

THE CONCEPT OF PIVOTAL HELIX IN INTERNATIONALIZATION ECOSYSTEMS AND THE ROLE OF EXPORT PROMOTION AGENCIES

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ABSTRACT

Objective: This study examines the institutional role of ApexBrasil within the Brazilian internationalization ecosystem (INT-E), identifying emerging patterns, key relationships, and unexplored perspectives. **Method:** Employing a grounded theory approach, the research combined semi-structured interviews and documental analysis. Content and thematic analysis integrated *a priori* categories from the literature with insights from interviews. An iterative process refined the interview protocol and emphasized emerging themes, constructing a theory on ApexBrasil's institutional role. **Main Results:** The study introduces the concept of the Pivotal Helix, positioning ApexBrasil as a central axis within the INT-E. Unlike traditional models where government, academia, civil society, and industry function independently, ApexBrasil integrates these helices, fostering collaboration and mutual reinforcement. This pivotal role enables the agency to connect diverse stakeholders, driving internationalization initiatives with a systemic approach. **Relevance / Originality:** Prior research has examined internationalization and support mechanisms in relation to company performance, but significant gaps remain regarding the dynamics of business ecosystems (BE) and Export Promotion Agencies' (EPAs) roles. This study addresses these gaps, particularly focusing on ApexBrasil's contributions beyond conventional market connections. **Theoretical / Methodological Contributions:** ApexBrasil challenges traditional theories on ecosystems and helix dynamics. Within the System S framework, it acts as a pivotal axis, bridging helices and fostering an internationalization-oriented BE while serving as a public policy executor and helix representative.

Keywords: Internationalization Ecosystems, Export Promotion Agencies, Pivotal Helix, International Business Theory.

O CONCEITO DE HÉLICE PIVÔ EM ECOSISTEMAS DE INTERNACIONALIZAÇÃO E O PAPEL DAS AGÊNCIAS DE PROMOÇÃO DE EXPORTAÇÕES

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RESUMO

Objetivo: Examinar o papel institucional da ApexBrasil no ecossistema de internacionalização brasileiro, identificando padrões emergentes, relações-chave e perspectivas inexploradas. **Método:** Por meio da teoria fundamentada, a pesquisa combinou entrevistas semiestruturadas e análise documental. As análises de conteúdo e temática integraram categorias *a priori* da literatura com *insights* obtidos das entrevistas. Um processo iterativo refinou o protocolo de entrevistas e enfatizou temas emergentes, construindo uma teoria sobre o papel institucional da ApexBrasil. **Principais Resultados:** Introduziu-se o conceito de hélice pivô, posicionando a ApexBrasil como eixo central no ecossistema de internacionalização. Diferentemente de modelos tradicionais em que governo, academia, sociedade civil e indústria operam de forma independente, a ApexBrasil integra essas hélices, promovendo colaboração e reforço mútuo. Esse papel pivô permite à agência conectar diversos *stakeholders*, impulsionando iniciativas de internacionalização com uma abordagem sistêmica. **Relevância e Originalidade:** Pesquisas anteriores examinaram a relação entre internacionalização e mecanismos de apoio ao desempenho empresarial, mas lacunas significativas permanecem quanto à dinâmica dos ecossistemas empresariais e ao papel das agências de promoção de exportação. **Contribuições Teóricas/Metodológicas:** A ApexBrasil desafia teorias tradicionais sobre ecossistemas e dinâmicas de hélices. No contexto do *framework* do Sistema S, atua como eixo pivô, conectando hélices e promovendo um ecossistema empresarial voltado à internacionalização, ao mesmo tempo que executa políticas públicas e representa uma hélice no sistema.

Palavras-chave: Ecossistemas de Internacionalização, Agências de Promoção de Exportação, Hélice Pivô, Teoria de Negócios Internacionais.

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INTRODUCTION

Internationalization, according to established international business theories, encompasses increased participation in global markets through mechanisms such as foreign direct investment (FDI), joint ventures, initial public offers (IPOs), technology exchange, and exports (Costa Jr. et al., 2024a; Hult et al., 2020; Knight & Liesch, 2016). This phenomenon spans various organizational categories, including small- and medium-sized firms (SMEs), multinational corporations (MNEs), universities, technological centers, government agencies, and civil society representatives, creating a complex and dynamic ecology that involves both local and international stakeholders (Distefano et al., 2016; Luo, 2021).

The expansion of internationalization gives rise to the concept of a global BE, defined as a network of organizations situated worldwide, some forming large clusters, interconnected in producing and delivering products, technologies, and services to a global market, thus generating global value (Luo, 2021). Such ecosystems, unique in their nature, have been shown to boost competitiveness through networking with domestic and international partners, knowledge sharing, and intercultural development, resulting in higher levels of entrepreneurial activity and innovation within and outside of regional, national, and international organizations (Henn et al., 2022; Odei & Stejskal, 2020).

The Brazilian Agency for the Promotion of Exports and Investments (ApexBrasil) is tasked with promoting Brazilian products and services abroad and attracting foreign investors. Established in 1998, initially as part of the Brazilian Support System for Micro and Small Enterprises (SEBRAE), it became an autonomous social service in 2003, operating as a private entity and integrated into the System S (System S—Law No. 10.668/03) (Alcaraz & Zamilpa, 2017; Costa Jr. et al., 2022).

ApexBrasil plays a pivotal role in developing networks capable of mobilizing private and public agents from various spheres and competencies in an integrated effort to expand Brazilian businesses internationally. This engagement involves stakeholders such as trade associations, industrial consortia, educational institutions, research centers, and business incubators (Farias & Miranda, 2016; Monticelli et al., 2017).

While existing research has diligently examined the correlation between internationalization, support mechanisms for internationalization, and overall company performance (e.g., Theodoraki & Catanzaro, 2021), significant gaps persist in the specialized literature (Costa Jr. et al., 2022). These gaps are notably evident in the domain of BE, with a specific emphasis on internationalization and the intricate ways in which diverse entrepreneurial ecosystems (EE) transcend geographical confines. This extends beyond conventional connections linking companies solely to product markets (Costa Jr. et al., 2024a, 2024b; Hult et al., 2020; Rong et al., 2022). Furthermore, a substantial gap exists in the literature concerning the role and influence of Export Promotion Agencies (EPAs) such as ApexBrasil within internationalization ecosystems (INT-E), underscoring the imperative for further exploratory studies to fill these knowledge gaps (Costa Jr. et al., 2022; Monticelli et al., 2017; Ribeiro et al., 2020).

Therefore, the current work endeavors to comprehensively analyze the institutional role of ApexBrasil in the Brazilian INT-E, identifying emerging patterns, meaningful relationships, and unexplored perspectives. The primary research question guiding this study is: “How does ApexBrasil influence and shape the internationalization processes of Brazilian businesses within the internationalization ecosystem?”

