., & Nguyen, H. T. (2023). Entrepreneurship education and entrepreneurial intention: The mediating role of entrepreneurial capacity. International Journal of Management Education, 21(1), 100730.

Dogan, E., Majeed, M. T., & Luni, T. (2021). Analyzing the impacts of geopolitical risk and economic uncertainty on natural resources rents. Resources Policy, 72, 102056.

Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st-century business. Environmental Quality Management, 8(1), 37–51.

Fini, R., Grimaldi, R., Marzocchi, G. L., & Sobrero, M. (2009, June). The foundation of entrepreneurial intention. In Summer Conference (Vol. 7, pp. 17–19).

Flint, C. (2021). Introduction to geopolitics. Routledge.

Gershberg, F. B., & Shimamura, A. P. (1994). Serial position effects in implicit and explicit tests of memory. Journal of Experimental Psychology: Learning, Memory, and Cognition, 20(6), 1370.

Hair, J. F., Jr., et al. (2021). Partial least squares structural equation modeling (PLS-SEM) using R: A workbook. Springer Nature.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2–24.

Instituto Brasileiro de Geografia e Estatística. (2024). Cidades e Estados do Brasil IBGE. https://cidades.ibge.gov.br.

Jena, R. K. (2020). Measuring the impact of business management student's attitude towards entrepreneurship education on entrepreneurial intention: A case study. Computers in Human Behavior, 107, 106275.

Jiaxin, G., Huijuan, Z., & Md Hasan, H. (2024, June). Global competence in higher education: A ten-year systematic literature review. Frontiers in Education, 9, 1404782.

Jooste, N., & Heleta, S. (2016). Global citizenship versus globally competent graduates: A critical view from the South. Journal of Studies in International Education, 21(1), 39–51.

Kennedy, J., et al. (2024). State of the climate 2024: Update for COP29.

Kishino, H., & Takahashi, T. (2019). Global citizenship development: Effects of study abroad and other factors. Journal of International Students, 9(2), 535–559.

Kline, R. B. (2023). Principles and practice of structural equation modeling (5th ed.). Guilford Publications.

Liñán, F., Rodríguez-Cohard, J. C., & Rueda-Cantuche, J. M. (2011). Factors affecting entrepreneurial intention levels: A role for education. International Entrepreneurship and Management Journal, 7, 195–218.

Lopes, J. M., Suchek, N., & Gomes, S. (2023). The antecedents of sustainability-oriented entrepreneurial intentions: An exploratory study of Angolan higher education students. Journal of Cleaner Production, 391, 136236.

Maheshwari, G., Kha, K. L., & Arokiasamy, A. R. A. (2023). Factors affecting students' entrepreneurial intentions: A systematic review (2005–2022) for future directions in theory and practice. Management Review Quarterly, 73(4), 1903–1970.

Massaro, V. R. (2022). Global citizenship development in higher education institutions: A systematic review of the literature. Journal of Global Education Research, 6(1).

Morais, D. B., & Ogden, A. C. (2011). Initial development and validation of the global citizenship scale. Journal of Studies in International Education, 15(5), 445–466. https://doi.org/10.1177/1028315310375308.

Moriano, J. A., Gorgievski, M., Laguna, M., Stephan, U., & Zarafshani, K. (2012). A cross-cultural approach to understanding entrepreneurial intention. Journal of Career Development, 39(2), 162–185.

Naudé, W. (2008). Entrepreneurship in economic development. WIDER Research Paper, 2008/20. United Nations University World Institute for Development Economics Research.

Nguyen, T. T., Nguyen, L. T. P., Phan, H. T. T., & Vu, A. T. (2021). Impact of entrepreneurship extracurricular activities and inspiration on entrepreneurial intention: Mediator and moderator effect. SAGE Open, 11(3), 21582440211032174.

OECD. (2018). Preparing our youth for an inclusive and sustainable world: The OECD PISA global competence framework. https://www.oecd.org/education/Handbook-PISA-2018-Global-Competence.pdf.

Ortiz-Rojo, R. A., & Finardi, K. R. (2022). Internationalization of universities and quality education: a focus on teaching, research and outreach activities. Acta Scientiarum. Human and Social Sciences, 44(2).

Ortiz-Rojo, R. A., & Lacruz, A. J. (in press). Students' motivation to participate in virtual exchange and its moderating effect on global competence. Revista Portuguesa de Educação.

Ortiz-Rojo, R. A., Finardi, K. R., & Lacruz, A. J. (2025). Global citizenship: insights from universities in the Global North and Global South. Ensaio: Avaliação e Políticas Públicas em Educação, 33(128).

Pain, R., Panelli, R., Kindon, S., & Little, J. (2010). Moments in everyday/distant geopolitics: Young people's fears and hopes. Geoforum, 41(6), 972–982.

Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: In search of conceptual origins. Sustainability Science, 14, 681–695.

Ratten, V. (2023). Entrepreneurship: Definitions, opportunities, challenges, and future directions. Global Business and Organizational Excellence, 42(5), 79–90.

R Core Team. (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing. https://www.R-project.org/.

Romero-Colmenares, L. M., & Reyes-Rodríguez, J. F. (2022). Sustainable entrepreneurial intentions: Exploration of a model based on the theory of planned behaviour among university students in north-east Colombia. International Journal of Management Education, 20(2), 100627.

Sabino, A., Moreira, A., Cesário, F. J. S., & Pinto Coelho, M. (2024). Measuring sustainability: A validation study of a triple bottom line (TBL) scale in Portugal. Emerging Science Journal, 8(3), 899–916.

Sanchez, G. (2013). PLS path modeling with R. Trowchez. http://www.gastonsanchez.com/PLS%20Path%20Modeling%20with%20R.pdf.

Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: Categories and interactions. Business Strategy and the Environment, 20(4), 222–237.

Soper, D. S. (2023). A-priori sample size calculator for structural equation models [Software]. https://www.danielsoper.com/statcalc.

Steyaert, C., & Katz, J. (2004). Reclaiming the space of entrepreneurship in society: Geographical, discursive and social dimensions. Entrepreneurship & Regional Development, 16(3), 179–196.

Truong, H. T., Le, T. P., Pham, H. T. T., Do, D. A., & Pham, T. T. (2022). A mixed approach to understanding sustainable entrepreneurial intention. International Journal of Management Education, 20(3), 100731.

United Nations Development Programme. (2024). Human development report 2023/2024. UNDP.

United Nations Department of Economic and Social Affairs. (2024). The sustainable development goals report 2024. United Nations.

Vuorio, A. M., Puumalainen, K., & Fellnhofer, K. (2018). Drivers of entrepreneurial intentions in sustainable entrepreneurship. International Journal of Entrepreneurial Behavior & Research, 24(2), 359–381.

Zhang, J., Li, B., Zhang, Y., Gong, C., & Liu, Z. (2022). From entrepreneurship education, government support, and global competence to entrepreneurial behavior: The serial double mediating effect of the self-efficacy and entrepreneurial intention. Frontiers in Psychology, 13, 838232.

Zhang, P., Wang, D. D., & Owen, C. L. (2015). A study of entrepreneurial intention of university students. Entrepreneurship Research Journal, 5(1), 61–82.

Zhang, Y., Duysters, G., & Cloodt, M. (2014). The role of entrepreneurship education as a predictor of university students' entrepreneurial intention. International Entrepreneurship and Management Journal, 10, 623–641.

5 FOURTH ARTICLE: Evaluating a university public engagement model through outreach projects: professors' involvement and measurement implications

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Abstract
The contribution of universities to society has been widely discussed; however, further exploration is needed regarding faculty engagement in this contribution and how such engagement can be measured. This study aims to empirically test a developed instrument and assess the fit of a model that examines professors' involvement in outreach projects as a means of contributing to the measurement of university public engagement. To this end, unlike previous studies, which mainly focus on the institutional perspective of university public engagement, this study centres on professors as its focal point. A Confirmatory Factor Analysis was conducted to assess the proposed model's validity. Data were analysed to evaluate the perceptions of professors involved in outreach projects from federal universities and federal institutes in Brazil. The results indicate that the Confirmatory Factor Analysis successfully validated the instrument (scale) developed and the model to measure university public engagement trough outreach projects professors' involvement. This study contributes to future research and practice by enhancing our understanding of professors' involvement in publicly engaged universities and its broader societal impact, offering a validated model for its measurement. In doing so, these findings offer new insights for university management and policymaking by systematically measuring professor-driven public engagement.

Keywords: public engagement, university-community partnerships, university outreach, faculty engagement, measurement.

Introduction

The role of the university has been widely discussed in terms of its contribution to society. There seems to be some consensus of a close relationship between the contribution of the university and the economic and social development of a given country or region (Arbo & Benneworth, 2007; Trippl et al., 2015). In addition to the university's two traditional missions of teaching and research, its third mission, that is, service/outreach, is considered directly involved in the channelling and materializing of the aforementioned contribution to society (Vargiu, 2014; Mtawa et al., 2016). Different views of the university and approaches to address its role in society have been proposed (Youtie & Shapira, 2008; Uyarra, 2010; Koekkoek et al., 2021).

The entrepreneurial university (Etzkowitz, 2004; Audretsch, 2014) emphasizes the production of knowledge and technologies, as well as its transfer and dissemination. The civic university approach proposed by Goddard et al. (2013) sees the university as a social innovator, acting as a multilevel actor, linking the local, national and global levels to public and private sectors to businesses and the community.

The engaged university (Breznitz & Feldman, 2012) goes beyond the production and dissemination of knowledge and technology claiming that the university should address social issues to contribute to its region. In this approach, universities' efforts are directly linked to the economic and social development of the communities involved.

As is often the case with engaged universities, the focus typically lies on the needs of the communities involved, as is the case of the context where the present study was carried out, Brazil. The literature highlights a significant gap in the understanding of university engagement in the Global South (e.g., Thomas & Pugh, 2020; Mtawa, Fongwa, & Wangenge-Ouma, 2016). While most research on university engagement has focused on countries in the Global North (e.g., Conway et al., 2009; Lo Presti & Marino, 2019; Sugawara et al., 2023; Lo Presti et al., 2024), there remains a notable lack of empirical studies in regions outside Europe and North America (Perkmann et al., 2021; Sánchez-Barrioluengo & Benneworth, 2019).

Moreover, a bias exists in the literature regarding empirical evidence on technology transfer, which predominantly comes from the U.S context (Uyarra, 2010). Furthermore, the Global South faces unique challenges (i.e., social, political, and economic conditions) and this study aims to contribute to filling part of this research gap by analysing university public engagement within the context of Brazilian public universities, specifically through professors' involvement in outreach projects.

Despite the existing models used to analyse regional university engagement (e.g., Sánchez-Barrioluengo & Benneworth, 2019; Sugawara et al., 2023), greater depth is needed specifically regarding faculty engagement in the third mission of the university and its contribution to society (Mtawa et al., 2016). In this regard, Perkmann et al. (2021) suggest the creation and validation of scales that assess faculty involvement in the university's engagement with the community. According to these authors, this issue has been partially addressed within the university as an individual index. That is, engagement has typically been studied from the institutional perspective (Etzkowitz, 2004; Goddard et al., 2013; Breznitz & Feldman, 2012), rather than from the faculty's perspective, which is crucial for understanding the materialization of the university's contribution and engagement with its community.

Bearing this in mind, including the perspectives of professors involved in extension projects is crucial. These professors play a pivotal role in implementing engagement activities by translating institutional guidelines into tangible actions that impact the community (Perkmann et al., 2021; Fitzgerald et al., 2012). Additionally, they often serve as "boundaryspanners", bridging the gap between the university and the external community (Weerts & Sandmann, 2010), positioning them in a unique position to evaluate university engagement (Abreu & Grinevich, 2013).

In addition, Hart and Northmore (2011) note that little progress has been made in developing robust tools to measure the benefits of university engagement with the community. Regardless of how a university is framed—whether as an entrepreneurial university (Audretsch, 2014), a civic university (Goddard et al., 2013), an engaged university (Breznitz & Feldman, 2012), or otherwise (Koekkoek et al., 2021)—we argue in this article that faculty involvement in the university's third mission (outreach) is essential for both the university's engagement and the materialization of its contribution to society.

According to Perkmann et al. (2021), faculty engagement refers to the interactions between academic researchers and non-academic organisations in activities beyond teaching and the commercialization of innovation and technology. These interactions include research collaboration, consulting engagements, and informal activities such as providing ad hoc advice and networking with professionals and communities. Abreu and Grinevich (2013) argue that informal activities should be more comprehensively offered to the non-academic community.

