UNIVERSIDADE ESTADUAL DE CAMPINAS

Faculdade de Ciências Aplicadas

GISELA CONSOLMAGNO PELEGRINI

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A INFLUÊNCIA DO ECOSSISTEMA EMPREENDEDOR NA CRIAÇÃO DE VALOR SOCIAL, ECONÔMICO E AMBIENTAL NO EMPREENDEDORISMO VERDE INTENSIVO EM CONHECIMENTO

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Coorientador/Co-advisor: Prof Dr. Rosley Anholon

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DEDICATION

To a younger self who believed in the power of education.

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EPIGRAPH

"Live as if you were to die tomorrow
and learn as if you were to live forever."
Gandhi

ABSTRACT

Green entrepreneurship is aligned with the sustainable development. The objective of this research is to investigate the influence of the dimensions of the entrepreneurial ecosystem on blended value creation in the perception of green entrepreneurs in knowledge-intensive entrepreneurship (KIE). It is intended to identify the main factors of ecosystems that facilitate the creation of social, economic and environmental value in knowledge-intensive green entrepreneurship, comparing the most appropriate configurations between green and non-green entrepreneurship. A multi-method methodology was used, combining symmetric techniques with Partial Least Square Structural Equation Modeling (PLS-SEM) and Necessary Condition Analysis (NCA), and asymmetric technique with and fuzzy-set Qualitative Comparative Analysis (fsQCA). Data comprehends 245 knowledge-intensive entrepreneurs participating in the Innovative Research in Small Businesses (PIPE) program of the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) in Brazil. The PLS-SEM results demonstrated a lack of alignment between the entrepreneurial ecosystem and blended value creation. For the green sample, only cultural and social factors influence blended value creation, while for the traditional sample, only social factors. In fsQCA, the results further highlighted the impact of the entrepreneurial ecosystem, with all elements appearing in some way in different configurations. The green knowledge-intensive entrepreneurship sample showed a more well-defined pattern of configurations, with only three paths leading to high blended value creation levels. The traditional sample already presented a significant heterogeneity of configurations, presenting nine paths. Education and training appear as a contributing causal condition for two green sample paths and none of the traditional sample, demonstrating the importance of this dimension for green companies. Physical infrastructure appears in six of the nine paths for traditional KIEs and only one for green ones, a more relevant dimension for traditional KIEs. The research contributes to the understanding of the contextual dynamics of the knowledge-intensive green ecosystem in a developing country, allowing the promotion of this type of entrepreneurship, which is in line with the United Nations Sustainable Development Goals (SDGs). The results can contribute to policymaking processes that seek to connect knowledge-intensive entrepreneurship with sustainable transitions within entrepreneurial ecosystems.

Keywords: Blended value creation. Entrepreneurial ecosystem. Knowledge-intensive entrepreneurship. Sustainable development goals.

Resumo

O empreendedorismo verde está alinhado com o desenvolvimento sustentável dos países. O objetivo desta pesquisa é investigar a influência das dimensões do ecossistema empreendedor na criação de valor combinado na percepção de empreendedores verdes em empresas intensivas em conhecimento (EIC). Pretende-se identificar os principais fatores dos ecossistemas que facilitam a criação de valor social, econômico e ambiental no empreendedorismo verde intensivo em conhecimento, comparando as configurações mais adequadas entre empreendedorismo verde e não verde. Foi utilizada uma metodologia multimétodos, combinando técnicas simétricas com Modelagem de Equações Estruturais de Mínimos Quadrados Parciais (PLS-SEM) e Análise de Condições Necessárias (NCA), e técnica assimétrica com Análise Comparativa Qualitativa de conjunto fuzzy (fsQCA). Os dados abrangem 245 empreendedores intensivos em conhecimento participantes do programa Pesquisa Inovativa em Pequenas Empresas (PIPE) da Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) no Brasil. Os resultados do PLS-SEM demonstraram uma falta de alinhamento entre o ecossistema empreendedor e a criação de valor combinado. Para a amostra verde, apenas os fatores culturais e sociais influenciam a criação de valor combinado, enquanto para a amostra tradicional, apenas os fatores sociais. No fsQCA, os resultados destacaram ainda mais o impacto do ecossistema empreendedor, com todos os elementos aparecendo de alguma forma em diferentes configurações. A amostra verde EIC mostrou um padrão de configurações mais bem definido, com apenas três caminhos levando a altos níveis de criação de valor combinado. A amostra tradicional já apresentava significativa heterogeneidade de configurações, apresentando nove caminhos. A educação e a formação aparecem como condição causal, contribuindo para dois caminhos da amostra verde e nenhum da amostra tradicional, demonstrando a importância desta dimensão para as empresas verdes. A infraestrutura física aparece em seis dos nove caminhos para as EIC tradicionais e apenas um para as EIC verdes, uma dimensão mais relevante para as EIC tradicionais. A pesquisa contribui para a compreensão da dinâmica contextual do ecossistema verde intensivo em conhecimento em um país em desenvolvimento, permitindo a promoção desse tipo de empreendedorismo, o que está alinhado aos Objetivos de Desenvolvimento Sustentável (ODS) das Nações Unidas. Os resultados podem contribuir para processos de elaboração de políticas que procurem ligar o empreendedorismo intensivo em conhecimento com transições sustentáveis dentro de ecossistemas empresariais.