1. THEORETICAL FRAMEWORK

Internationalization is conceptually perceived as the strategic process through which organizations expand their operations and influence beyond domestic borders to engage in international markets, involving activities such as establishing foreign subsidiaries, forming strategic alliances, engaging in cross-border mergers and acquisitions, exporting products and services, and leveraging international partnerships (Costa Jr. et al., 2024a; Hult et al., 2020; Knight & Liesch, 2016).

This phenomenon includes a diverse range of entities, from SMEs to multinational enterprises (MNEs), universities, technology centers, government agencies, and civil society representatives, creating a complex and dynamic ecosystem (Baier-Fuentes et al., 2021; Cha et al., 2023; Costa, 2022).

Factors such as trade liberalization, digital business models, technological innovations, FDI accessibility, and social media have made internationalization cru-

cial for business growth and competitiveness (Alcaraz & Zamilpa, 2017; Henn et al., 2022; Knight & Liesch, 2016). The evolution of internationalization leads to the concept of global BE—networks of organizations worldwide, interconnected to produce and deliver products, technologies, and services globally, thus creating global value (Hult et al., 2020; Luo, 2021; Nambisan et al., 2019). These ecosystems enhance competitiveness through networking, knowledge sharing, and intercultural development, fostering entrepreneurial activity and innovation across regional, national, and international levels (Henn et al., 2022; Odei & Stejskal, 2020).

Fundamentally, the concept of ecosystems originally pertains to the interaction and interdependence of biotic (living organisms) and abiotic (physical environment) factors. This concept has been adapted to the business environment to study the coeffect and coevolution of organizations and their external environment. This adaptation explains how different actors, both institutions and individuals, within a non-centrally organized economic community coexist, thrive, innovate, cooperate, and compete through informal arrangements (Costa Jr. et al., 2024a; Hewett et al., 2022).

The BE concept surpasses conventional paradigms such as clusters, marketing ecosystems, and global value chains. It incorporates diverse stakeholders, including social networks, research institutions, regulatory bodies, and civil society representatives (Cha et al., 2023; Hewett et al., 2022). Acknowledged as a paradigmatic framework for comprehending business dynamics and interactions (Adner, 2017; Cha et al., 2023; Jacobides et al., 2018; Rong et al., 2022).

The concept of EE, widely acknowledged in specialized literature (e.g., Ferreira et al., 2023; Henn et al., 2022), encapsulates dynamic interactions amongst diverse actors, organizations, and processes within a given region, fostering the creation, growth, and scaling of new businesses, along with economic, technological, and social development (van Schijndel, 2019; Zahra & Hashai, 2022). Although there is a growing exploration of internationalization within the context of EE, a systematic examination of entrepreneurial internationalization, particularly concerning internationalization support ecosystems (ISE) and cross-border connections, remains less clear (Theodoraki & Catanzaro, 2021; van Schijndel, 2019).

Innovation ecosystem (IE), in its turn, is intricately linked to entrepreneurship, fostering collaborative arrangements for knowledge and technology exchange amongst diverse actors, including organizations, businesses, research centers, and policymakers (Champenois & Etzkowitz, 2018; Costa, 2022). These ecosystems encompass diverse domains such as science and technology, venture capital, innovative infrastructure, innovation demand, legislative framework, and human capital (Costa, 2022; Odei & Stejskal, 2020; Roig et al., 2020).

The triple and quadruple helix framework (Leydesdorff, 2012), emphasizing collaboration between universities, industries, and government, proves instrumental in driving innovation and economic development within such ecosystems (Baier-Fuentes et al., 2021). This model extends to include civil society as a fourth helix, exerting influence on knowledge-based collaboration and open innovation (Distefano et al., 2016; Leydesdorff, 2012).

Digitalization stands as a pivotal driver of globalization and the expansion of international business, providing diverse actors, from SMEs to MNEs, with the means to partake in cross-border transactions through innovative platform-based models (Nambisan et al., 2019; Yonatany, 2017). The advent of digital platform ecosystems (DPEs) has brought about a paradigm shift in business dynamics, fostering seamless collaboration and value creation across organizational and geographical boundaries (Ciasullo et al., 2022; Yonatany, 2017). Within this context, the processes of digital transition and the adoption of platform-based models fundamentally influence the landscape of global entrepreneurship, dictating how businesses enter foreign markets and collaborate for value creation (Hewett et al., 2022; Tatarinov et al., 2022).

The conceptual framework guiding the present study (Costa Jr. et al., 2024a) adopts an INT-E perspective, integrating four interrelated ecosystem concepts and its variants as presented in Figure 1.

These ecosystemic arrangements exhibit varying degrees of interconnectedness, and each underscores internationalization as a pivotal strategy for organizational survival and expansion. Consequently, one can posit that the notion of INTE-E incorporates components from the other ecosystems examined, serving as a central integrative concept as presented by Costa Jr. et al. (2024a). Moreover, it can be con-

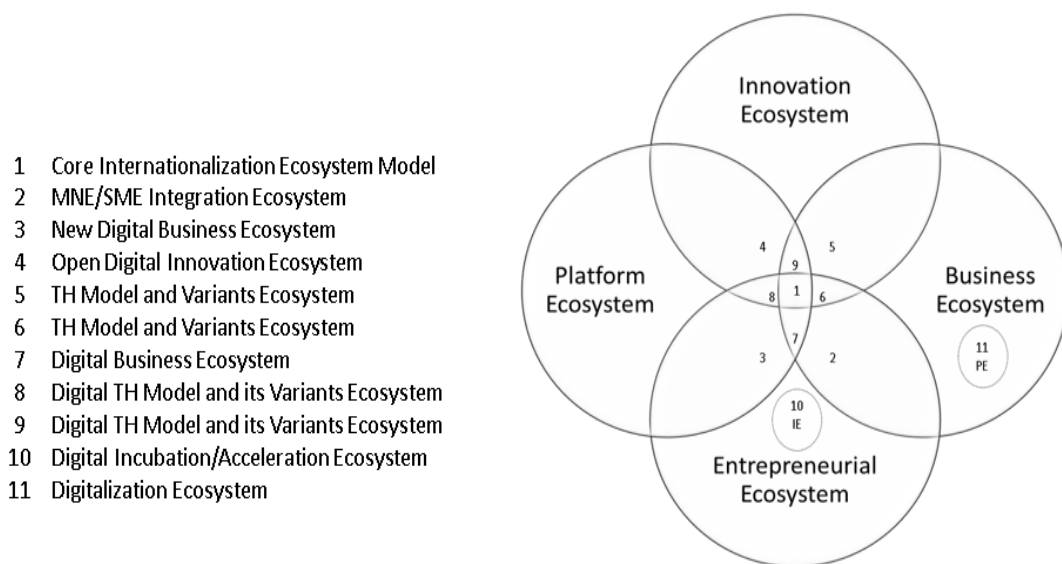
tended that each ecosystem possesses a distinctive nature contingent upon environmental characteristics and actor interrelations. Nevertheless, by identifying shared characteristics inherent in diverse ecosystem concepts, one can propose distinct typologies of ecosystems, each bearing a unique relationship to the internationalization process.