Considering these views of faculty engagement that go beyond teaching and research, this paper frames engagement, in contrast to the models reviewed here, as a premise for the public engagement of the university. Moreover, it will be based on this premise and measured to test the empirical structure of the model used inspired by Hart, Northmore and Gerhardt (2009) and Hart and Northmore (2011). The proposal of the aforementioned authors was developed from a systematic review of existing works in the field and several models proposed to measure the public engagement of the university, thus constituting a relevant and reliable contribution to the measurement of the engagement of a university with society. The present study aims to add to that contribution by analysing empirical data derived from the perceptions of professors involved in outreach projects.

We argue that the university's contribution to society primarily occurs through activities associated with its third mission. These activities include, but are not limited to, the creation of new knowledge, participation in startup creation laboratories, patent registration, involvement in public policy development, knowledge transfer to society, and projects addressing social or other community needs. Given the significant variation in the contributions of different universities to their regions (Arbo & Benneworth, 2007; Mtawa et al., 2016), faculty engagement can also vary, influencing the ways in which universities engage with their communities.

Having outlined this context, the objective of this study is to empirically test an instrument and model based on the theoretical propositions of Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011), using professors' involvement in outreach projects and their perceptions of their role in the university's public engagement. To achieve this, the seven dimensions of university public engagement proposed by Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011) are applied, and a survey was conducted with a sample of professors from federal universities and federal higher education institutes in Brazil.

This study contributes to the theorization of the university's role and contribution to society, highlighting that faculty engagement is essential for these contributions to be realized. In this context, the seven dimensions of Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011) were assessed from the perspective of professors involved in university/community engagement.

Literature review

The role and contribution of the university have been subjects of ongoing discussion (Goddard & Chatterton, 1999). According to Audretsch (2014), the direction of the university underwent a significant shift in the 1800s with the ideas of Alexander Humboldt. These ideas initiated the transformation of the university, shaping it into what we now recognize as its first two missions: teaching and research. Boyer (1990) later suggested that the university must go beyond its traditional teaching and research functions in order to maintain its legitimacy in the eyes of society.

From this perspective, the work of professors at the university can be divided into four dimensions: discovery—linked to the research conducted by professors; integration—related to multidisciplinary collaboration between professors; application—referring to the application of the first two dimensions in pursuit of new results; and teaching, with the caveat that it brings the most reliable and up-to-date knowledge to students.

In terms of university involvement with the community and its contribution to society (Goddard & Chatterton, 1999), the third mission of outreach/service/extension is responsible for channelling this involvement (Vargiu, 2014; Mtawa et al., 2016). According to Charles et al. (2010), university involvement is influenced not only by its profile but also by the nature of the community and its needs, whether economic or social, and by what the university can do to address them (Arbo & Benneworth, 2007).

According to De Paula (2013), university extension/outreach in Brazil began in 1911, initially at the University of São Paulo, to address social demands that continue to persist in the country. In its early stages, extension activities included providing services to rural areas, offering continuing education, and supporting the working classes. Legally, university extension/outreach was formally recognized in 1931 with Decree No. 19,851, dated April 11, 1931, which established the foundations of the Brazilian university system (De Paula, 2013). It was not until the 1950s and 1960s that Brazilian universities became aware of their social commitment, particularly after the University Reform of 1968 (Law 5,540/68), which stipulated that universities and higher education institutions should expand their reach to the community through special courses, services, teaching activities, and research (Gadotti, 2017).

University engagement with its community has been the subject of many studies (e.g., Hart & Northmore, 2009; Mtawa et al., 2016; Sandmann et al., 2016; Sanchez-Barrioluengo & Benneworth, 2019; Thomas & Pugh, 2020), which discuss, among other things, the contribution of universities to the economic and social development of the community (e.g., Goddard & Chatterton, 1999; Arbo & Benneworth, 2007; Trippl et al., 2015).

Various authors have outlined the role of universities in society. Youtie and Shapira (2008) described the university as a "storehouse of knowledge," a "knowledge factory," and a "knowledge hub." Uyarra (2010) identified five key roles for universities: the "knowledge factory," the "relational university," the "entrepreneurial university," the "systemic university," and the "engaged university.

Over time, researchers have conceptualized university–community engagement through a broad spectrum of definitions. This has led to the overlap of terms and concepts such as “civic engagement,” “public engagement,” “community outreach,” “community–university partnerships,” “scholarship of engagement,” and “community–university collaborations” (Koekkoek et al., 2021).

Following Boyer’s (1990) study, several model proposals have been made to address university engagement and its contributions (see Table 1). Mtawa et al. (2016) applied Boyer’s model and suggested that the university’s engagement with the community is influenced by several contextual specificities. Therefore, the use of Boyer’s model in different contexts must be approached carefully, considering the realities of each context.

Table 1
Model proposals for university public engagement

Source	Scope	Context	Dimensions	Measurements	Data analysis
Conway et al. (2009)	University engagement levels	The classification is additive, so that the outcomes and activities which take place at higher levels include those already taking place at the lower levels. Progression between the classes involves developing the capacities which can deliver new kinds of activities and outcome whilst not undermining what has already been achieved.	1. Providing information 2. Public Relations 3. Dissemination of academic findings 4. University as a cultural influence 5. Critical engagement	Not informed	Not applicable
Hart and Northmore (2011)	Publicly engaged university	University public engagement which involves higher education experts interacting with non-experts thus opening higher education to the public while also enriching its research and teaching through the involvement with local communities to produce wider benefits.	1 Public access to facilities 2 Public access to knowledge 3 Student engagement 4 Faculty engagement 5 Widening participation (equalities and diversity) 6 Encouraging economic regeneration and enterprise in social engagement 7 Institutional relationship and partnership building	Not informed	Not applicable
Fitzgerald et al. (2012)	Institutionalisation of Engagement	Advancement and institutionalisation of engagement within higher education through five dimensions: philosophy and mission; faculty involvement and support; student leadership and support; community partnership, involvement, and leadership; and institutional support and infrastructure, contemplating 23 components that include alignment of engagement efforts with key institutional priorities, having in place a coordinating body that sets standards of excellence, and strong support for	1.Philosophy and mission of community engagement 2. Faculty support for and involvement in community engagement 3. Student support for and involvement in community engagement 4. Community participants and partnerships 5. Institutional support for community engagement	Not informed	Not applicable

		engaged scholarship within academic departments and disciplinary cultures.			
Vargiu (2014)	Public Engagement of Higher Education Institutions	The study discusses possible indicators for the evaluation of public engagement of universities, based on comparison between three reports chosen after analysis of mainstream publishing and grey literature: mission, governance and overarching institutionalized strategies for public engagement; research; student engagement and educational outreach; dissemination; accessibility and use of facilities; community partnerships, stakeholders' relations and participation in external activities.	1. Mission, governance and overarching institutionalized strategies for public engagement 2. Research 3. Students' engagement and educational outreach 4. Dissemination 5. Accessibility and use of facilities 6. Community partnership, stakeholder relations and participation in external activities	Not informed	Not applicable
Marino and Lo Presti (2018)	Online Public engagement	This work investigates the construct of online public engagement and identifies the modalities universities use to give visibility to their approach on institutional websites.	1. Social engagement 2. Research engagement 3. Widening engagement *[generated factors from framework proposed by Hart and Northmore (2011) and Hart et al. (2009)]*	Websites evaluation (Likert-type scale – 5 points)	Exploratory factor analysis and Student's t-test
Lo Presti and Marino (2019)	Public engagement index	The study focuses on the public engagement of universities by investigating the university websites for detecting the best practices that can better orientate the universities towards public engagement.	1.Public access to facilities 2.Public access to knowledge 3.Student engagement 4.Faculty engagement 5.Widening participation 6.Encouraging economic regeneration 7.Institutional relationship *[from framework proposed by Hart and Northmore (2011) and Marino and Lo Presti (2018)]*	Websites evaluation (Likert-type scale – 5 points	Elaboration of the Public engagement index
Sanchez Barrioluengo and Benneworth (2019)	Higher Education Business and Community Interaction	Analysis of the role played by the internal university structure as shaper of university performance through third mission activities.	1.Steering core 2. Administrative machinery 3. Internal coupling 4. Academic heartland	Secondary data from Higher Education Statistics Agency – HESA	Exploratory factor analysis and Covariance-based structural equation modelling

				(dummies and continuous variables)	
Sugawara et al. (2023)	Community-university engagement	The landscape of community-engaged activities as experienced by the faculty of Southeastern European universities and their perceived impact on capacity-building for local community development.	1.Engaged teaching and learning 2.Engaged research 3.Community outreach and personal service	Survey questionnaire (Likert-type scale – 5 points)	Hierarchical multiple regression

Source: authors

Another widely used model, which has inspired and is considered in many studies (see Table 1), is the entrepreneurial university model (Etzkowitz, 2004; Audretsch, 2014). In this model, the university's contribution is linked to economic and social development through the production of knowledge and technologies, which are then transferred (Uyarra, 2010), delivering solutions to society's problems and disseminating new knowledge and innovations to industry and third-sector organisations (Audretsch, 2014).

The model discussed earlier is connected to incubators and laboratories where research is conducted, creating a context in which the university engages with other key actors, such as industry and government institutions that support innovation (Leydesdorff & Etzkowitz, 1998). According to Audretsch (2014), the role of the entrepreneurial university extends beyond fostering innovation, startup creation, and the transfer of new technologies to society. Audretsch (2014) argues that this broader role involves the promotion of entrepreneurial capital within society. Similarly, Jongbloed et al. (2008) emphasize that an entrepreneurial culture within the university is essential for facilitating a mutual exchange of benefits between the university and society.

The concept of the entrepreneurial university has been critiqued on the grounds that the commercialization of innovations generated within the university may undermine its core teaching mission (Jones & Patton, 2018). Given the diversity of perspectives on the university's role in society, which can even challenge models like the entrepreneurial university, the level of engagement from the academic community—particularly faculty involvement in outreach initiatives—is likely to be varied and heterogeneous. When considering the civic university (Goddard et al., 2013) and its responsibility to provide opportunities for the society it serves, it becomes clear that the inclusion of students, companies, and public institutions is crucial. Moreover, the university should deeply engage with its local context, forming partnerships with nearby universities and colleges, and being managed in a way that fosters broad institutional involvement with its city and region, all while maintaining a global outlook without compromising its local identity.

In the civic university approach, strong partnerships between the university and civil society are essential for the university's contribution to society. In this context, Goddard et al. (2013) emphasize the importance of transversal management and leadership to reduce barriers between the university and society. Furthermore, universities adopting this civic model would not only focus research on addressing major challenges, such as sustainable development, but also tailor their teaching to cultivate future citizens who can contribute to innovations that serve the public interest.

The concept of the engaged university (Breznitz & Feldman, 2012) is not unique in highlighting the university's contribution to economic and social development, as both the entrepreneurial and civic models also emphasize this role. However, the engaged university specifically recognizes the benefits that the university brings to its community or region simply through its existence. This includes its contributions, such as generating employment and providing essential services for its operation.

The engaged university approach (Breznitz & Feldman, 2012) also emphasizes the university’s role in shaping public policies that benefit its region, alongside the importance of fostering close relationships with industry and government actors (Leydesdorff & Etzkowitz, 1998; Goddard et al., 2013).

As such, the engaged university approach advocates for a deeper integration of the university at the local and regional levels (Sanchez-Barrioluengo & Benneworth, 2019), extending beyond the principles of the entrepreneurial university (Etzkowitz, 2004; Audretsch, 2014) by addressing social issues, policymaking, and fostering stronger engagement with industry and government sectors. Given this broader scope, Trippl et al. (2015) question the lack of evidence supporting the university’s capacity to meet the expectations of the engaged university model. Additionally, these authors argue that the engaged university framework overlooks the fact that some countries adopt national, rather than regional, policies to promote or fund the development of university activities.

There is broad consensus on the crucial role that universities play in the economic and social development of a region or country. However, we argue that for this engagement to be realized, as Sandmann et al. (2016) suggest, there must be an intersection of university socialization and institutional change—particularly in how university administrators perceive and implement the core functions of teaching, research, and service/outreach.

Hart, Northmore, and Gerhardt (2009) highlight several benefits of the university’s public engagement, including improved quality of life and well-being, increased social capital, cohesion, and social inclusion, as well as local or regional economic regeneration. On the other hand, Perkmann et al. (2021) emphasize the benefits of faculty engagement, such as enhanced academic productivity, research quality and direction, marketable outcomes, educational achievements, and social and economic impact. These perspectives illustrate how university and faculty engagement are interconnected in contributing to society.