Palavras-chave: Criação de valor combinado. Ecossistema empreendedor. Empreendedorismo intensivo em conhecimento. Metas de desenvolvimento sustentável.

Summary

1. INTRODUCTION

Entrepreneurship can be defined as the creation of new economic activity, functioning as a tool to solve social and economic problems (Landström & Harirchi, 2018). The importance of the place for the development of entrepreneurship has been increasingly highlighted, and several studies have linked entrepreneurial activity with the context and the ecosystem (Acs et al., 2017; Malerba & McKelvey, 2018; Spigel, 2017). Thus, entrepreneurial ecosystems have received great attention from scientific communities and practitioners in recent years (Alvedalen & Boschma, 2017; Malecki, 2018; Schäfer, 2021; Schäfer & Mayer, 2019).

The entrepreneurial ecosystem consists in an interconnected network composed of several actors, organizations (firms, banks), institutions (public agencies, universities) and entrepreneurial processes that, together, are capable of causing an extensive impact in the region where they are installed (Mason & Brown, 2014). Research on entrepreneurial ecosystems has shown enormous growth, with more than 75% of publications on the subject being published after 2018 (Schäfer, 2021). Likewise, the theoretical advancement in entrepreneurial ecosystem has addressed different fronts of analysis, such as tourism (Bachinger et al., 2020), education (Clark et al., 2020; Elnadi & Gheith, 2021), anthropology (Klien, 2021), as well as research on sustainability (Fischer, Salles-Filho, et al., 2022; Grigore & Dragan, 2020; O'Connor et al., 2018).

According to Wurth et al. (2022), shifts in research in the field enabled advances, one being in re-orienting research toward productive entrepreneurship rather than venture creation and innovation. Such shift also places consistent changes in the unit of analysis, permitting a closer look and more precise examination in interdependencies and their effect on new value creation in firms.

As an activity of great impact on economic development (Audretsch & Lehmann, 2005), entrepreneurship consists of an activity that provides financial gains, however, in recent decades it has followed a path that also seeks to create value in the social and environmental spheres (Demirel et al., 2019). The creation of economic, social and environmental value simultaneously originated the term blended value creation (Hechavarría et al., 2017). The strength this type of enterprise (namely green or

sustainable) has gained can be attributed to recent discussions held by the United Nations and the establishment of the Sustainable Development Goals (SDGs), which not only established objectives in view of a more sustainable future, but also motivated debates involving the theme (Prado et al., 2022).

According to Muñoz & Cohen (2017), as an extension of entrepreneurship, the sustainable approach has strengthened in recent decades, attracting debates that go beyond thinking that the area is an extension of social and environmental entrepreneurship. Initial studies involving sustainability and entrepreneurship addressed the developments related to who the so-called green entrepreneurs were and their differences in relation to the traditional ones. Advances in the field followed entrepreneurship studies and quickly extended to perceptions related to ethics, entrepreneurial profile and preferences (Munoz & Cohen, 2017). More recently, studies have unfolded on what would be the drivers that inclined entrepreneurs to social and environmental creation (Bojica et al., 2018; di Domenico et al., 2010; Gunawan et al., 2021; Laukkanen & Tura, 2020; Prado et al., 2022).