This framework illustrates how BE, EE, IE, and PE interact to shape internationalization dynamics. Some ecosystems, such as Core Internationalization Models (1), integrate all four types and are driven by open innovation, collaboration, and global connectivity. Others focus on specific intersections: for instance, MNE/SME Integration Ecosystems (2) emphasize partnerships between traditional and innovative firms, while New Digital BE (3) revolve around platform-based, disruptive digital models with a strong internationalization component. Ecosystems vary in their reliance on internationalization; some, like Digital Incubation (10), treat it as central, whereas more traditional clusters (2) integrate it gradually. These dynamics showcase how the nature and purpose of the ecosystem shape its approach to international markets, whether through fostering disruptive innovation, supporting digital transition, or leveraging partnerships across businesses and institutions (Costa Jr. et al., 2024a; 2024b).

Export Promotion Agencies are focused on information, training, trade mobility, and financial aid

(Costa Jr. et al., 2022; Dornelas & Carneiro, 2018; Monticelli et al., 2017), emphasizing internal development, international competitiveness, and image promotion (Bianchi & Figueiredo, 2017). These programs offer services like market research, marketing campaigns, financing projects, participation in fairs, sector consultancies, and promotion through conventions and business meetings (Dornelas & Carneiro, 2018; Ribeiro et al., 2020). Despite its significance, previous studies (Costa Jr. et al., 2022) have noted that ApexBrasil is not systematically studied by academics, leaving room for exploratory studies on its institutional role in the Brazilian INT-E, which is the focus of the current research.

Furthermore, EPAs also have a central role in INT-E, going beyond the execution of public policies. They act as network organizers that connect firms, government, academia, and civil society, while continuously adapting their strategies to environmental changes. The literature highlights different dimensions of ApexBrasil's contribution: support for the development of Brazilian multinationals (Fleury & Fleury, 2011), formulation of sector-specific public policies to enhance international competitiveness (Bianchi & Figueiredo, 2017), and the articulation of export promotion programs through the lens of internationalization theories (Rezende & Reis, 2021). Taken together, these studies indicate that EPAs operate not only as poli-



Source: Costa Jr. et al. (2024a).

Figure 1. Internationalization ecosystem core concept.

cy implementers but also as dynamic coordinators within ecosystems, performing functions that can be understood through the lens of the pivotal helix: a flexible and adaptive axis that connects actors and sustains systemic cohesion in complex internationalization environments.

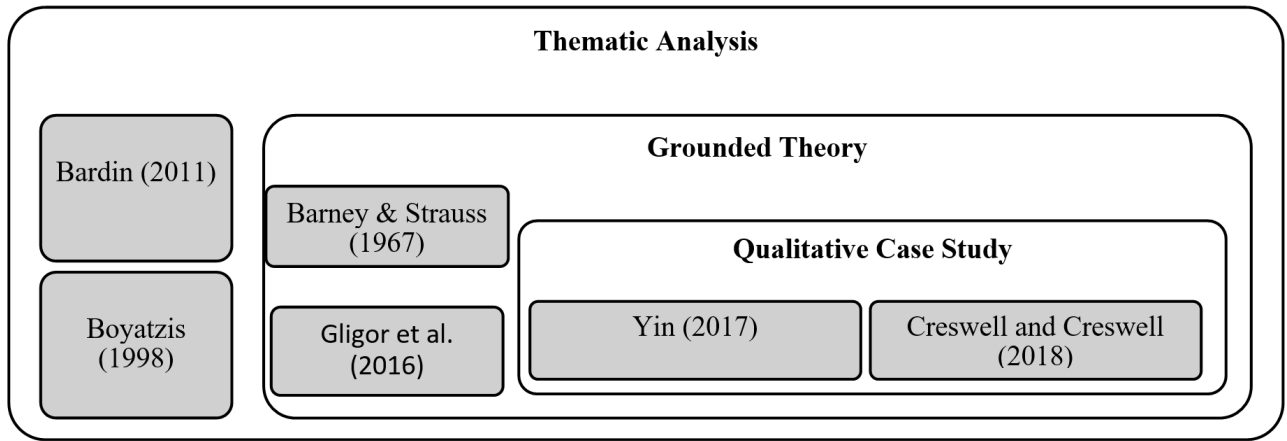
Building on these conceptual contributions, the present research employs the following analytical categories: BE, EE, IE, and PE (Costa Jr. et al., 2024a; 2024b). Each of these constructs is further divided into meso-categories, which capture intermediate dimensions (e.g., strategic alliances, entrepreneurial activity, university–industry collaboration, and digital transition), and into micro-categories, which represent specific operational elements derived from the literature. These categories were employed as *a priori* analytical dimensions, guiding the initial stages of data codification. For transparency, the constructs and their respective codes are presented in Table 1, located in the Results and Discussion section, which systematizes the categories adopted from prior literature and applied in the present research design.

2. METHODOLOGY

A Systematic Literature Review supported by Content and Thematic Analysis (Denyer & Tranfield, 2009) was conducted by Costa Jr. et al. (2024a; 2024b) to explore internationalization from an ecosystemic perspective. Complemented by a documental analysis of corporate reports, handbooks, and brochures from ApexBrasil’s website and social networks (ApexBra-

sil, 2020a; 2020b; Costa Jr. et al., 2022), the analysis employed content and thematic techniques (Bardin, 2011; Boyatzis, 1998; Guest et al., 2012) alongside Grounded Theory methodology (Gligor et al., 2016; Roig et al., 2020). This included interviews with ApexBrasil stakeholders and secondary data analysis of key publications, such as Integrated Management Reports (ApexBrasil 2020a) and the Strategic Report (ApexBrasil, 2020b), to ground findings in real-world contexts. Importantly, the combination of systematic literature review, documental analysis, and semi-structured interviews configured a triangulation strategy aimed at mitigating potential biases related to interviewees’ perspectives and enhancing the robustness of the analytical process (Creswell & Creswell, 2018; van Schijndel, 2019).

Thus, the methodological orientation of this study follows a pragmatic application of grounded theory, in which *a priori* categories derived from the literature were combined with *a posteriori* categories that emerged from the interviews. This iterative process of constant comparison reflects an abductive analytical logic, whereby data and theory are mobilized jointly to construct the most plausible theoretical explanations for the institutional role of ApexBrasil. Such abductive reasoning, as discussed by Timmermans and Tavory (2012), extends the explanatory potential of grounded theory by recognizing the interplay between empirical evidence and theoretical sensitivity, reinforcing the theory-building nature of this research. Details of the research structure can be seen in Figure 2.



Source: Elaborated by the author.

Figure 2. Research structure.

The choice of a case study methodology was made based on its common usage in social sciences to get in-depth cumulative knowledge about specific phenomena, addressing the questions formulated in the research, while identifying the dynamics of phenomena's development, clustering complex information (Yin, 2017). It was also taken into account the incompleteness of the framework on INT-E and its early stages of development (Costa Jr. et al., 2024a; 2024b; Theodoraki & Catanzaro, 2021), which makes the case study approach advisable in business studies (Creswell & Creswell, 2018).