Sanchez-Barrioluengo and Benneworth (2019) examined the university's strategic decisions regarding its internal structure and performance in relation to its third mission. They explored the issue of faculty engagement, although their findings were counterintuitive and lacked a robust explanation for faculty involvement in the university's regional engagement.

This is precisely where this study focuses, that is, in the recognition that in order to analyse the engagement and contribution of the university to society, faculty engagement in the form of outreach activities must be analysed too. To achieve this, the study builds on various concepts of entrepreneurial, civic, and engaged universities, incorporating and extending them by utilizing the framework of Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011), as other authors have done (e.g., Vargiu, 2014; Marino & Lo Presti, 2018; Lo Presti & Marino, 2019).

One of the key strengths of this model is its consideration of both formal and informal mechanisms of engagement. This enables a deeper understanding of how universities contribute to societal development, extending beyond the simple transfer of knowledge and technology to include activities such as social inclusion, diversity efforts, and community partnership building. Furthermore, the model's dimensions are flexible and broad enough to be adapted to various institutional contexts, including those in the Global South. Consequently, the present study has two main objectives: to develop an instrument and to empirically test its structure.

University public engagement

Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011) reference the Higher Education Funding Council for England (HEFCE) concept of university public engagement, which involves higher education experts interacting with non-experts. This approach opens higher education to the public while enriching its research and teaching through engagement with local communities, thereby generating broader societal benefits. These authors also highlight several potential benefits of this engagement, including relevance, democratisation, inclusion, and the exchange between the university and the community it aims to improve.

Hart, Northmore, and Gerhardt Dimensions (2009) and Hart and Northmore (2011)

Dimension 1: Public access to the facilities

Public access to university facilities, such as residential accommodation, meeting spaces, and sports, artistic, and scientific facilities, can be either commercial or non-commercial, depending on the nature of the activity. Potential measures for evaluating this dimension include facility usage levels and more qualitative indicators, such as satisfaction with the facilities themselves and with the management of public relations. Additionally, public access points could be assessed in terms of their physical location, transport links, accessibility for individuals with disabilities, and how access is communicated to the public.

Dimension 2: Public access to knowledge

While universities do not hold a monopoly on knowledge creation, their capacity to generate and transmit knowledge makes public access to the knowledge produced at a given institution a key aspect of public engagement. This can occur through established curricula, direct access to individual experts, or one-time events like science fairs. Approaches developed in other sectors, such as museums, libraries, and archives, also hold potential and may lead to outcomes that extend beyond the delivery of specific services, for example:

- quality of life, well-being and happiness
- intellectual capital/social cohesion/social inclusion
- security and protection
- equality/combating deprivation and social exclusion
- promote democracy and civil community engagement

Dimension 3: Student Engagement

This dimension focuses on harnessing the learner's potential for the benefit of the community. Measurement can include the number of students involved and the hours worked. Broader outcomes for students might include the development of a sense of civic engagement. Institutional commitment can also be evaluated based on whether activities attract formal recognition for those involved, allowing the impact to be identified in areas such as physical, human, economic, and cultural capital.

Dimension 4: Faculty engagement

Faculty involvement overlaps to some extent with Dimension 2 and Dimension 7, but Dimension 4 specifically focuses on individual academic involvement, including that of staff. One approach to measuring this dimension could include data on paid work, after-hours volunteering, and management roles within local voluntary and community sector organisations. Institutional commitment can be assessed through measures related to attracting recognition and fostering continuing professional development. It is important to note that the outcomes in this dimension are primarily intended to create a social impact.

Dimension 5: Expansion of participation (equality and diversity)

The expansion of participation in university courses is closely linked to efforts to reduce social gaps and inequalities in society. In this dimension, measurement can focus on the number of enrolments and the retention rates of students from non-traditional backgrounds.

Dimension 6: Economic regeneration and ventures in social engagement

This dimension focuses on the social impact for students and graduates, regional competitiveness, and the relationship between the university and industry. The goal is to understand how the university and its actions toward the community can generate broader societal benefits. A key question to consider is the extent to which and in what ways the university can benefit disadvantaged groups in their regional contexts, particularly in relation to:

• contributing to build or strengthen existing civil society institutions
• encourage and facilitate the creation of new cultural values and social cohesion
• contribute to generating new possibilities for relationships and business opportunities at a local, national and global levels

Dimension 7: Institutional relationship and building partnerships

This dimension aims to capture how the institution operates and organises itself to achieve its public engagement objectives through activities at the institutional level. Examples include the university's mission, activities, resource allocation (including human resources), and institutional support for monitoring, evaluation, and communication. It also covers institutional social responsibility issues, such as the impact on the environment.

Table 2 presents the 7 dimensions (factors) and 40 items (indicators) of the developed instrument.

Table 2
Dimensions and Indicators of the Public Engaged University

Dimension	Item
D1. Public access to facilities	• Q6_D1 Access to university libraries • Q7_D1 Access to university buildings and physical facilities e.g. for conferences, meetings, events, accommodation, gardens, etc. • Q8_D1 Shared facilities e.g. museums, art galleries • Q9_D1 Public access to sports facilities • Q10_D1 Summer sports schools
D2. Public access to knowledge	• Q11_D2 Access to established university curricula • Q12_D2 Public engagement events, e.g. science fairs, science shops • Q13, 14_D2 Publicly accessible database of university expertise • Q15_D2 Public involvement in research
D3. Student engagement	• Q16_D3 Student volunteering • Q17_D3 Experiential learning e.g. practice placements, collaborative research projects • Q18_D3 Curricular engagement • Q19_D3 Student-led activities, e.g. arts, environment
D4. Faculty engagement	• Q20_D4 Research centres draw on community advisers for support/direction • Q21_D4 Volunteering outside working hours e.g. on trustee boards of local charities • Q22_D4 Staff with social/community engagement as a specific part of their job • Q23_D4 Promotion of policies that reward social engagement • Q24_D4 Research helpdesk/advisory boards • Q25_D4 Public lectures • Q26_D4 Alumni services
D5 Widening participation (equalities and diversity)	• Q27, 28_D5 Improving recruitment and success rate of students from non-traditional backgrounds through innovative initiatives e.g. access courses, financial assistance, peer mentoring • Q29_D5 A publicly available strategy for encouraging access by students with disabilities
D6 Encouraging economic regeneration and enterprise in social engagement	• Q30_D6 Research collaboration and technology transfer • Q31_D6 Meeting regional skills needs and supporting SMEs • Q32_D6 Initiatives to expand innovation and design e.g. bringing together staff, students and community members to design, develop and test Assistive Technology for people with disabilities • Q33_D6 Business advisory services offering support for community–university collaborations e.g. social enterprises • Q34_D6 Prizes for entrepreneurial projects
D7 Institutional relationship and partnership building	• Q35_D7 University division or office for community engagement • Q36_D7 Collaborative community-based research programmes responsive to community-identified needs • Q37_D7 Community–university networks for learning/ dissemination/knowledge exchange • Q38_D7 Community members on board of governance • Q39_D7 Public ceremonies, awards, competitions and events • Q40_D7 Website with community pages • Q41_D7 Policies on equalities, recruitment, procurement of goods and services, environmental responsibility •Q42_D7 International links • Q43_D7 Conferences with public access and public concerns • Q44_D7 Helpdesk facility • Q45_D7 Corporate social responsibility

Source: Adapted from Hart, Northmore and Gerhardt (2009) and Hart and Northmore (2011).

It should be clarified that the items in the instrument developed for this study were associated with a 7-point Likert scale, whereas Hart, Northmore, and Gerhardt (2009), and later Hart and Northmore (2011), specify the indicators related to the dimensions without suggesting a scale of agreement.

Methodological procedures

To test the empirical structure of the instrument developed to assess faculty perceptions of the university's public engagement, a self-administered online questionnaire was emailed to the Deans of Education at all 69 Brazilian Federal Universities and all 27 Brazilian Federal Institutes of Education, Science, and Technology. The Deans were asked to forward the questionnaire to the professors. Data were collected from September 20 to December 13, 2022, using a questionnaire created on the SurveyMonkey platform.

The minimum sample size, considering 7 latent variables (i.e., factors), 40 manifest variables (i.e., items), a significance level of 0.05, statistical power of 0.8, and an effect size of 0.3, considered medium according to Cohen's grading, (1988), was estimated at 170 observations using the online Free Statistics Calculators application (Soper, 2023).

A total of 511 responses were collected, of which 235 were considered valid. To determine the valid responses, cut-off questions were applied. First, participants were asked if they agreed to complete the questionnaire, with 509 answering "yes" and 2 answering "no." Next, they were asked to respond to a filter question aimed at identifying professors who had coordinated or participated in an outreach project at some point since 2017. A total of 348 responses were positive. Of these, 242 completed the entire questionnaire. To ensure the respondent's attention while completing the questionnaire, participants were instructed to select the option numbered 3, among the options 1 to 7, in a shuffled question within Dimension 4. There were 235 correct answers (i.e., those who selected the option numbered 3). Therefore, the sample size meets the estimated minimum (sample = 235 > minimum sample = 170).

In terms of the sample description, the majority of responses were obtained from professors at federal universities (86%), compared to those from federal institutes (13.2%). Additionally, 55.7% of the respondents identified as female, 43.4% as male, and 0.9% chose not to answer.

It is also noteworthy that more than half of the responses came from the Northeast region of Brazil (51.9%). This is interesting considering that the Southeast region, which has the highest concentration of universities and federal institutes (and likely the largest number of professors), did not show a corresponding level of participation in this study, with only 18.3% of responses coming from that region.

The highest percentage of professors reported having a teaching career of 11 to 15 years (29.4%), followed closely by those with 6 to 10 years of experience (28.1%). Additionally, professors in the field of Applied Social Sciences accounted for the largest group of respondents in this survey (19.6%). A descriptive summary of the respondents' profile is presented in Table 3.

Table 3
Sample Description

Description		Frequency	Relative frequency
Q1. Type of educational institution	Federal University	204	86,8%
	Federal Institute	31	13,2%
	Total	**235**	**100,0%**
Q2. Gender	Female	131	55,7%
	Male	102	43,4%
	Prefer not to answer	2	0,9%
	Total	**235**	**100,0%**
Q3. Region of the Educational Institution's Location	North Region	15	6,4%
	Northeast Region	122	51,9%
	West-Canter Region	31	13,2%
	Southeast Region	43	18,3%
	South Region	24	10,2%
	Total	**235**	**100,0%**
Q4. Teaching Career Duration	Up to 5 years	21	8,9%
	From 6 to 10 years	66	28,1%
	From 11 to 15 years	69	29,4%
	From 16 to 20 years	36	15,3%
	More than 20 years	43	18,3%
	Total	**235**	**100,0%**
Q5. Area of knowledge more adherent to teaching activities	Exact and earth sciences	27	11,5%
	Biological Sciences	11	4,7%
	Engineering	21	8,9%
	Health Sciences	46	19,6%
	agricultural sciences	16	6,8%
	applied social sciences	46	19,6%
	human sciences	41	17,5%
	Linguistics, letters and arts	27	11,5%
	Total	**235**	**100,0%**

Source: authors

To empirically assess the fit and validation of the developed instrument for evaluating professors' perceptions of the public-engaged university, it was decided to conduct the confirmatory factor analysis using the Diagonal Weighted Least Squares (DWLS) estimator, which employs a polychoric correlation matrix and robust standard error correction, due to the ordinal nature of the data (DiStefano et al., 2019).

Furthermore, assuming the factor variances equal to 1 (so that the covariances could be treated as correlations, allowing for the analysis of discriminant validity).

It should be noted that, to assess any potential common method bias resulting from the use of the same online self-administered questionnaire (Chang, Witteloostuij, & Eden, 2010), the one-factor Harman test was applied. Additionally, the questionnaire was pre-tested with 8 respondents (5% of the estimated minimum sample) to identify any inaccuracies. Since no issues were found, these responses were included in the sample. Finally, it is clarified that the data were processed using JASP software (Jasp Team, 2023).

Analysis of results

Preliminarily, we assessed the fit of the model with the seven dimensions proposed by Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011), considering three different configurations: factors correlated (Model 1), factors uncorrelated (Model 2), and a second-order factor (Model 3). To evaluate model fit, the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are typically used, with smaller values indicating a better fit. However, these statistics are not available for robust DWLS estimation, and no established method for model comparison using robust DWLS exists. Therefore, we relied on fit statistics and standardized factor loadings to compare the models. The model with correlated factors (Model 1) showed the best fit.