Green or sustainable entrepreneurship, when it has the potential to radically impact the ecosystem, standing out for the high use of knowledge, can, in addition to achieving social and environmental benefits, generate innovations in processes, products and services, inserting itself in the so-called knowledge-intensive entrepreneurship (Fischer et al., 2022). Aiming at the creation and diffusion of knowledge through new products and technologies, knowledge-intensive entrepreneurship innovates in the use of resources and its creations make the market more dynamic; especially if we consider the entrepreneur as a vector of transformation of society (Malerba & McKelvey, 2020).

In addition, the concepts that involve knowledge-intensive entrepreneurship deal with the individual and the processes that permeate their networking and the context in which they operate, from the sectoral to regional level (Malerba & Mackelvey, 2020). Such contexts would be key responsible for both fundraising and sources of knowledge. Thus, both green entrepreneurship and knowledge-intensive entrepreneurship are highly dependent on the entrepreneurial ecosystem in which they are inserted (Fischer, Salles-Filho, et al., 2022; Theodoraki et al., 2022).

Research in the field is needed in order to gain more knowledge about the influence and promotion of sustainable entrepreneurship through the entrepreneurial

ecosystem (Audretsch et al., 2024; Bertello et al., 2022; Fischer, Meissner, et al., 2022). The connection between the configurations and evolution of the entrepreneurial ecosystem with environmental and green economy issues are important research gaps on the subject (Cloitre et al., 2022; Pankov et al., 2021). There is a scarcity of research that addresses value creation and the benefits that investigations on the subject can bring (Rodríguez-García et al., 2019). The integration of green entrepreneurship with the field of innovation research is a challenge for academics and society (Demirel et al., 2019). Regarding methodological aspects in green entrepreneurship research, there is a shortage of more comprehensive databases that allow for more rigorous statistical analyzes (Demirel et al., 2019). Fischer et al. (2022) suggest the use of different methodologies, such as the Comparative Qualitative Analysis of data, which can contribute in order to understand the phenomenon.

Complementarily, Muñoz and Cohen (2017) argue that the field would benefit from studies that extend to the influence of multiple contexts and how immersion in these ecosystems would influence the entrepreneurial process. Similarly, Malerba and McKelvey (2020) concluded that knowledge-intensive entrepreneurship occurs differently in countries and sectors, which presents an opportunity to explore the Brazilian context from a green perspective (Fischer, Salles-Filho, et al., 2022; Rocha et al., 2022).

In this context, this thesis explored knowledge-intensive entrepreneurship under the green lens and the creation of combined value (financial, environmental and social), as a consequence of the elements of the entrepreneurial ecosystem in which they are inserted (Bertello et al., 2022; Fischer et al., 2022). A broader understanding of this phenomenon, in order to encompass the impact of the entrepreneurial ecosystem on the perception of entrepreneurs, can go beyond theoretical and academic contributions (Theodoraki, Dana, & Caputo, 2022).

Understanding the contextual dynamics of the knowledge-intensive green ecosystem in a developing country allows promoting this type of entrepreneurship, which is aligned with the United Nations Sustainable Development Goals (SDGs). The results can inform policy-making processes that seek to connect the promotion of knowledge-intensive entrepreneurship with environmentally sustainable transitions within business ecosystems.

After this introduction, this thesis proposal is divided in: Objective (2); Theoretical Discussion (3); Research methodology (4); Results (5), Discussion (6); Final remarks (7), followed by references.

2. OBJECTIVE

The goal of this research consists in investigating the entrepreneurial ecosystem influence on the blended value creation (social, economic and environmental value) in the perception of knowledge intensive green entrepreneurs, which belong to PIPE FAPESP (São Paulo Research Foundation), an innovation program for small and medium enterprises.