2.1. Data collection and analysis

Primary data was collected through semi-structured interviews with nine senior ApexBrasil representatives between June and September 2023. The instrument included 50 open questions, enabling flexibility for follow-up queries and the exploration of emerging themes (Bardin, 2011; Theodoraki & Catanzaro, 2021). Conducted virtually via Google Meet and Microsoft Teams, the interviews totaled 415 minutes, averaging 46 minutes each, and resulted in 59,730 transcribed words across 148 A4 pages.

The interviewees occupied senior positions across ApexBrasil, covering the main organizational areas directly linked to the agency's institutional role in the INT-E. The group comprised managers and coordinators from Government Relations, Market Intelligence, International Expansion, Agribusiness, Competitiveness, Industry and Services, Investment, and Institutional Relations. Their professional trajectories ranged from 9 to over 16 years within the organization, which ensured familiarity with both policy design and program implementation. This composition provided access to respondents involved in strategic decision-making processes and operational coordination, thus guaranteeing that the data collected reflected multiple institutional perspectives relevant to the research question.

The sample was purposive, aligning participants' expertise with the study's focus (Costa Jr. et al., 2024a; 2024b). A minor snowballing element emerged when one participant was recommended to replace another who could not participate (Creswell & Creswell, 2018). Transcriptions were completed using the Cockatoo Transcription Service.

Content and Thematic Analysis followed a two-stage approach. First, *a priori* categories from the literature review (Costa Jr. et al., 2024a; 2024b) were applied using protocols by Guest et al. (2012). Second, inductive reasoning generated *a posteriori* categories from the interview data (Bardin, 2011). This dual approach integrated theoretical and practical insights (Gligor et al., 2016).

Themes were coded iteratively, with classification and refinement to ensure depth (Williams & Moser, 2019). Emerging themes connected findings to the existing literature, helping identify ApexBrasil's role in the INT-E. The grounded theory supported theme development and theoretical contributions in qualitative research (Bardin, 2011; Gligor et al., 2016; Williams & Moser, 2019).

3. RESULTS AND DISCUSSION

3.1. Constructs and codification

To organize the presentation of findings, the results are structured into two complementary parts. First, the *a priori* categories derived from the previous literature (Costa Jr. et al., 2024a; 2024b) are detailed, as shown in Table 1, in order to demonstrate how established theoretical constructs were operationalized in this study. Second, the *a posteriori* categories that emerged directly from the empirical analysis are presented in Table 2, highlighting novel dimensions specific to ApexBrasil's *modus operandi*. This distinction clarifies the interplay between prior theoretical knowledge and new empirical contributions, thus delimiting more clearly the theoretical advancement promoted by the article.

The research conducted by Costa Jr. et al. (2024a; 2024b) identified a set of *a priori* categories, organized into four main constructs or macro-categories: BE, EE, IE, and PE. These constructs were further divided into 13 meso-categories, encompassing a total of 41 micro-categories, each assigned a corresponding code.

To ensure transparency in the analytical process, the procedure used to calculate frequencies is detailed as follows. After an iterative coding process that combined deductive (*a priori*) and inductive (*a posteriori*) categorization, each coded occurrence was logged and consolidated in an Excel 2013 spread-

Table 1. Internationalization ecosystem constructs: *a priori* categories.

Macro-category	Meso-category	Micro-categories	Codes	Frequency (%)	Total (%)
Business Ecosystem	Business strategy	Resource-Based View	(BE BS RBV)	2.51	42.73
		Transactional Costs	(BE BS TC)	0.90	
		International Ambidexterity	(BE BS IAB)	1.08	
		Dynamic Capabilities	(BE BS DC)	3.59	
		Strategic Alliances	(BE BS SA)	11.67	
		Knowledge-based View	(BE BS KBV)	3.41	
	Clusters	Regional Clusters	(BE CTs RCTs)	2.69	
		Public Policies	(BE CTs PP)	1.44	
	Networking, supply chain, and knowledge sharing	Knowledge Transfer	(BE NS KT)	7.00	
		Supply Chain Management	(BE NS SC)	2.69	
	Foreign Direct Investment	Cross-Border Venture Capital Investments	(BE FDI CBV)	5.03	
		Mergers & Acquisitions	(BE FDI M&A)	0.72	
Entrepreneurial Ecosystem	Entrepreneurial activity	Local Support Ecosystems	(EE EA LSE)	6.28	25.31
		Economic Resilience	(EE EA ER)	0.18	
		Entrepreneurship Policies	(EE EA EP)	0.90	
	International Entrepreneurship	Mixed Embeddedness Theory	(EE IE MET)	0.18	
		Ecosystem Integration	(EE IE Eint)	1.62	
		Transnational Entrepreneurship	(EE IE TE)	4.13	
	Academic Entrepreneurship	Entrepreneurial Education	(EE AE Eed)	1.44	
		Technology-Based University Spin-Offs	(EE AE T-USOs)	0.18	
		Business Incubators and Accelerators	(EE AE BIAs)	1.44	
	Entrepreneurial organizations	Small and Medium Organizations	(EE EO SMEs)	2.51	
		Startups and Scaleups	(EE EO STSC)	4.31	
		Born Global Firms	(EE EO BG)	1.26	
		Multinational Enterprises	(EE EO MNE)	0.90	
Innovation Ecosystems	Triple and Quadruple Helix	University- Industry Collaboration	(IE THx UEC)	2.87	5.92
		Innovation Networks	(IE THx IN)	0.72	
		Entrepreneurial Discovery Process	(IE THx EDP)	0.18	
		Innovation Policies	(IE THx InP)	0.18	
	Innovation Strategy	Open Innovation	(IE IS OI)	0.72	
		Smart Specialization	(IE IS SS)	0.18	
		National Innovative Systems	(IE IS NIS)	0.18	
	Innovative Organizations	Research Technology Organizations	(IE IOs RTOs)	0.54	
		HEIs 3 rd Mission	(IE IOs HEI)	0.36	
Platform Ecosystems	Digital Transition and Digitization	Digital Servitization	(PE DTD DS)	0.36	20.47
		Digital Transformation	(PE DTD DT)	3.77	
		Digital Economy	(PE DTD DE)	2.15	
	Digital Ecosystems	E-Commerce and E-Marketing	(PE DE e-cm)	3.59	
		Omnichannel Strategy	(PE DE OMS)	0.72	
		Digital Business Models	(PE DE DBM)	1.26	
		Enabling Technologies	(PE DE Dtech)	1.80	

Source: Elaborated by the authors based on Costa Jr. et al. (2024a).

sheet to enable descriptive statistics. The unit of analysis corresponded to interview excerpts interpreted by the authors, and individual segments could receive more than one code whenever multiple themes were present. The frequency of a category corresponds to the ratio between the number of times its code was applied across the aggregated *corpus* of interviews (n= 554 codifications) and the total number of codifications observed, yielding proportional measures expressed as percentages. No weighting was attributed when multiple codes overlapped in the same excerpt; instead, all codes were counted independently to preserve thematic coverage. Table 1 presents these categories along with the frequency of each code's occurrence in the interviews.