To assess the fit of the proposed instrument (assuming correlated factors – Model 1), the following indices were analysed, as outlined in the literature (e.g., Hair Jr. et al., 2009; Brown, 2015): absolute fit indices – Relative chi-square, RMSEA (Root Mean Square Error of Approximation), and SRMR (Standardized Root Mean Square Residual); incremental fit indices – CFI (Comparative Fit Index) and TLI (Tucker-Lewis Index); and parsimony fit indices – Hoelter ($\alpha = 0.01$) and Hoelter ($\alpha = 0.05$).

It should be clarified that the Chi-square statistic, as a goodness-of-fit index, represents the difference between the specified hypothetical model and the model suggested by the data. Since this statistic is sensitive to sample size (Hair Jr. et al., 2009; Brown, 2015), we chose to use the Chi-square value relative to the number of degrees of freedom (i.e., Chi-square relative). Table 4 presents a summary of the instrument fit test results.

Table 4
Model fit indices

Type	Index	Result	Criterion	Source
Absolut	χ^2 relative	1,66	< 3	Brown (2015)
	RMSEA	< 0,053	≤ 0,08	Hair Jr. et al. (2009)
	RMSEA (Inferior$_{90\%}$)	0,048	> 0	Brown (2015)
	RMSEA (Superior$_{90\%}$)	0,059	< 1	Brown (2015)
	SRMR	0,063	< 0,09	Hair et al. (2009)
Incremental	CFI	0,995	> 0,92	Hair Jr. et al. (2009)
	TLI	0,994	> 0,92	Hair Jr. et al. (2009)
Parsimony	Hoelter (α = 0,01)	154,081	< 75: unacceptable ≥ 200: ideal	Hoelter (1983)
	Hoelter (α = 0,05)	159,492	< 75: unacceptable ≥ 200: ideal	Hoelter (1983)

Note. n = 235

Absolute fit measures assess how well the model predicts the variance-covariance matrix. Incremental measures compare the model to the null model (i.e., where the covariances between all input indicators are fixed at zero). Parsimony measures evaluate the model's explanatory power relative to the number of coefficients required to achieve this level of fit (Brown, 2015).

While the absolute and incremental fit indices yielded results that meet the evaluation criteria, the parsimony index suggests that, although acceptable, the model could be more parsimonious. The standardized factor loadings based on 45 items across the 7 factors are presented in Table 5.

Table 5
Standardized Factor loadings

Factor	Indicator	Estimate
Factor 1	Q6_D1	0,74
	Q7_D1	0,52
	Q8_D1	0,92
	Q9_D1	0,97
	Q10_D1	0,99
Factor 2	Q11_D2	0,45
	Q12_D2	0,75
	Q13_D2	0,67
	Q14_D2	0,65
	Q15_D2	0,61
Factor 3	Q16_D3	0,81
	Q17_D3	0,79
	Q18_D3	0,59
	Q19_D3	0,85

Factor 4	Q20_D4	0,70
	Q21_D4	0,71
	Q22_D4	0,72
	Q23_D4	0,80
	Q24_D4	0,82
	Q25_D4	0,66
	Q26_D4	0,72
Factor 5	Q27_D5	0,93
	Q28_D5	0,84
	Q29_D5	0,92
Factor 6	Q30_D6	0,71
	Q31_D6	0,88
	Q32_D6	0,73
	Q33_D6	0,90
	Q34_D6	0,85
Factor 7	Q35_D7	0,80
	Q36_D7	0,61
	Q37_D7	0,49
	Q38_D7	0,80
	Q39_D7	0,78
	Q40_D7	0,71
	Q41_D7	0,80
	Q42_D7	0,82
	Q43_D7	0,81
	Q44_D7	0,76
	Q45_D7	0,66

Note. n = 235

The estimates (i.e., standardized factor loadings) were strong (> 0.5 for all items, except Q11_D2 and Q37_D7), indicating that all items were sufficiently associated with their respective factors.

For model validation, the reliability of internal consistency was assessed using McDonald's omega. Convergent validity was evaluated through standardized factor loadings and the Average Variance Extracted (AVE). Discriminant validity was examined by the correlations between the factors (i.e., the dimensions of the instrument). Regarding content validity, this study is grounded in the dimensions of a publicly engaged university as proposed by Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011). A summary of the results is presented in Table 6.

Table 6
Instrument validity

Dimension	Internal consistency reliability	Convergent validity[a]	Discriminant validity
	ω McDonald (> 0,7) Flora (2020)	AVE (> 0,5) Hair Jr. et al. (2009)	Correlation between factors (< 0,9) Henseler, Ringle and Sarstedt (2015)
1 Public access to facilities	0,80	0,72	Maximum = 0,761 (Factor 4)
2 Public access to knowledge	0,70	0,40	Maximum = 0,704 (Factor 6)
3 Student engagement	0,80	0,59	Maximum = 0,714 (Factor 7)
4 Faculty engagement	0,78	0,54	Maximum = 0,896 (Factor 7)
5 Widening participation (equalities and diversity)	0,83	0,80	Maximum = 0,719 (Factor 7)
6 Encouraging economic regeneration and enterprise in social engagement	0,82	0,67	Maximum = 0,872 (Factor 7)
7 Institutional relationship and partnership building	0,83	0,55	Maximum = 0,896 (Factor 4)

Note. n = 235
[a] Standardized factor load of all indicators ≥ 0.5 (according to the criterion proposed by Hair Jr. et al., 2009), except in relation to indicators Q11_D2 (0.45) and Q37_D7 (0.49).

It was observed that all dimensions of the instrument were validated, both in terms of internal consistency reliability (i.e., the extent to which the indicators of each factor are related and occupy the same dimensional space) and discriminant validity (i.e., the degree to which each factor is distinct from the others).

However, the convergent validity (i.e., the shared proportion of variance among the indicators of the same factor) for Dimension 2 (Public Access to Knowledge) was somewhat weaker, as the AVE was 0.4. The standardized factor loadings for the items from Q11_D2 to Q15_D2 were, respectively, 0.45, 0.75, 0.67, 0.65, and 0.61.

As a result, the model was re-estimated with the exclusion of the variable Q11_D2 (which had a standardized factor loading of 0.45). The impact of this exclusion on global fit, internal consistency, convergent validity, and discriminant validity was assessed. The Hoelter index values increased, indicating a less parsimonious model, and the AVE dropped to 0.36. Therefore, in order to preserve the conceptual domain of the dimension as proposed by Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011), whose model serves as the foundation for this study, the original model was retained.

Discussion and Conclusions

This study aimed to develop an instrument based on the theoretical framework proposed by Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011) to assess faculty perceptions of university public engagement, specifically focusing on faculty involved in outreach projects. The instrument was designed using the seven dimensions of public engagement at universities outlined by the authors. A survey was then conducted with a sample of professors from federal universities and federal higher education institutes in Brazil to test its empirical structure.

Several authors have questioned the role of universities in contributing to society (e.g., Hart & Northmore, 2010; Sandmann et al., 2016; Sanchez-Barrioluengo & Benneworth, 2019; Thomas & Pugh, 2020), with particular focus on understanding the contributions universities make to the economic and social development of the communities or regions they serve (e.g., Goddard & Chatterton, 1999; Arbo & Benneworth, 2007; Trippl et al., 2015). In this context, the university's third mission emerges as a key avenue for channelling these contributions (Charles et al., 2010; Mtawa et al., 2016).

Various perspectives (e.g., Youtie & Shapira, 2008; Uyarra, 2010; Audretsch, 2014; Goddard et al., 2013; Breznitz & Feldman, 2012; Koekkoek et al., 2021) and models (e.g., Boyer, 1990; Conway et al., 2009; Fitzgerald et al., 2012; Sanchez-Barrioluengo & Benneworth, 2019; Sugawara et al., 2023) have been proposed and examined to understand the university's role within the community. Additionally, scholars argue that there is a gap in available scales to measure both the university's engagement with the community (Hart & Northmore, 2011) and the involvement of faculty in this engagement (Perkmann et al., 2021).

To address this gap, this study developed an instrument based on the framework proposed by Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011), incorporating the 7 dimensions of the publicly engaged university. The study also empirically validated these dimensions through the perceptions of faculty involved in outreach activities at federal universities and federal higher education institutes in Brazil.

Through confirmatory factor analysis, the study successfully confirmed the fit of the model to the data (with some reservations regarding its parsimony) and validated the measurement of all dimensions of the instrument (with reservations regarding the convergent validity of dimension 2). This research makes a significant contribution by expanding the existing literature on university-public engagement (Uyarra, 2010). By focusing on the perceptions of professors — those directly involved in implementing public engagement initiatives — this study offers valuable insights into the extent of a university's impact on its community from a largely unexplored perspective (Fitzgerald et al., 2012; Perkmann et al., 2021). The instrument developed here, which measures this contribution, helps fill a gap identified by Hart & Northmore (2011), fostering synergies between the planning and execution of outreach initiatives in universities, ultimately leading to a more effective contribution to society.

Unlike previous studies that mainly focus on the institutional perspective of engagement and are often situated in the context of the Global North (e.g., Perkmann et al., 2021; Thomas & Pugh, 2020), this research centres on professors as its focal point. In contrast to studies that have typically concentrated on specific regions, such as the United States (e.g., Lo Presti & Marino, 2019) or Europe (e.g., Lo Presti et al., 2024), this analysis is grounded within the context of Brazilian universities. Therefore, this study contributes to filling the gap identified in the literature by offering a validated scale from the perspective of professors, an area that has been underexplored, particularly in the context of the Global South.

Considering the various contributions and models formulated by authors in the field, we believe that the instrument validated in this study effectively captures these contributions. It offers a path towards a more robust measurement of the university's societal impact, enabling us to progress toward models that better understand how universities, within their capabilities (Trippl et al., 2015), can contribute to society based on its needs and developmental potential. Moreover, the validated instrument holds significant practical implications for universities. It empowers institutions to refine their engagement strategies by offering clear insights into which aspects of engagement are well-developed, and which require further attention. Additionally, this tool can support universities in strategically positioning themselves within public policies, amplifying their involvement in regional development projects, and making a direct contribution to the economic and social betterment of their local communities.

Testing the fit and validation of the instrument, however, is not an end in itself. Thus, further research is needed to expand this analysis. The sample for this study was formed exclusively by professors from the federal higher education system in Brazil (public sector) that had experience in outreach projects.

We acknowledge that the perceptions of professors directly involved in outreach projects may be subject to bias, as they are closely engaged with these activities and often have a strong commitment to them. However, it is precisely this proximity that allows them to offer a well-informed view of university public engagement. We believe that professors' perceptions provide valuable insights into universities' public engagement, since they operationalize many of the activities that integrate the community and the university (Perkmann et al., 2021, Weerts & Sandmann, 2010).

Again, we acknowledge that relying solely on professors' perceptions of university public engagement and exclusively using the items proposed by Hart, Northmore, and Gerhardt (2009) and Hart and Northmore (2011) could be seen as a limitation of our study. However, our aim was specifically to address the gap in empirical evidence regarding university engagement from the professors' perspective. This approach contrasts with the more common focus on institutional engagement, as seen in the existing literature.

Given the scope and contributions of this study, future research could consider using the instrument to assess engagement from the perspectives of professors with and without experience in outreach projects. This would allow for estimating the effect of outreach (i.e., the institution's third mission) on university engagement. Additionally, it would be valuable to evaluate the perceptions of different university stakeholders, both internal (e.g., students, staff) and external (e.g., community, partners), in order to assess the factorial structure of the scale from a multidimensional perspective. This could be achieved, for example, by employing a multigroup approach for data analysis.

Furthermore, the sample showed a strong predominance of professors from federal universities compared to those from federal institutes, with a high percentage of responses coming from the Northeast region of Brazil. This does not rule out the possibility that differences between universities and federal institutes, as well as regional and country-specific differences, may influence the results (Arbo & Benneworth, 2007). Such factors could be further investigated using a multigroup confirmatory factor analysis.

Building on the findings of this study, future research could further explore, based on empirical evidence, the effect of the university's public engagement on measures of the institution's performance (treating it as an exogenous variable). Alternatively, it could investigate the influence of factors such as faculty engagement on public engagement at the university (treating it as an endogenous variable).

Future research could build on our findings to develop an engagement index for universities and explore how effectively this index predicts faculty engagement or the likelihood of the institution achieving higher or lower levels of public engagement.