Furthermore, the following specific goals are sought:

1. Formulate and test a research conceptual model to evaluate the antecedents of blended value creation in knowledge-intensive organizations;

2. Analyze the differences in the relationships between green entrepreneurship and non-green entrepreneurship.

3. Verify different configurations between ecosystem elements that result in high levels of blended value creation in green entrepreneurship.

Given the aforementioned, this thesis unfolds in two questions:

- *What ecosystems' factors impact on the blended value creation in knowledge-intensive green entrepreneurship?*

- *What configurations are required or enough to reach high levels of blended value creation?*

3. THEORETICAL DISCUSSION

This section is divided in order to achieve the purpose of this project. Thus, it unfolds in four major parts: Entrepreneurial ecosystems (3.1), Knowledge-intensive entrepreneurship (3.2), Blended value creation (3.3), and Green entrepreneurship (3.4).

3.1. ENTREPRENEURIAL ECOSYSTEMS

As a multifaceted economic endeavor, entrepreneurship field transcends strategic approaches, drawing significant influence from governmental support, network externalities, and resource availability (Audretsch et al., 2019).

Main ideas on entrepreneurial ecosystem date back to 1980's and 1990's, as a result of changes from research more focused on individualistic perspectives and personality-based studies (Stam & van de Ven, 2018).Complimentarily, this more recent focus would be a result of a decentralizing process which previously considered the individual as the only value creation vector (Stam & van de Ven, 2021).

As defined by Mason & Brown (2014, p. 5), entrepreneurial ecosystems are "a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organizations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial processes (e.g. the business birth rate, numbers of high growth firms, levels of 'blockbuster entrepreneurship', number of serial entrepreneurs, degree of sell- out mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment".

Similarly, Qian et al (2012), who employ the term *system* instead of ecosystem, consider it a set of crucial factors that influence creation, discovery and exploitation of opportunities within the entrepreneurial field, namely: social, institutional and economic factors, amongst others. According to the literature, the performance of entrepreneurship systems would depend on major elements, e.g.: individuals

(entrepreneurs and inventors), organizations (firms, government agencies and research institutions) and institutions (property right protection) (Qian et al., 2012).

For Cao & Shi (2021), the literature shows certain agreement on entrepreneurship ecosystems being a community of multiple stakeholders which coexist and coevolve by providing a supportive environment for entrepreneurial activities within a region, as it can also be seen in the aforementioned concepts.

According to the World Economic Forum (WEF, 2013, p. 7), eight pillars compose the entrepreneurial ecosystem, as displayed in Table I.

Table I. EE Pillars

Accessible markets	**Human Capital and workforce**
• **Domestic market/foreign market:** large, medium and small companies as customer, as well as the government.	• Management Talent • Technical Talent • Entrepreneurial Company Experience • Outsourcing Availability • Access to Immigrant Workforce
Funding and finance	**Support system**
• Friends and Family • Angel Investors • Private Equity • Venture Capital • Access to Debt	• Mentors/Advisors • Professional Services • Incubators/Accelerators • Network of Entrepreneurial Peers
Regulatory framework and infrastructure	**Education and training**
• Ease of Starting a Business • Tax Incentives • Business-Friendly Legislation/Policies • Access to Basic Infrastructure (e.g. water, electricity) • Access to Telecommunications/Broadband • Access to Transport	• Available Workforce with Pre-University Education • Available Workforce with University • Education Entrepreneur-Specific Training
Major universities as catalysts	**Cultural support**
• Major Universities Promoting a Culture of Respect for Entrepreneurship • Major Universities Playing a Key Role in Idea-Formation for New Companies • Major Universities Playing a Key Role in Providing Graduates for New Companies	• Tolerance of Risk and Failure • Preference for Self-Employment • Success Stories/Role Models • Research Culture • Positive Image of Entrepreneurship • Celebration of Innovation

Source: WEF (2013, p. 7).

As displayed in Table I, the World Economic Forum mentions several important factors as pillars of Entrepreneurial Ecosystems, being universities and education and training extensive contributors, especially if we consider knowledge-intensive entrepreneurs.