As the broader thematic group, BE received a total of 42.73% of all codifications, pointing to the major operating areas relevant to ApexBrasil within the proposed INT-E framework (Costa Jr. et al., 2024a).

From a conceptual standpoint, Resource-Based View (BE BS RBV) with 2.51% and Dynamic Capabilities (BE BS DC) with 3.59% are frequently discussed, indicating a focus on leveraging internal resources and adapting to changing environments. Strategic Alliances (11.67%) play a significant role, suggesting a

reliance on collaborative efforts for business success, placing ApexBrasil as a key player in the ecosystem integration. Regional Clusters (BE CTs RCTs), with 2.69% —perceived by the interviewees as the different ApexBrasil's sectoral projects—are mentioned, reflecting attention to geographic concentrations of interconnected businesses and institutions. Knowledge Transfer (BE NS KT) with 7% is also a major theme, emphasizing the importance of sharing expertise within networks, which relates to ApexBrasil export qualification programs, especially PEIEX. Cross-Border Venture Capital Investments (BE FDI CBV) with 5.03% and Mergers & Acquisitions (BE FDI M&A) with 0.72%, to a lesser extent, are also prominent, suggesting an exploration of different forms of FDI for business expansion.

It is possible to infer that ApexBrasil plays a pivotal role in fostering strategic alliances (BE BS SA) and Knowledge Transfer (BE NS KT), indicating its involvement in building collaborative partnerships to enhance Brazil's global presence and possibly pointing out to its main *modus operandi* within the ecosystem.

Entrepreneurial ecosystems were the second most coded thematic category, with 25.31% of codification across the interviews. Local Support Eco-

Table 2. Internationalization ecosystem constructs: *a posteriori* categories.

Macro-category	Meso-category	Micro-categories	Codes	Frequency (%)	Total (%)
ApexBrasil	Networking, supply chain and knowledge sharing	Key Companies	(APEXB NS KC)	0.18	11.85
		Regional Development	(APEXB NS RegD)	0.18	
	Advanced Technology	Transport Technology	(APEXB AT TT)	0.36	
		Aggrotech	(APEXB AT Agtec)	0.54	
	Business Strategy	Gender	(APEXB BS Gen)	1.08	
		Institutional Barriers	(APEXB BS IB)	2.33	
		Operational Barriers	(APEXB BS OB)	1.80	
	Triple and Quadruple Helix	Presidential Diplomacy	(APEXB THx PD)	0.36	
		Environmental Social and Governance	(APEXB THx ESG)	1.62	
		Brazilian S System	(APEXB THx SiS)	1.26	
	Foreign Direct Investment	Infrastructure	(APEXB FDI INF)	0.18	
	International Entrepreneurship	Export Culture	(APEXB IE Cexp)	1.62	
		Tele Emigrants/Immigrants	(APEXB IE Tim)	0.36	

Source: Elaborated by the authors.

systems (EE EA LSE) is the most recurring code with 6.28%, suggesting a strong emphasis on fostering a supportive local environment for entrepreneurial activities, indicating a focus on community engagement and resources. Transnational Entrepreneurship (EE IE TE) also presents a significant utilization with 4.13%, it highlights a keen interest in activities that transcend national borders, indicating a global orientation in the EE with a focus on different internationalization strategies. Albeit ApexBrasil not having an exclusive focus on startups and scaleups, (EE EO STSC) presents a substantial use, with 4.31% of codification, including 1.26% for born global firms (EE EO BG), this code underscores the importance placed on the development and scaling of startups within the EE, indicating a focus on innovation and growth as well as dynamic internationalization process.

The data portrays a significant role ApexBrasil plays in the EE, valuing local support, global perspectives, educational initiatives, and the growth of startups, underscoring a comprehensive approach to fostering entrepreneurship.

Innovation ecosystems was the least coded Macro-Category with only 5.92% of occurrence. Its key element is university-industry collaboration (IE THx UEC), with 2.87%, there is a strong emphasis on fostering collaboration between universities and industries that is reflected in programs such as PEIEX—The Export Qualification Program, suggesting a significant role in promoting knowledge exchange and partnerships for innovation (Costa Jr. et al., 2022). However, no other key Micro-Dimensions played a significant role in the codification. This may open a relevant line of enquiry regarding ApexBrasil role as an innovation driver, given that internationalization may be perceived as a form of innovation (Costa et al., 2024a; Knight & Liesch, 2016) and also point out to a gap in the literature regarding EPAs and innovation as well as a potential avenue for enquiry regarding innovation networks and entrepreneurial discovery processes, two vital elements for ecosystem internationalization.

A platform ecosystem was a Macro-Category that had considerable weight not only in the previous SLR (Costa Jr. et al., 2024a; 2024b) but also with the responses given by the interviewees, presenting 20.47% of the total codification.

The thematic analysis shows a strong focus on digital transformation, the prominence of codes such as

(PE DTD DT) with 3.77% and (PE DTD DE) with 2.15%, indicates a strong emphasis on digitalization and the adoption of digital technologies in the internationalization process as well as ApexBrasil's internal processes. Furthermore, the significant use of codes like (PE DE e-cm) with 3.59% and (PE DE DBM) with 1.26% suggests a strategic integration of digital platforms for marketing and the development of innovative business models in the internationalization context.

The data suggest that ApexBrasil's activities and strategies are associated with various aspects of digital transition, digitization, and digital ecosystems. The major subcategories highlight the diverse dimensions of ApexBrasil's involvement in fostering digital aspects within INT-E. The percentage distribution further emphasizes the relative importance of each subcategory, providing insights into potential focal areas for ApexBrasil's efforts in promoting internationalization through digital means.

Throughout the interviews, some new themes were also found, forming a set of *a posteriori* categories encompassing a Macro-Category composed of six Meso-Dimensions, totaling 13 Micro-Categories, each with its corresponding code. These categories emerged only after the coding of the interview *corpus*, and therefore are considered genuinely empirical findings of this study, rather than constructs derived from the previous literature. Details about *a posteriori* categories are presented in Table 2.

The *a posteriori* categories and its codification represent themes that were found in the interviews and had no direct correspondence with the themes found in the previous SLR (Costa Jr. et al., 2024a; 2024b); developing a framework based on the collected data, which was analyzed on a continual basis modeling the original interview protocol and expanding its scope, while unveiling some new themes that stood out due to their relevance. These new codes were compared to other informant data as well as the SLR data, creating a new Macro-Category (ApexB), very specific to ApexBrasil *modus operandi* and the very perception of their collaborators, which allows for the theorization of its role in the Brazilian INT-E. In total, there were 54 codes that occurred 554 times across the *corpus* of the interview.