Additionally, university managers could use the validations from this study to assess the role a given university plays in contributing to society and how this is reflected in the role of professors and the institution as a whole.

References

Abreu, M., & Grinevich, V. (2013). The nature of academic entrepreneurship in the UK: Widening the focus on entrepreneurial activities. *Research Policy*, *42*(2), 408-422.

Arbo, P., & Benneworth, P. (2007). Understanding the regional contribution of higher education institutions: A literature review. *OECD Education Working Papers*, No. 9, OECD Publishing.

Audretsch, D. B. (2014). From the entrepreneurial university to the university for the entrepreneurial society. *The Journal of Technology Transfer*, *39*(3), 313-321.

Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. Princeton University Press, N.J: Carnegie Foundation for the Advancement of Teaching.

Breznitz, S. M., & Feldman, M. P. (2012). The engaged university. *The Journal of Technology Transfer*, *37*(2), 139-157.

Brown, T. A. (2015). *Confirmatory factor analysis for Applied research*. 2 ed. Guilford Press.

Chang, S.-J., Witteloostuij, A. van, & Eden, L. (2010). Common method variance in international business research. *Journal of International Business Studies, 41*, 178–184. doi: 10.1057/jibs.2009.88

Charles, D., Benneworth, P., Conway, C., & Humphrey, L. (2010). How to benchmark universitycommunity interactions. *The community engagement and service mission of universities*, 69-85.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2 Ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

Conway, C., Humphrey, L., Benneworth, P., Charles, D., & Younger, P. (2009). Characterising modes of university engagement with wider society: A literature review and survey of best practice.

De Paula, J. A. (2013). A extensão universitária: história, conceito e propostas. *Interfaces-Revista de Extensão da UFMG*, *1*(1), 5-23.

DiStefano, C., McDaniel, H. L., Zhang, L., Shi, D., & Jiang, Z. (2019). Fitting Large Factor Analysis Models With Ordinal Data. *Educational and Psychological Measurement, 79*(3), 417–436.

Etzkowitz, H. (2004) 'The evolution of the entrepreneurial university', *Int. J. Technology and Globalisation*, 1(1), 64-77.

Fitzgerald, H. E., Bruns, K., Sonka, S. T., Furco, A., & Swanson, L. (2012). The Centrality of Engagement in Higher Education. *Journal of Higher Education Outreach and Engagement*, 16(3), 7-27.

Flora, D. B. (2020). Your coefficient alpha is probably wrong, but which coefficient omega is right? A tutorial on using R to obtain better reliability estimates. *Advances in Methods and Practices in Psychological Science*, *3*(4), 484-501.

Gadotti, M. (2017). Extensão universitária: para quê. *Instituto Paulo Freire*, *15*(1-18), 1.

Goddard, J., Kempton, L., & Vallance, P. (2013). The civic university: Connecting the global and the local. In Capello, R., Olechnick, A, and Gorzelak, G. (eds) (2012). *Universities, cities and regions* (pp. 67-87). Loci for knowledge and innovation creation. London, Routledge.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Análise multivariada de dados*. Bookman.

Hart, A., Northmore, S., & Gerhardt, C. (2009). Briefing paper: Auditing, benchmarking and evaluating public engagement. *NCCPE Research Synthesis*, *1*, 1-48.

Hart, A., & Northmore, S. (2011). Auditing and evaluating university–community engagement: Lessons from a UK case study. *Higher Education Quarterly*, *65*(1), 34-58.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, *43*, 115-135.

Hoelter, J. (1983). The analysis of covariance structures: goodness of fit indices. Sociological Methods and Research*, 11*(3), 325-344.

Jasp Team (2023). *JASP* (Version 0.17). [Computer software].

Jones, D. R., & Patton, D. (2018). An academic challenge to the entrepreneurial university: The spatial power of the 'Slow Swimming Club'. *Studies in higher education*, *45*(2), 375-389.

Jongbloed, B., Enders, J., & Salerno, C. (2008). Higher education and its communities: Interconnections, interdependencies and a research agenda. *Higher education*, *56*(3), 303-324.

Koekkoek, A., Van Ham, M., & Kleinhans, R. (2021). Unraveling university-community engagement: A literature review. *Journal of Higher Education Outreach and Engagement*, *25*(1).

Letizia Lo Presti & Vittoria Marino (2019): Is online public engagement a new challenge in the university communication plan? A managerial perspective, Studies in Higher Education, DOI: 10.1080/03075079.2019.1619680

Lo Presti, L., Maggiore, G., Marino, V., & Resciniti, R. (2024). Inclusion and social justice in sustainable higher education: An integrated perspective through the lens of public engagement. *Journal of Management and Governance*, 1-39.

Marino, V., & Lo Presti, L. (2018). Approaches to university public engagement in the online environment: insights from Anglo-Saxon higher education. *International journal of educational management*, *32*(5), 734-748.

Mtawa, N. N., Fongwa, S. N., & Wangenge-Ouma, G. (2016). The scholarship of university-community engagement: Interrogating Boyer's model. *International Journal of Educational Development*, *49*, 126-133.

Perkmann, M., Salandra, R., Tartari, V., McKelvey, M., & Hughes, A. (2021). Academic engagement: A review of the literature 2011-2019. *Research Policy*, *50*(1), 104114.

Sánchez-Barrioluengo, M., & Benneworth, P. (2019). Is the entrepreneurial university also regionally engaged? Analysing the influence of university's structural configuration on third mission performance. *Technological forecasting and social change*, *141*, 206-218.

Sandmann, L. R., Saltmarsh, J., & O'Meara, K. (2016). An integrated model for advancing the scholarship of engagement: Creating academic homes for the engaged scholar. *Journal of Higher Education Outreach and Engagement*, *20*(1), 157-174.

Soper, D.S. (2023). *A-priori Sample Size Calculator for Structural Equation Models* [Software]. https://www.danielsoper.com/statcalc.

Sugawara, C. L., Kim, H. W., Stanke, K. M., Krasniqi, V., & Basic, S. (2023). The role of community-university engagement in strengthening local community capacity in Southeastern Europe. *International journal of educational development*, *98*, 102747.

Thomas, E., & Pugh, R. (2020). From 'entrepreneurial'to 'engaged'universities: social innovation for regional development in the Global South. *Regional Studies*, *54*(12), 1631-1643.

Trippl, M., Sinozic, T., & Lawton Smith, H. (2015). The role of universities in regional development: Conceptual models and policy institutions in the UK, Sweden and Austria. *European Planning Studies*, *23*(9), 1722-1740.

Uyarra, E. (2010). Conceptualizing the regional roles of universities, implications and contradictions. *European Planning Studies*, *18*(8), 1227-1246.

Vargiu, A. (2014). Indicators for the evaluation of public engagement of higher education institutions. *Journal of the Knowledge Economy*, *5*, 562-584.

Youtie, J., & Shapira, P. (2008). Building an innovation hub: A case study of the transformation of university roles in regional technological and economic development. *Research policy*, *37*(8), 1188-1204.

Weerts, D. J., & Sandmann, L. R. (2010). Community engagement and boundary-spanning roles at research universities. *Journal of Higher Education*, 81(6), 632-657. https://doi.org/10.1080/00221546.2010.11779075.

6 CONCLUSIONS

This thesis was developed within the context of potential interactions among three spheres: university, industry, and government. More specifically, aspects of PPs directed toward both the industrial sector and the educational field—namely, the university—were examined in the broader context of promoting economic, social, and sustainable development in society. Articles 1 and 2 relate to the industrial field, while Articles 3 and 4 focus on the educational field. Together, the four articles form a sequential structure that supports the overall thesis of this PhD work and approach adopted. Figure 8 shows the flow of the work done in this thesis.

Figure 8. Work thesis flow

Source: author

The trajectory of the developed work in this thesis was initiated with a contextualization that problematized and then established objectives for this research endeavour. Then, focusing on the context of PPs for industry and education, four scientific articles were developed. As indicated in Figure 8, the logic used for the development of the whole research was to firstly investigate a field where PPs are implemented in relation to the industry (related to SDG 9), that is the IE.

Drawing on the results of that first article (impact and DC), the second article evaluated the impact of a Brazilian national program that aims to foster export using the lens of DC in the analysis. After that and now focusing on PPs directed to the educational field (related to SDG 4), a third article was developed to analyse how future professionals are being prepared to face the global context that new professionals will face—such as the one explored in the second article of this thesis. This issue is central to this discussion and was incorporated into this thesis in terms of its relationship with industry and education, evidenced in the PPs that can contribute to this development.

Specifically, given the global nature of IE, one of the fields in which these professionals may operate, the aim of this thesis was to investigate how well are students equipped to navigate such a context. This inquiry becomes even more relevant considering the statistical analysis made in Article 2, which showed no statistically significant impact for the Brazilian program evaluated. This result, alongside other aspects found such as implementation problems, lack of feedback, can be taken as evidence of the lack of statistical significance and perhaps and more importantly, the lack of preparation of members of those companies in the evaluated programme when it comes to implementing actions indicated by the programme (Ortiz-Rojo, Lacruz & Ferreira, 2025).

The third article of this thesis evaluated the direct and indirect effects of EI on GC and sustainability dimensions. Additionally, the moderator effect of a geopolitical aspect was measured. Therefore, it is essential to consider how future professionals are being prepared in terms of GC to face the challenges of the global context. This preparation is closely linked to their development in professional activities, as well as to the performance of the companies they will work for. In addition to the university's role in fostering innovation (Etzkowitz, 2008) and interacting with the other two spheres (Etzkowitz & Leydesdorff, 2000), it is also necessary to incorporate aspects related to the global context—namely, GC—into this equation.

Finally, apart from what was related to the educational role of university (first mission), the fourth article investigated the public engagement of universities through professors' involvement in outreach projects (third mission of universities), considered here as evidence of the contributions of education as a PP to the development addressed in this thesis. The idea was to study how the university, the industry and the government can contribute for economic, social and sustainable development. In the case of the university, it is proposed that its contribution goes beyond the preparation of new professionals for the job market to foster innovation—through, for example, startup labs—and collaborations with the other two spheres. Part of this contribution can be materialized through the university third mission of outreach, particularly through the involvement of professors in outreach activities aimed at directly addressing societal challenges and contributing to the broader development discussed in this thesis.

Epistemologically speaking, this thesis used THM as an umbrella lens combined with a variety of lens and methodological approaches to develop the four articles that composed the whole research endeavour. This thesis can be considered comprehensive in its extent. It compasses PPs related to the fields of industry and education and the interaction of these fields to foster an economic, social and sustainable development. Because of the challenging and complex context of the phenomenon investigated in this thesis a varied selection of lens and methodologies were used to address the object of investigation.

This thesis adopts an epistemological pluralism compatible with a post-positivist stance, which acknowledges the existence of an empirical reality that is accessible through different methods, although conditioned by biases (Phillips & Burbules, 2000). The use of bibliometric techniques in Article 1 follows a descriptive post-positivist tradition. In Article 2, the impact assessment draws on assumptions of causal positivism. Article 3, on the other hand, explores the relationships within nomothetic models based on a relational explanatory post-positivist logic. Finally, in Article 4, the development of a measurement instrument is grounded in pragmatic post-positivist assumptions, focused on the validity of the scales.

Having said that and considering that the contribution of each article is discussed on each text and further exposed in this conclusion section of this thesis, it is convenient to highlight the theoretical contribution of the thesis as a whole. The THM in its proposal of interaction among the spheres of university, industry and government argue that as a result of the increased interaction fostered by this model, not only hybrid organizations can emerge (Etzkowitz & Leydesdorff, 2000)—but also enhanced learning and development across all three spheres, supporting the core objective of the THM, which is fostering innovation and driving growth within a knowledge-based economy (Leydesdorff & Etzkowitz, 1996; Etzkowitz, 2008).

New frameworks to better explain the evolving relationships among the spheres and the innovations have been put forward after that argument. Carayannis and Campbell (2009) and Leydesdorff (2012) introduced the concept of a 'fourth helix' (regarding culture), while Carayannis and Campbell (2010) proposed a 'fifth helix' (regarding the environment). Additionally, Peris-Ortiz et al. (2016) proposed a 'Multiple Helices' (regarding ecosystems), reflecting the growing complexity of innovation systems.

The contribution of this thesis does not add another helix to the THM, because that would mean transforming the THM in an *ad infinitum* process. More important than that, it deepens and situates the discussion on the role of each sphere so as to improve the contribution of each one for the desired development. In the case of the university, apart from fostering innovation and knowledge, the thesis proposes it fosters GC and a direct contribution to the development here addressed through its third mission. Articles 3 and 4 help to understand the importance of these aspects when it comes to the current role of university in fostering and working for an economic, social and sustainable development of society.