The results suggest a diverse set of themes within ApexBrasil's internationalization role in the ecosystem, including technology, business strategy, gover-

nance, and FDI. The focus on institutional (APEXB BS IB) and operational barriers (APEXB BS OB) with 2.33% and 1.8%, respectively, along with aspects like export culture and technology, indicates a comprehensive approach to international business development without ignoring the internal and external barriers in the Brazilian ecosystem. The Triple and Quadruple Helix dimension highlights the importance of collaboration between government, industry, academia, and society in ApexBrasil's strategy, with particular emphasis on its social role, which is clear in their focus on gender equality (APEXB BS Gen) —1.08% and Environmental Social and Governance drive (APEXB THx ESG) with 1.62%.

The ApexBrasil thematic analysis reveals an organization that sees its institutional role as beyond the economic sphere of export promotion and FDI.

3.2. Content and thematic analysis: code interactions

As previously discussed, the thematic analysis was composed of 54 codes across four *a priori* and one *a posteriori* categories. Codes occurred in 554 instances during the interviews, with considerable intersections amongst the codes, totaling 898 (at least two codes occurring simultaneously).

Each macro-category includes a set of codes that exhibited significant interactions with other codes across the interviews. Tables 3–6 present the primary codes within each macro-category, detailing their occurrence relative to all other codes (Occr), the percentage of interactions with other codes (Intxns with), and the overall percentage of interactions (Total Intxns). Additionally, for each main code, the tables highlight the codes with which it interacts most frequently, forming thematic clusters.

Table 3. Business ecosystems codification occurrence and intersections.

Codes	Occr (%)	Intxns with (%)	Total Intxns (%)	Key Intxns	%
Strategic Alliances (BE BS SA)	11.73	57	11.58	Local Support Ecosystems (EE EA LSE)	13.46
				E-commerce and E-marketing (PE DE e-cm)	7.69
				Knowledge Transfer (BE NS KT)	7.69
				Cross-Border Venture Capital Investments (BE FDI CBV)	5.77
				University- Industry Collaboration (IE THx UEC)	5.77
Knowledge Transfer (BE NS KT)	7.04	37.04	6.90	Local Support Ecosystems (EE EA LSE)	14.52
				Digital Transformation (PE DTD DT)	14.52
				Strategic Alliances (BE BS SA)	12.90
				Cross-Border Venture Capital Investments (BE FDI CBV)	9.68
				Startups and Scaleups (EE EO STSC)	6.45
Cross-Border Venture Capital Investments (BE FDI CBV)	5.05	38.89	6.12	Startups and Scaleups (EE EO STSC)	20.00
				Knowledge Transfer (BE NS KT)	10.91

It continues...

Table 3. Continuation.

Cross-Border Venture Capital Investments (BE FDI CBV)	5.05	38.89	6.12	Strategic Alliances (BE BS SA)	10.91
				Transnational Entrepreneurship (EE IE TE)	7.27
Regional Clusters (BE CTs RCTs)	2.71	25.93	3.12	Local Support Ecosystems (EE EA LSE)	21.43
				Knowledge Transfer (BE NS KT)	17.86
				Brazilian S System (APEXB THx SiS)	10.71
				Institutional Barriers (APEXB BS IB)	10.71
Dynamic Capabilities (BE BS DC)	3.61	33.33	3.01	E-commerce and E-marketing (PE DE e-cm)	14.81
				Resource-Based View (BE BS RBV)	11.11
				Knowledge Transfer (BE NS KT)	7.41
Dynamic Capabilities (BE BS DC)	3.61	33.33	3.01	Strategic Alliances (BE BS SA)	7.41
				International Ambidexterity (BE BS IAB)	7.41
				Knowledge-Based View (BE BS KBV)	7.41
Supply Chain Management (BE NS SC)	2.71	24.07	3.01	Local Support Ecosystems (EE EA LSE)	18.52
				Strategic Alliances (BE BS SA)	14.81
				Regional Clusters (BE CTs RCTs)	11.11
Resource-Based View (BE BS RBV)	2.53	18.52	1.89	Knowledge-Based View (BE BS KBV)	23.53
				Dynamic Capabilities (BE BS DC)	17.65
				Small and Medium Organizations (EE EO SMEs)	11.76
				Knowledge Transfer (BE NS KT)	11.76

Source: Elaborated by the authors based on Costa Jr. et al. (2024a).

Table 3 highlights the interconnectivity of codes within all categories, indicating thematic areas of significance. (BE BS SA) is the most important code in all analyses; it represents over 11% of all occurrences, interacting with 57% of other codes, representing over 11% of all interactions. It is important to notice

that the same code interacts significantly with codes from all *a priori* categories, specifically (EE EA LSE)—13.46%; (PE DE e-cm)—7.69%; (BE NS KT)—7.69%; (BE FDI CBV)—5.77%; and (IE THx UEC)—5.77%. There is a profound correlation between Strategic alliances and LSE, pointing to the nurturing role played

Table 4. Entrepreneurial ecosystems codification, occurrence, and intersections.

Codes	Occr (%)	Intxns with (%)	Total Intxns (%)	Key Intxns	%
Local Support Ecosystems (EE EA LSE)	6.32	22.22	2.78	Knowledge Transfer (BE NS KT)	20.00
				Strategic Alliances (BE BS SA)	20.00
				Startups and Scaleups (EE EO STSC)	12.00
				Regional Clusters (BE CTs RCTs)	8.00
				Cross-Border Venture Capital Investments (BE FDI CBV)	8.00
				Enabling Technologies (PE DE Dtech)	8.00
Startups and Scaleups (EE EO STSC)	4.33	38.89	6.12	Cross-Border Venture Capital Investments (BE FDI CBV)	20.00
				Business Incubators and Accelerators (EE AE BIAS)	9.09
				Knowledge Transfer (BE NS KT)	7.27
				Strategic Alliances (BE BS SA)	7.27
				Born Globals (EE EO BG)	7.27
Transnational Entrepreneurship (EE IE TE)	4.15	27.78	4.57	E-commerce and E-marketing (PE DE e-cm)	19.51
				Strategic Alliances (BE BS SA)	14.63
				Cross-Border Venture Capital Investments (BE FDI CBV)	14.63
				Startups and Scaleups (EE EO STSC)	12.20
Small and Medium Organizations (EE EO SMEs)	2.53	37.04	3.45	Strategic Alliances (BE BS SA)	12.90
				Local Support Ecosystems (EE EA LSE)	12.90
				E-commerce and E-marketing (PE DE e-cm)	6.45
				Transnational Entrepreneurship (EE IE TE)	6.45
				Resource-Based View (BE BS RBV)	6.45
				Supply Chain Management (BE NS SC)	6.45
				Export Culture (APEXB IE CExp)	6.45

Source: Elaborated by the authors based on Costa Jr. et al. (2024a).

by ApexBrasil. Their influence on digital businesses is also seen in the interaction between strategic alliances and e-commerce and e-marketing categories.

It is possible to perceive that local ecosystem support is profoundly related to the BE strategy, focusing on networking, supply chain management, and knowledge sharing within regional clusters, occurring mainly through strategic alliances.

Table 4 provides insights into the key thematic areas and interactions between EE, international en-

trepreneurship, and various dimensions of business networks and strategies.

Even though (EE EA LSE) occurs more often (6.32%), it is the code with the least number of interactions (2.78%), only interacting with 22% of the codes. On the other hand, (EE EO STSC) occurs only 4.33% of the time, but has a much higher level of interactions, almost 39% of the codes, representing a little over 6% of all interactions. That leads to the inference that startups and scaleups are themes with

Table 5. Innovation ecosystems codification, occurrence, and intersections.

Codes	Occr (%)	Intxns with (%)	Total Intxns (%)	Key Intxns	%
University - Industry Collaboration (IE THx UEC)	2.89	25.93	2.45	Strategic Alliances (BE BS SA)	27.27
				Innovation Networks (IE THx IN)	9.09
				Open Innovation (IE IS OI)	9.09
				Environmental, Social, and Governance (APEXB THx ESG)	9.09

Source: Elaborated by the authors based on Costa *et al.* (2024a).

Table 6. Platform ecosystems codification, occurrence, and intersections.

Codes	Occr (%)	Intxns with (%)	Total Intxns (%)	Key Intxns	%
Digital Transformation (PE DTD DT)	3.79	31.48	3.79	Knowledge Transfer (BE NS KT)	23.53
				Digital Economy (PE DTD DE)	14.71
				Strategic Alliances (BE BS SA)	8.82
E-commerce and E-marketing (PE DE e-cm)	3.61	33.33	4.68	Strategic Alliances (BE BS SA)	16.67
				Transnational Entrepreneurship (EE IE TE)	14.29
				Dynamic Capabilities (BE BS DC)	9.52
				Cross-Border Venture Capital Investments (BE FDI CBV)	7.14
				Startups and Scaleups (EE EO STSC)	7.14

Source: Elaborated by the authors based on Costa Jr. *et al.* (2024a).

a broader scope, having several initiatives and programs designated to support them.

Once again, one of the key elements for their internationalization is seen on the strategic alliances, specifically to develop local ecosystems to expand through e-commerce. It is possible to see ApexBrasil's role beyond the usual export promotion initiatives, providing different strategies for the international expansion of digital businesses and connecting different ecosystem players to create the synergy necessary to develop an INT-E.

Table 5 presents the least complex set of intersections. Within IE, only the code (IE THx UEC) had a significant occurrence (2.89%) as well as intersections with other codes (25.93%). The major intersection occurs with (BE BS SA), which is in accordance with the literature on Triple and Quadruple Helix, as the helix concept and *modus operandi* are related to strategic alliances and synergistic efforts (Leydesdorff, 2012).

It is important to emphasize that this code has a considerable intersection with the *a posteriori* code (APEXB THx ESG), which plays a significant role in explaining ApexBrasil ESG orientation as a strategic alliance effort, placing ApexBrasil as a key integrating force amongst the helices; playing a role in innovation and social responsibility alike, while connecting different players to further integrate the ecosystem.

Table 6 presents the codes found within the PE Macro-Category key interactions. Two codes have the largest number of occurrences, Digital Transformation (3.79%) and e-commerce and e-marketing (3.61%). Once again, strategic alliances play a fundamental role in interacting with both codes 8.82% and 16.67%, respectively. It is possible to notice that Knowledge transfer exerts considerable interaction with digital transition (23.53%), indicating the need to prepare the companies to digital transition in order to become more prone to internationalization.

Digital transition can be perceived as a mediating force for internationalization, fostering it through a considerable amount of knowledge transfer as well as strategic alliances. It is also possible to see that ApexBrasil is quite advanced with regard to e-commerce, having integrated a platform strategy to support business exports and knowledge transfer.

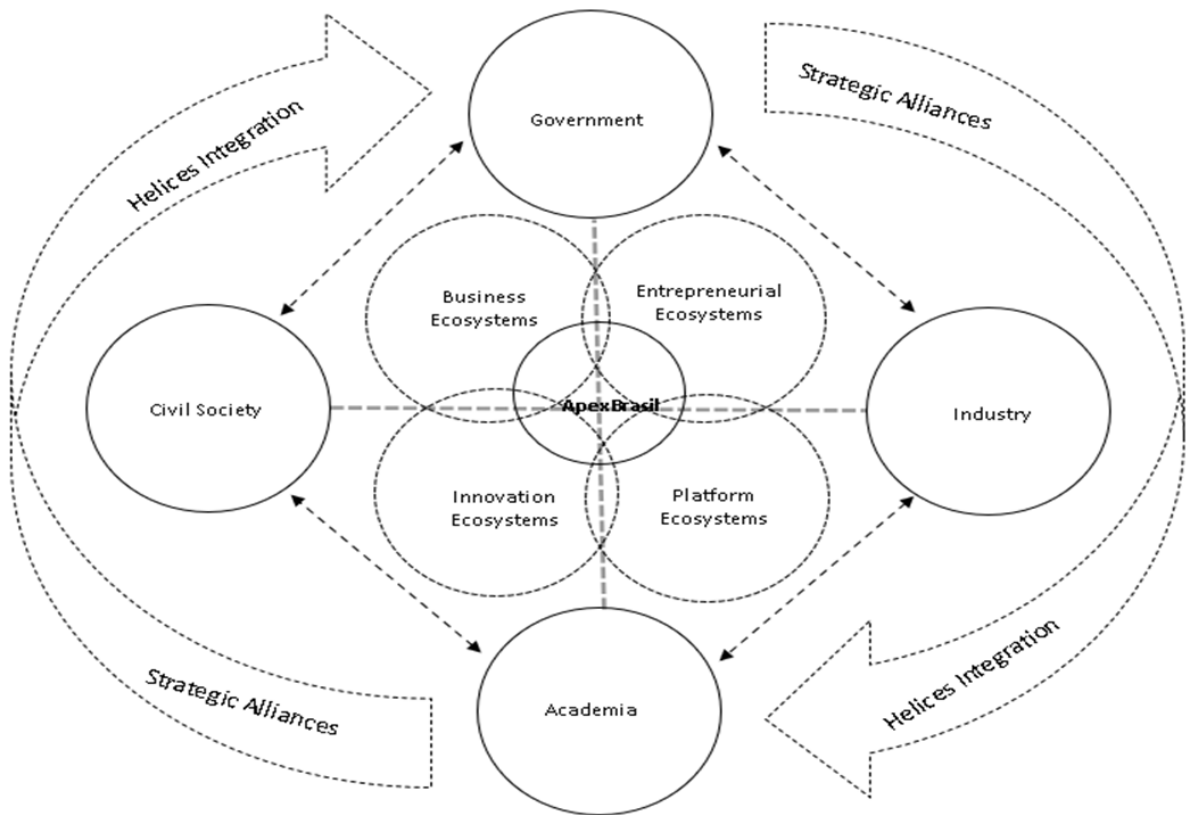
3.3. A grounded view on ApexBrasil's Institutional role in the Brazilian internationalization ecosystem

Upon examining the data presented, a discernible institutional role emerges for ApexBrasil—one that lacks clear identification in the pertinent business literature regarding the institution (Costa Jr. et al., 2022; Dornelas & Carneiro, 2018; Monticelli et al., 2017) or other similar organizations across the world. Figure 3 presents the grounded theorization about ApexBrasil's potential role in the INT-E:

Notably, this role appears distinct from existing grounded theories on BE. Positioned within the System S framework (Costa Jr. et al., 2022), ApexBrasil assumes a unique role, functioning not only as an executor of public policy but also as a potential pivotal axis within the triple and quadruple helix structure. It is contended that the crux of ApexBrasil's institutional role within the INT-E framework does not conform to a singular helix (government); rather, it functions interconnecting various helices (government, academia, civil society, and industry) while concurrently weaving a BE oriented toward internationalization.