As for the industry, the THM may not have the same responsibility level of university in the model but, considering the results of this thesis, the industry can have a more prominent role in cooperating with the other spheres in terms of implementation of PPs and research purposes which can be inputs for the advancement of future initiatives that go into industry benefits. Put differently, besides the important role of industry (companies) in economy, for example generating jobs, incomes and applying their own strategies to face the challenges of the global context, they can strengthen their cooperation with the other spheres which can result in new initiatives and applications for the industry with the potential to benefit all parties.

For the government helix, aspects related to evaluation can be added to the model. That is, in the interaction and cooperation with the other spheres, the evaluation of PPs can be considered so that improvements and feedback based on these evaluations can contribute to the improvement of those PPs. Therefore, more than adding helices, what can be considered an advancement for the THM is the deepening of the helices into aspects related to the role of each helix and its cooperation with the others. The aforementioned argument can contribute to research initiatives working in different fields applying or analysing the THM.

Regarding the limitations of the thesis and considering the Brazilian programme evaluated, evidence of a statistical impact on the variable of interest was not found. This result could appear as a contradiction to the thesis of cooperation an interaction of the three spheres for the development here addressed. Notwithstanding the lack of significance, it is precisely at this point where insights appear and contributions for the THM are originated as exposed earlier in this conclusions section. The economic, social and sustainable development is a global and ongoing challenge that needs to be addressed through approaches like THM. Therefore, the findings and contributions of this thesis, specifically for the THM and the ones exposed in each article of this research endeavour are indeed valuable.

Regarding PPs directed toward industry, this thesis first provides valuable insights and a state of the art of a field in which PPs are implemented to promote entrepreneurship and exports—namely, IE. As such, this thesis makes a relevant contribution to research on the IE field, bringing thematic maps of different periods that help to understand not only the state of the art of each time frame, but also, and perhaps more representatively, the thematic evolution of the cognitive structure of the IE field. Moreover, the thesis presents empirical findings related to the implementation of a specific PP in this IE sector, contributing both practically and theoretically. The practical contribution involves the evaluation of a program designed to foster exports, while the theoretical contribution stems from the use of the DC lens, offering new insights to the PPs field when coupled with the DC lens.

Furthermore, in considering the university as part of an educational policy with the potential to support economic, social, and sustainable development, this thesis explored how universities prepare new professionals to operate in a global context. The results of this article, among others, contribute for a further discussion about a Sustainable Global Entrepreneurship. Additionally, the thesis examined the university's contribution to society through the involvement of professors in its third mission of outreach, offering tools to measure such contribution.

To address the context outlined above, and as previously mentioned, four scientific articles were developed, each of which aligned with specific research objectives. Table 1 presents an overview of these articles, including their respective objectives and main findings.

Table 1. Objectives and findings by article

Article 1	To understand the cognitive structure of the research area of IE	Three thematic maps representing the periods of 1995-2004, 2005-2014 and 2015-2022 were yielded. IE is a research area that has grown significantly since the second period, showing a considerable increase in publications from 127 in the first period to 1,042 in the second. This increase remained constant reaching 1,934 in the third and final period. The themes that stood out the most and were most representative in the field of IE were performance of companies in IE, innovation, knowledge, entrepreneurial companies, entrepreneurial orientation, management, strategy, model and export behaviour. A conceptual variation of the themes was also observed with the performance theme standing out, maintaining a high representativeness in the three periods analysed with displacements between the basic themes –

		transversal – and the driving themes. Another highlight was the capabilities' theme, which, over time, resulted in the dynamic capabilities theme. As emerging themes, performance, entrepreneurial orientation, entrepreneurship, impact and management appear. Based on the results and conclusions of this study, a research agenda was proposed
Article 2	To evaluate the potential impact, at the national level, of the PEIEX program on the exports of companies from municipalities participating in the program	The analysis revealed that there was no statistically significant variance in export performance between the municipalities that took part in the EPP and those that did not. The inclusion of lagged dependent variables and placebo group tests further confirmed the findings of no impact. It is suggested that policymakers consider refining the execution of EPP by incorporating learning and feedback mechanisms to ensure long-term impact, which could influence future program adaptations
Article 3	To analyse the direct and indirect effects in the relationship between EI, GC and the three dimensions of sustainability and the moderated (by a geopolitical aspect) effect in the relationship between the dimensions of GC and sustainability dimensions	The results of this study suggested that there is a direct positive effect of future professionals' entrepreneurial intention on the three dimensions of sustainability, as well as on the three dimensions of global competence. Also, that in the positive effect of entrepreneurial intention on the social dimension of sustainability there is an indirect effect through students' intercultural communication dimension of global competence and that in the positive effect of entrepreneurial intention of future professionals on the environmental dimension of sustainability there is an indirect effect through students' self-awareness dimension of global competence. The empirical evidence of this study represents a valuable contribution in terms of theory and practice for studies addressing sustainability and how new professionals are being equipped to face such a challenge. Also, the results of the study pave the way for a broader discussion of Sustainable Global Entrepreneurship
Article 4	To empirically test a developed instrument and assess the fit of a model that examines professors' involvement in outreach projects	The results indicate that the Confirmatory Factor Analysis successfully validated the instrument (scale) developed and the model to measure university public engagement trough outreach projects professors' involvement. This study contributes to future research and practice by enhancing our understanding of professors' involvement in publicly engaged universities and its broader societal impact, offering a validated model for its measurement. In doing so, these findings offer new insights for university management and policymaking by systematically measuring professor-driven public engagement

Source: author

Based on the results of the four articles that composed this thesis, it is possible to reflect on their contributions and consider potential actions to foster the economic, social, and sustainable development addressed throughout this thesis. To reiterate, in the context of this study, such development is understood as contributing to the common good of society, going beyond economic issues (UNPD, 2022).

To make such development plausible, this thesis adopts the view that the interaction and cooperation among university, industry and government can play a crucial role (Etzkowitz, 2008). Within the context of this thesis and considering the lack of statistically significant impact of the evaluated program—PEIEX—on the export performance of companies from the participating municipalities, the interaction and cooperation among the involved spheres may be insufficient or inadequately addressed. Furthermore, the absence of feedback from this program, either to participants or to those responsible for its implementation (Ortiz-Rojo, Lacruz & Ferreira, 2025), highlights the need for enhanced cooperation among these spheres. The outcomes of Article 2 reinforce the importance of cooperation among the spheres, as proposed by the THM, and invite further reflection on this dynamic in various contexts—particularly within the Brazilian context, where the evaluated program is implemented.

In the introductory chapter of this thesis, a comprehensive context was presented to frame the societal development issues addressed in this thesis. The way government decisions (Acemoglu et al., 2014) and political systems have historically influenced national development trajectories over time (Maddison, 2006; Burroni, 2020) was presented. Various indices were also discussed to illustrate the positive or negative consequences of government actions, highlighting the importance of PPs in shaping development outcomes (King & Rebelo, 1990; Reinert, 1999; Acemoglu et al., 2014; Burroni, 2020).

One of the key indices discussed is the HDI, which highlights disparities in development across countries (UNDP, 2024). To some extent, this index may reflect the impact of government decisions and the outcomes of PPs implementation, influencing how a country is positioned in global development rankings.

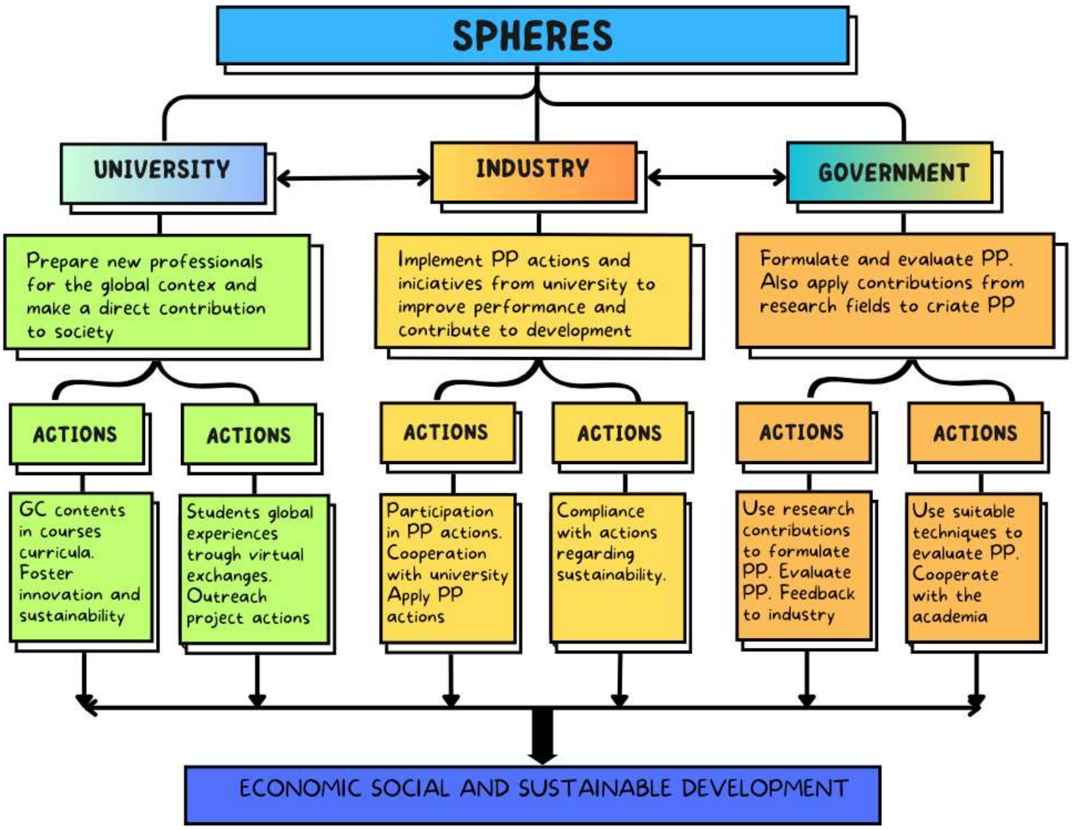
Conversely, the GMPI offers insight into the more adverse aspects of development (GMPI, 2021, 2024) reinforcing the necessity of research efforts in terms of PP. Regarding the specific context of industry, the implementation of PPs aimed at fostering exports—such as the program evaluated in the second article of this thesis—can influence national competitiveness. This is reflected not only in competitiveness indices like reported in CNI (2025), but also in export performance metrics (CNI, 2024).

Another aspect understood as somehow affecting advances either in the industry or the education field has to do with the preparation of new professionals when it comes to bringing well equipped professionals into industry. New professionals should be capable of facing a global context. For example, in the case of IE, Ortiz-Rojo and Lacruz (2023c) reported the challenging context of Brazilian federal universities regarding IE contents addressed in their business courses. Also highlighted in the initial part of this thesis, was the importance of addressing the preparation of new professionals in terms of their GC to develop in a global context (Ortiz-Rojo & Lacruz, 2025).

Indeed, that brief recall of what was presented in the introductory part of this thesis reinforces the idea of bringing together the spheres here addressed to foster the development of society as discussed in this thesis contributing to the SDG 4 and SDG 9. The former related to education and the latter to industry, both seeing as achievable through the formulation, application and evaluation of PPs.

The interaction among university, industry and government in this thesis is not understood as a linear process, but rather as a process with potential for a permanent cooperation where one sphere can contribute to other(s) (Etzkowitz & Leydesdorff, 2000). Besides the discussions and conclusions on each article of this thesis, Figure 9 below briefly presents the three spheres with their general purposes and recommended actions that can be taken to contribute to the economic, social and sustainable development discussed in this thesis.

Figure 9. Sphere's role for economic, social and sustainable development



Source: author

As shown in the Figure 9, each sphere can play an important role and cooperate with each other to contribute to the economic, social and sustainable development. The university can work to prepare new professionals to face the global context. Including global issues in university courses is necessary and international experiences can be productive in terms of putting students in contact with the global context. Given financial constraints that many students face - which is the case of Brazil - virtual exchanges initiatives are a real possibility to make that experience possible as reported in Ortiz-Rojo and Lacruz (2025).