As a pivotal axis, ApexBrasil assumes many different institutional roles, not clearly described in its strategic report and managerial reports (ApexBrasil, 2020a; 2020b), bearing an institutional role of a collaborative facilitator, creating platforms and initiatives that bring together government, industry, academia, and civil society. It also establishes a collaborative culture, fostering open dialogue and mutual understanding amongst diverse stakeholders. Finally, despite not having its main focus on innovation, ApexBrasil strategically aligns the activities and initiatives of the different helices within the Quadruple Helix Model, identifying synergies and coordinating efforts to ensure a harmonious integration that maximizes the impact of innovation across sectors.

The interactive relations between the pivotal helix and ApexBrasil's activities become more evident when analyzing how the agency simultaneously connects, reconfigures, and mobilizes diverse actors across the INT-E. Acting as a pivotal helix, ApexBrasil does not merely execute isolated export promotion programs but continuously realigns its initiatives, such as qualification projects, investment attraction, sectoral integration, and governance coordination, to maintain the systemic cohesion of the ecosystem. This dynamic



Source: Elaborated by the author.

Figure 3. ApexBrasil internationalization role: a grounded view.

Table 7. ApexBrasil and internationalization ecosystem: a grounded research agenda.

Research Theme	Key Research Questions
Pivotal Helix Concept Adaptability	Can the concept of helix integration, as identified in the case of ApexBrasil, be applied to other institutions or contexts?
Helix Integration Dynamics	How effective is ApexBrasil managing the integration of different helices (government, academia, civil society, and industry) in its internationalization efforts?
Comparative Analysis	What distinguishes ApexBrasil's approach from similar internationalization agencies worldwide?
Policy Execution	How does ApexBrasil's role enhance business ecosystems and their readiness for internationalization?
Stakeholder Involvement	How do stakeholders perceive their engagement with ApexBrasil in the internationalization process?

Source: Elaborated by the author.

role is synthesized in Figure 3, which illustrates how ApexBrasil operates as the central axis interlinking government, industry, academia, and civil society, while adjusting to contextual transformations. In this sense, the pivotal helix concept provides an analytical lens to interpret ApexBrasil's integrative capacity,

highlighting the institution's strategic contribution to ecosystemic internationalization.

The integration role of a pivotal helix institution, previously unexamined in the triple and quadruple helix literature concerning single institutions, raises intriguing avenues for further research, as summarized in Table 7.

The diversity of relevant and original research questions seems to validate the study carried out by Costa et al. (2022), in which it was noted that ApexBrasil's role within the Brazilian business internationalization scenario is little researched and has not caught the due attention it deserves.

CONCLUSION

This study sought to answer the research question: How does ApexBrasil influence and shape the internationalization processes of Brazilian businesses within the INT-E? The analysis demonstrates that ApexBrasil fulfils this role by acting as a pivotal helix institution that: fosters strategic alliances and knowledge transfer; integrates multiple helices—government, industry, academia, and civil society—into coordinated initiatives; and adapts its programs and policies dynamically to systemic changes, thereby reinforcing Brazil's global competitiveness.

The article conducted through the content and thematic analysis using a grounded approach provides a nuanced and new understanding of ApexBrasil's institutional role in the Brazilian INT-E. The conceptual INT-E framework was presented as contemporary and dynamic business frameworks distinguished by their emphasis on open innovation, collaborative work practices, and technology-driven business models. These ecosystems fundamentally prioritize internationalization as the central determinant shaping their nature. The transnational aspect of internationalization assumes a pivotal role within the model, indicating a paradigmatic shift toward global collaboration and market engagement.

The findings suggest that ApexBrasil plays a key role in fostering strategic alliances and knowledge transfer, indicating a significant involvement in building collaborative partnerships to enhance Brazil's global presence. The research highlights ApexBrasil's substantial role in the EE, emphasizing local support, global perspectives, educational initiatives, and the growth of startups. Digitalization emerges as a key theme, with a strong emphasis on digital transformation, adoption of digital technologies, and strategic integration of digital platforms for marketing and innovative business models.

The discernible institutional role that emerges for ApexBrasil challenges existing theories on BE and helices dynamics. Positioned within the System S framework, ApexBrasil assumes a unique role as both an

executor of public policy and a representative within the triple and quadruple helix structure. Contrary to a singular helix, ApexBrasil functions as a pivotal axis, interconnecting various helices while concurrently weaving a BE oriented toward internationalization. The nature of such a role is complex and dynamic, demanding further studies to delve into the pivotal axis concept and its applicability within ApexBrasil and other key institutions in the Brazilian INT-E.

In addition to the theoretical and empirical contributions, the study opens avenues for future research. First, there is a need to investigate whether the pivotal helix role observed in ApexBrasil can also be identified in other EPAs or comparable institutions in emerging economies. Second, further studies could examine how the integration of multiple helices—government, industry, academia, and civil society—evolves over time, particularly under conditions of institutional or political change. Third, research may explore the mechanisms through which pivotal helix institutions balance operational demands (e.g., program implementation) with strategic functions (e.g., ecosystem coordination and agenda-setting). Finally, comparative international studies could advance the theoretical scope of the pivotal helix concept, assessing its applicability across different institutional environments and its potential to enrich the literature on INT-E.

In addition to these contributions, future research could further contextualize Brazil's performance in terms of internationalization, especially regarding innovative businesses, by comparing the period before and after the creation of ApexBrasil. Such studies could also benefit from incorporating detailed case analyses of firms that have achieved international success with the agency's support, thus providing concrete illustrations of ApexBrasil's pivotal helix role. Although these aspects go beyond the scope of the present study, they represent promising avenues for advancing both theoretical and practical understanding of EPAs in emerging economies.

The research has some limitations common to its procedures and nature. It utilized a small sample size of nine individuals, potentially limiting the representation of diverse perspectives within the ecosystem. Including stakeholders from various institutions would enhance understanding. Additionally, temporal constraints may affect the relevance of findings, urging consideration of ApexBrasil's evolving role over time. The subjective nature of content and thematic analysis introduces poten-

tial researcher biases. Finally, while the study mentions ApexBrasil's role in connecting helices, it lacks a detailed exploration of the dynamics and challenges involved, suggesting a need for deeper investigation in future research. Addressing these limitations in future studies would strengthen the understanding of how pivotal helix institutions shape INT-E in different contexts.

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