Additionally, beyond its role in education - such as forming new professionals and developing research - which can contribute to formulate PPs and inform the industry - the university can contribute making a direct contribution to society. In this thesis there is an understanding that the university, through its third mission of outreach, can materialize such contribution. More especially, the role of professors in outreach projects is key when it comes to effectively making that contribution. In that regard, Article 4 of this thesis makes a relevant contribution to research and policymakers. The article offers validated tools to measure university public engagement trough outreach projects professors' involvement advancing the role of universities when it comes to the contribution to the development here defended.

To achieve what was exposed above regarding the university, actions are needed. Table 2 further explains the actions presented in Figure 9.

Table 2. University actions to foster development

Action	Description
GC contents in courses curricula	Inclusion of contents regarding the economic, social and sustainability aspects of today's global context so that create students' awareness not just about their local context, but rather regarding the global one which affect their local.
Foster innovation and sustainability	Given the global problematic regarding the environment and sustainability, fostering innovation can help also to find solutions and contributions to that problematic.
Facilitate students' global experiences	Given the impossibility of most students of having an international exchange experience, Virtual Exchanges are a real opportunity to put students in international cooperation experiences which can contribute to their GC acquisition.
Outreach project actions	Involve professors and students in outreach activities can help to make a direct contribution to society and consequently to the development here discussed. Besides, this contribution could be made to the near community of the university, stretching the relationship between university and its community, as well as perhaps an acknowledgment of the role of university in society.

Source: author

Regarding the role of industry, when it comes to the formulation and implementation of PPs aiming at supporting companies, it is expected that participating companies can cooperate in terms of the implementation of actions considered in a given PP. Also, feedback for facilitating both, to achieve PPs goals and PPs evaluations need to be contemplated. In the case of SMEs, considering that those are the ones that need more support, PPs should be continuously formulated for that sake. However, the participation of companies in terms of a real implementation of PPs should also be considered as reported by Ortiz-Rojo, Lacruz and Ferreira (2025).

Additionally, the industry can take advantage of programs aiming at supporting companies which are originated in universities. For example, participation in startup labs, innovation centres, research labs, or using scientific research evidence to learn and perhaps implement new actions in their strategies, among others. Additionally, all the above-mentioned aspects regarding the industry - thinking on the development of society in this thesis exposed - need to be coupled with strategies and actions that companies should have in their business models as those related to sustainability.

Table 3 presents the actions above mentioned.

Table 3. Industry actions to foster development

Action	Description
Participation in PP initiatives	Companies can search for help- specially SMEs- and be informed regarding PPs available initiatives. If the company participates in a given PP initiative, then this participation must be real in terms of completing all actions. As such, maybe PPs goals are achieved, and PPs evaluations are supported
Cooperate with the university	Companies and the industry can contribute with universities in terms of research. Information regarding companies in a given field can support the realization of research endeavours that will support new initiatives aiming at the formulation of PPs, supporting companies and the industry in general
Participation in university initiatives	Companies can take advantages of university initiatives so that improve their performance and learning processes. As such, new capabilities can be introduced into the company and into its business model
Actions regarding sustainability	Besides the actions above mentioned, companies can have their own initiatives so that to contribute for example in terms of sustainability. All these actions together can help to achieve an economic, social and sustainable development

Source: author

Regarding the government, its important role in the formulation of PPs can be subsidized by drawing on academic research for that formulation. It would be constructive to have more synergies in terms of cooperation aiming at formulating PPs towards economic, social and sustainable development. In fact, this cooperation could extent to the act of starting a business, as mentioned in the introductory part of this thesis, where bureaucracy is challenging for countries like Brazil.

Another aspect that is seldom addressed in relation to PPs, as noted in both the introductory chapter and the second article of this thesis, is evaluation. The government, along with the formulation and implementation of PPs, needs to evaluate PPs to make informed decisions. Moreover, considering the observed lack of feedback in the case of the program evaluated in the second article of this thesis, and the potential of these results to be extended to other PPs, feedback needs to be delivered to the PP implementation responsible and participating companies. This is quite an important point that can help to improve PPs outcomes and favour potential adjustment for future editions.

Additionally, in evaluating the impact of PPs, more suitable techniques need to be used. Again, in the case of the impact evaluation made in the second article of this thesis, the econometrics techniques used were the more suitable techniques for that case for making causal inferences with that context and availability of data. Although, as informed by Ortiz-Rojo, Lacruz and Ferreira (2025), it was identified an evaluation action for that program, it did not consider any causality effect technique as must be applied to infer any causality in the case of PPs. Table 4 presents actions related to the government.

Table 4. Government actions to foster development

Action	Description
Subsidized the formulation of PPs	The formulation of PPs should be supported alongside other initiatives, incorporating input from university research efforts. This process should function as a continuous feedback loop that includes the evaluation of PPs
Evaluation of PPs	In addition to formulating and implementing PPs, the government must also evaluate them to support informed decision-making. The evaluation of PPs should employ the most appropriate methodologies to determine whether these programs genuinely have an impact
Feedback regarding PPs outcomes	Feedback should be provided to those responsible for PP implementation as well as to the participating companies. Participants can review their actions and level of involvement, while the individuals overseeing the implementation can use this feedback to enhance their experience and consider adjustments for future editions
Cooperation with the academia	Alongside utilizing subsidies from academic institutions for the formulation of PPs, the government can also collaborate with universities through ongoing efforts to improve the development discussed in this thesis. Actions related to PPs and programs can foster innovation within universities and the broader community, encouraging the pursuit of solutions in areas such as sustainability, among others

Source: author

As presented in these conclusions and the last part of this thesis, the role of each sphere, that is, university, industry and government is necessary and relevant within a context of permanent cooperation to foster the development in this thesis discussed. These conclusions are aligned with the overall lens used in this thesis, namely, THM. Taken together the findings of this study confirm that collaboration among universities, industry, and government in public policy processes—when each actor fulfils its role while supporting the others—can promote economic, social, and sustainable development.

The application of the recommended actions presented in this final part of the thesis can contribute to make possible the thesis here defended and bring the benefits that go beyond economics issues, that is, the ones related to the development of people immerse in a rapidly evolving more global context.

Finally, I would like to take the liberty of offering a metaphor — one that, at least in my mind, captures the essence of the connection and cooperation among the three spheres discussed in this thesis.

Imagine the dynamic among the university, the industry and the government as a reflection of one of the most fascinating phenomena in physics: entropy. Commonly associated with disorder and the ever-expanding universe, entropy is often misunderstood. While it is true that entropy involves dispersion and transformation, it is not merely chaos — it is also about energy distribution and the ongoing evolution of systems.

In light of this metaphor, let us imagine the environment shaped by the interaction of the three spheres as a closed system — a kind of universe where each sphere draws energy from the collective system to grow, transform, and evolve. Crucially, this energy exchange is not a zero-sum game. As each sphere develops, it not only consumes energy but also feeds back to the system, fostering an ongoing cycle of mutual reinforcement and renewal. University can contribute back with education for new professionals here discussed (SDG 4) and with a direct contribution to society. The industry, in cooperating with the other spheres, can create jobs generating income for people. Also, it can contribute to the national economy in terms of exports, performance and innovation figures (SDG 9), for example. In the case of government, it can contribute back to the system by refining PPs which might consider contributions from the other spheres for its formulation and the evaluation of them, thus creating new PPs that foster the development for society.

This metaphor of entropy reminds us that progress arises not from isolated action, but from dynamic interplay. Just as entropy fuels the cosmos, the collaborative energy between these spheres fuels the economic, social and sustainable development of society.

REFERENCES

Acemoglu, D., Gallego, F. A., & Robinson, J. A. (2014). Institutions, human capital, and development. *Annu. Rev. Econ.*, *6*(1), 875-912.

Acs, Z., & Storey, D. (2004). Introduction: *Entrepreneurship and economic development. Regional studies*, V. 38.8, pp. 871-877.

Acs, Z. (2008). How is entrepreneurship good for economic growth? *Entrepreneurship, Growth and Public Policy* (pp. 291-301). Edward Elgar Publishing.

Acs, Z., Åstebro, T., Audretsch, D., & Robinson, D. T. (2016). Public policy to promote entrepreneurship: a call to arms. *Small business economics, 47*, 35-51.

Acs, Z. J., & Szerb, L. (2007). Entrepreneurship, economic growth and public policy. *Small business economics, 28*, 109-122.

Apexbrasil. (n.d) *Programa de qualificação para exportação PEIEX*. Retrieved from: https://portal.apexbrasil.com.br/qualifique-sua-empresa-peiex/.

Audretsch, D. B. (2014). From the entrepreneurial university to the university for the entrepreneurial society. *The Journal of Technology Transfer*, *39*, 313-321.

Autio, E. (2005). Creative tension: the significance of Ben Oviatt's and Patricia McDougall's article 'toward a theory of international new ventures'. *Journal of International Business Studies*, *36*, 9-19.

Batista, M., Domingos, A., & Vieira, B. (2021). Políticas públicas: modelos clássicos e 40 anos de produção no Brasil. *BIB-Revista Brasileira de Informação Bibliográfica em Ciências Sociais*, (94), 1-25.

Baumol, W. J. (2004). *Welfare Economics and the Theory of the State* (pp. 937-940). Springer US.

Becker, G. S., & Mulligan, C. B. (2003). Deadweight costs and the size of government. *The Journal of Law and Economics*, *46*(2), 293-340.

Borges, C., Najberg, E., Ferreira, V. R. S., & Costa, C. S. (2013). Perfil das recomendações dos pesquisadores brasileiros às políticas públicas de empreendedorismo. *Administração Pública e Gestão Social*, 02-09.

Breschi, S., et al. (2019), "Public research and innovative entrepreneurship: Preliminary cross-country evidence from micro data", OECD Science, Technology and Industry Policy Papers, No. 64, OECD Publishing, Paris.

Burroni, L. (2020). *Public policies, productivity and economic growth in OECD countries* (No. hal-03455959). HAL.

Campos, R. C., Valadares, G. C., Andrade, D. M., & Lopes, M. A. (2020). Empreendedorismo como Contribuição para Formação Docente na Pós-Graduação

Brasileira/Entrepreneurship as Contribution to Professor´ S Formation in the Brazilian Post-Graduation. *Revista FSA (Centro Universitário Santo Agostinho)*, *17*(7), 176-199.

Capella, A. C. N. (2020). Estudos sobre formação da agenda de políticas públicas: um panorama das pesquisas no Brasil. *Revista de Administração Pública*, *54*, 1498-1512.

Carayannis, E. G., & Campbell, D. F. (2009). 'Mode 3'and'Quadruple Helix': toward a 21st century fractal innovation ecosystem. *International journal of technology management*, *46*(3-4), 201-234.

Carayannis, E. G., & Campbell, D. F. (2010). Triple Helix, Quadruple Helix and Quintuple Helix and how do knowledge, innovation and the environment relate to each other?: a proposed framework for a trans-disciplinary analysis of sustainable development and social ecology. *International Journal of Social Ecology and Sustainable Development (IJSESD)*, *1*(1), 41-69.

Castaño, M. S., Méndez, M. T., & Galindo, M. Á. (2016). The effect of public policies on entrepreneurial activity and economic growth. *Journal of Business Research*, *69*(11), 5280-5285.

Confederação Nacional da Indústria. (2025). Competitividade Brasil. Retrieved from: Competitividade Brasil - Portal da Indústria - CNI.

Confederação Nacional da Indústria. (2020). Competitividade Brasil 2019-2020. – Brasília: CNI.

Confederação nacional da indústria. (2022). *Desempenho da Indústria no Mundo* / Confederação Nacional da Indústria. Brasília: Ano 6 • Número 1 • Setembro. Retrieved from: Desempenho da indústria no mundo - Portal da Indústria - CNI.

Confederação nacional da indústria. (2024). *Desempenho da Indústria no Mundo* / Confederação Nacional da Indústria. Brasília: Ano 8 • Número 1 • Dezembro. Retrieved from: Desempenho da indústria no mundo - Portal da Indústria - CNI.

Coordenação de aperfeiçoamento de pessoal de nível superior. (2019). *Proposta de Aprimoramento da Avaliação da Pós-Graduação Brasileira para o Quadriênio 2021-2024 – Modelo Multidimensional*. Retrieved from: https://www.gov.br/capes/pt-br/centrais-de-conteudo/25052020-relatorio-final-2019-comissao-pnpg-pdf/view.

Da Cruz, N. F., & Marques, R. C. (2014). Revisiting the determinants of local government performance. *Omega*, *44*, 91-103.

Etzkowitz, H. (2008). *The Triple Helix: University–Industry–Government Innovation in Action*. Routledge, 270 Madison Ave, New York, NY 10016.

Etzkowitz, H., & Leydesdorff, L. (1995). The Triple Helix--University-industry-government relations: A laboratory for knowledge based economic development. *EASST review*, *14*(1), 14-19.

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university–industry–government relations. *Research policy*, *29*(2), 109-123.

Etzkowitz, H., & Zhou, C. (2017). Hélice Tríplice: inovação e empreendedorismo universidade-indústria-governo. *Estudos avançados*, *31*, 23-48.

Facchini, F., & Melki, M. (2013). Efficient government size: France in the 20th century. *European Journal of Political Economy*, 31, 1-14.

Flores, D. C., Hoeltgebaum, M., & Silveira, A. (2008). O ensino do empreendedorismo nos cursos de pós-graduação em administração no Brasil. *Revista de Negócios*, 13(2), 93-104.

GEM (Global Entrepreneurship Monitor) (2023). Global Entrepreneurship Monitor 2022/2023 Global Report: Adapting to a “New Normal”. London: GEM.

Gertler, P. J., Martínez, S., Premand, P., & Rawlings, L. B. (2018). *Avaliação de Impacto na Prática*, segunda edição. World Bank Publications.

Guimarães, Felipe Furtado, & Kyria Rebeca Finardi. 2021. “Global Citizenship Education (GCE) in Internationalisation: COIL as Alternative Thirdspace.” Globalisation, Societies and Education 19 (5): 641–657.

Hauner, D., & Kyobe, A. (2010). Determinants of government efficiency. *World Development*, 38(11), 1527-1542.

Henrique, D. C., & Cunha, S. K. D. (2008). Práticas didático-pedagógicas no ensino de empreendedorismo em cursos de graduação e pós-graduação nacionais e internacionais. RAM. *Revista de Administração Mackenzie*, 9, 112-136.

Jann, W., & Wegrich, K. (2017). Theories of the policy cycle. In *Handbook of public policy analysis* (pp. 69-88). Routledge.

Johanson, J., & Vahlne, J. E. (1977). The internationalization process of the firm—a model of knowledge development and increasing foreign market commitments. In *International business* (pp. 145-154). Routledge.

Jongbloed, B., Enders, J., & Salerno, C. (2008). Higher education and its communities: Interconnections, interdependencies and a research agenda. *Higher education*, *56*, 303-324.

King, R. G., & Rebelo, S. (1990). Public policy and economic growth: developing neoclassical implications. *Journal of political Economy*, *98*(5, Part 2), S126-S150.

Knight, G. A., & Cavusgil, S. T. (1996). The born global firm: A challenge to traditional internationalization theory. *Advances in International Marketing*, 8, 11-26.

Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born-global firm. *Journal of International Business Studies*, 35(2), 124-141.

Knight, G. A., & Liesch, P. W. (2016). Internationalization: From incremental to born global. *Journal of World Business*, 51(1), 93-102.

Lacruz, A. J. (2016). Governance for partnership sustainability: An approach from the agency theory. In *Multiple helix ecosystems for sustainable competitiveness* (pp. 27-43). Springer, Cham.

Leydesdorff, L. (2000). The triple helix: an evolutionary model of innovations. *Research policy*, *29*(2), 243-255.

Leydesdorff, L., & Etzkowitz, H. (1996). Emergence of a Triple Helix of university—industry—government relations. *Science and public policy*, *23*(5), 279-286.

Leydesdorff, L., & Etzkowitz, H. (1998). The triple helix as a model for innovation studies. *Science and public policy*, *25*(3), 195-203.

Leydesdorff, L. (2012). The triple helix, quadruple helix,…, and an N-tuple of helices: explanatory models for analyzing the knowledge-based economy?. *Journal of the knowledge economy*, *3*(1), 25-35.

Maddison, A. (2006). *The world economy*. OECD publishing.

Malacarne, R., & Brunstein, J. (2021). Discursos e Iniciativas Educacionais de Desenvolvimento de Competências para a Sustentabilidade do World Business Council for Sustainable Development. *Organizações & Sociedade*, *28*, 917-943.

Mazzucato M. (2013). *The entrepreneurial state*: *debunking public vs private sector myths*. Anthem press. London - New York – Delhi.

McDougall, P. P., & Oviatt, B. M. (2000). International entrepreneurship: the intersection of two research paths. *Academy of management Journal*, *43*(5), 902-906.

Ministério da economia. Estratégia Federal de Desenvolvimento para o Brasil relativa ao período de 2020 a 2031 (EFD 2020-2031). Retrieved from: https://www.gov.br/economia/pt-br/assuntos/gestao/estrategia-federal-de-desenvolvimento.

Morais, D. B., & Ogden, A. C. (2011). Initial development and validation of the global citizenship scale. *Journal of Studies in International Education*, *15*(5), 445-466.

Naretto, N., dos Reis Botelho, M., & Mendonça, M. (2004). A trajetória das políticas públicas para pequenas e médias empresas no Brasil: do apoio individual ao apoio a empresas articuladas em arranjos produtivos locais. *Planejamento e políticas públicas*, (27). 61-115.

The Nobel Prize. (2021). Press release. Retrieved from: https://www.nobelprize.org/prizes/economic-sciences/2021/press-release/.

OECD (2016). Global competency for an inclusive world. Directorate for Education and Skills OECD. 2, rue André Pascal 75775 Paris Cedex 16 France.

OPHI (Oxford Poverty and Human Development Initiative) and UNDP (United Nations Development Programme) (2024). *Global Multidimensional Poverty Index 2024: Poverty amid conflict*. United Nations Development Programme and Oxford Poverty and Human Development Initiative.

Ortiz-Rojo, R. (2025) 'Variables affecting the internationalisation of small and medium-sized companies', Int. J. Business and Globalisation, Vol. 41, No. 1, pp.1–24.

Ortiz-Rojo, R. A., & Finardi, K. R. (2022). Internationalization of universities and quality education: a focus on teaching, research and outreach activities. Acta Scientiarum. Human and Social Sciences, 44(2).

Ortiz-Rojo, R. and Lacruz, A. (2026). Students' motivation to participate in virtual exchange and its moderating effect on global competence. Revista portuguesa de educação.

Ortiz-Rojo, R. e Lacruz, A. (2023a). Empreendedorismo Internacional: mapeamento temático e proposta de agenda de pesquisa. *Revista Organizações & Sociedade*, V. 30, N. 105, pp. 302-328.

Ortiz-Rojo, R. A., & Lacruz, A. J. (2023b). Avaliação de impacto de políticas públicas: diretrizes para a avaliação do PEIEX. *Anais do Encontro brasileiro de Administração Pública*. Brasília, DF, Brasil, 10.

Ortiz-Rojo, R., & Lacruz, A. J. (2023c). Empreendedorismo Internacional em Cursos Superiores de Administração Brasileiros. *Revista de Empreendedorismo e Gestão de Micro e Pequenas Empresas*, *8*(02), 68-87.

Ortiz-Rojo, Ramon Andres; Lacruz, Adonai José; Ferreira, João J.. POLÍTICA PÚBLICA E EXPORTAÇÕES BRASILEIRAS: ANÁLISE DO PROGRAMA NACIONAL DE QUALIFICAÇÃO PARA EXPORTAÇÃO.. In: Anais do Encontro Brasileiro de Administração Pública. Anais...Ananindeua(PA) Unama, 2025. Disponível em: https//www.even3.com.br/anais/encontro-brasileiro-administracao-publica/1059457-POLITICA-PUBLICA-E-EXPORTACOES-BRASILEIRAS--ANALISE-DO-PROGRAMA-NACIONAL-DE-QUALIFICACAO-PARA-EXPORTACAO. Retrieve on: 22/07/2025

Oviatt, B.M. and McDougall, P.P. (1994) 'Toward a theory of international new ventures', *Journal of International Business Studies*, Vol. 25, No. 1, pp.45–64.

Peiex. Programa de Qualificação Para a Exportação. Retrieved from: https://portal.apexbrasil.com.br/qualifique-sua-empresa-peiex/.

Peris-Ortiz, M., Ferreira, J. J., Farinha, L., & Fernandes, N. O. (2016). Introduction to multiple helix ecosystems for sustainable competitiveness. In *Multiple helix ecosystems for sustainable competitiveness* (pp. 1-13). Springer, Cham.

Phillips, D. C., & Burbules, N. C. (2000). *Postpositivism and educational research*. Rowman & Littlefield Publishers.

Pierson, C. (2004). *The Modern State*. Second edition, Taylor & Francis e-Library.

Ramacciotti, B. L., & Bernardino, M. C. D. C. (2020). Vertentes epistemológicas das políticas públicas: entre as análises descritiva e prescritiva. *Cadernos de Pesquisa*, *50*, 56-76.

Reinert, E. S. (1999). The role of the state in economic growth. *Journal of economic Studies*, *26*(4/5), 268-326.

Sabatier, P. A., & Weible, C. M. (Eds.). (2007). *Theories of the policy process*. Westview press.

Secretaria de comércio exterior. *Relatório do Comércio exterior brasileiro de serviços 2020*. Retrieved from: https://www.gov.br/produtividade-e-comercio-exterior/pt-br/assuntos/comercio-exterior/publicacoes-secex/boletins-de-comercio-exterior/arquivos/relatorio-servicos-2020.pdf.

Serviço Brasileiro de Apoio às Micro e Pequenas Empresas. (2018). *Relatório de pesquisa. MPE que deixaram de exportar*. https://datasebrae.com.br/comercioexterior/.

Serviço Brasileiro de Apoio às Micro e Pequenas Empresas. (2023). *Micro e pequenas empresas se destacam na exportação*. Retrieved from: Micro e pequenas empresas se destacam na exportação - Sebrae.

Sidney, M. S. (2017). Policy formulation: design and tools. In *Handbook of public policy analysis* (pp. 105-114). Routledge.

da Silva, J. F., & Patrus, R. (2017). O "bê-á-bá" do ensino em empreendedorismo: uma revisão da literatura sobre os métodos e práticas da educação empreendedora. *Revista de Empreendedorismo e Gestão de Pequenas Empresas*, 6(2), 372-401.

Souza, C. (2003). Políticas públicas: questões temáticas e de pesquisa. *Caderno Crh*, *16*(39), 11-24.

Souza, C. (2006). Políticas públicas: uma revisão da literatura. *Sociologias*, (16), 20-45.

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic management journal*, *28*(13), 1319-1350.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic management journal*, *18*(7), 509-533.

United Nation Development Programme. (2021). *Global multidimensional poverty index 2021. Unmasking disparities by ethnicity, caste and gender*. By the United Nations Development Programme and Oxford Poverty and Human Development Initiative.

United Nation Development Programme. What is human development? Retrieved from: https://hdr.undp.org/about/human-development.

United Nations Development Programme. (2024). Human Development Report 2023-24: Breaking the gridlock: Reimagining cooperation in a polarized world. New York. Retrieved from: Human Development Report 2023-24 | Human Development Reports.

United Nations. *The Sustainable Development Goals*. Retrieved from:https://www.un.org/sustainabledevelopment/.

Unesco. *Pathways to 2050 and beyond findings from a public consultation on the futures of higher education*. Retrieved from:https://www.iesalc.unesco.org/en/futures-of-higher-education/pathways-to-2050-and-beyond/.

Urbano, D., Aparicio, S., & Audretsch, D. (2019). Twenty-five years of research on institutions, entrepreneurship, and economic growth: what has been learned?. *Small Business Economics*, *53*, 21-49.

Vieira, S. F. A., Melatti, G. A., Oguido, W. S., Pelisson, C., & de Negreiros, L. F. (2013). Ensino de empreendedorismo em Cursos de Administração: um levantamento da realidade brasileira. *Revista de Administração FACES Journal*, 12(2), 93-114.

Weible, C. M., & Sabatier, P. A. (Eds.). (2017). *Theories of the policy process*. Routledge.

White, H., & Raitzer, D. A. (2017). *Impact evaluation of development interventions: A practical guide*. Asian Development Bank.

World Bank. 2020. *Doing Business 2020.* Washington, DC: World Bank. DOI:10.1596/978-1-4648-1440-2.

Zahra, S. A. (2021). International entrepreneurship in the post Covid world. *Journal of World Business*, *56*(1), 101143.

Zahra, S. A., & George, G. (2002). International entrepreneurship: The current status of the field and future research agenda. *Strategic entrepreneurship: Creating a new mindset*, 253-288. Published 2002 by Blackwell Publishing Ltd.

Zahra, S. A., Sapienza, H. J., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. *Journal of Management studies*, *43*(4), 917-955.