Within said system, entrepreneurs face many challenges, once there are several paths in regard to process and products to develop for a sustainable future, also the opportunities and choices regarding technology and innovation, new markets as well as challenging scenarios in face of personal conflicts especially if sustainable goals are regarded (Gifford et al., 2021).

In accordance with Cao & Shi (2021), three characteristics represent entrepreneurship ecosystems: interaction, resource and governance logic. Under the interaction logic, structural elements and interactions are considered vital, emphasizing connection, innovation generation and configurations considering actors, network and institutions (Cao & Shi, 2021). Moreover, the interactions would provide mechanisms to provide opportunity identification and exploitation, besides resource allocation.

Resource logic in the entrepreneurial ecosystem include finance, human knowledge and physical structure, entrepreneurs, in turn, coordinate knowledge, capital and labor (Cao & Shi, 2021). Resources can be provided by several kinds of actors within the ecosystems (e.g. individuals, government, grants, private investments, etc.). The third logic refers to governance and stands in the policymaking position (Cao & Shi, 2021). As ecosystems have several actors, the authors highlight different stakeholders present different impact and roles.

According to Schäfer (2021), studies on EE have intensified since 2018, indicating the research topic has received notorious focus due to tremendous theoretical contributions received in said period. The author highlights academic advancements still have been occurring on concepts and frameworks (Mason & Brown, 2014), also on emerging sustainability research (Fischer, Bayona-Alsina, et al., 2022; Prado et al., 2022; Rocha et al., 2022).

On the field's lack of agreement on a unique definition, Schäfer (2021) states slight similarities resonate on regionally placed communities and elements that provide a nurturing environment for opportunities within the entrepreneurial field. With respect to

spatial characteristics, Schäfer (2021) advocates the literature unfolds when it comes to the linkage of 'spatial' to regional and the function of spatial relationships in respect to both proximity and distance and social constructions that can explain the dynamics and mechanisms in and between entrepreneurial ecosystems. Similarly, Ács et al. (2014) outline evaluating variables altogether and considering contextualization are crucial to recognize entrepreneurship process are always embedded within a country framework.

Research on entrepreneurial ecosystems have focused extensively on macro levels (e.g. institutions) and it neglected the role of entrepreneurial ventures and individuals (Pankov, et al., 2021). In addition, the authors advocate that it would be a central perspective towards shedding a closer look to sustainability, once it is responsible for addressing global challenges and such sustainable entrepreneurs could impact positively by being a role model to society. Similarly, Pankov, et al. (2021) addressed the context in which the ecosystem exists plays critical role regarding opportunities, influencing individuals' decision-making process, innovativeness (Autio et al., 2014), growth (Mason & Brown, 2013) and performance.

For Wurth et al. (2022), the field have shifted focus towards namely productive entrepreneurship. This concept relates to any entrepreneurial activity which contributes to economy or additional output (Baumol, 1990) and it would also include innovative start-ups and entrepreneurs fostering innovation. According to authors, (Wurth et al., 2022), placing productive entrepreneurship in the center of the research agenda would be possible to develop more precise research on the interdependencies which would impact new value creation in organizations, that is, it could enable understanding which attributes and exogenous regional factors support it.

Sustainably wise, an EE would not exist without it, once it is already a part of the ecosystem and it helps it survive, whereas without sustainability, the ecosystem would certainly be, somehow, jeopardized (Grigore & Dragan, 2020). Emerging as a complimentary concept, Sustainable Entrepreneurial Ecosystems (SEE), as coined by Cohen (2006, p. 3), it is defined "as an interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures".

By intertwining industrial ecology, geographic clusters and entrepreneurial ecosystems, Cohen (2006) articulates that in a SEE some elements are crucial, namely:

universities, which poses a role of educating (future) leaders not solely on concepts and strategies in business related areas, but also on the relevance of sustainability and its relations to the ecosystem; government, regarding grants, subsides, policies, innovation foment. Moreover, it highlights the importance of capital source and professional and support services, infrastructure, culture, amongst others.

By employing fuzzy-set qualitative comparative analysis (fsQCA) and in agreement with Spigel (2017) and evaluating elements that also are approached in this thesis proposal, a Chilean research evaluated 71 local entrepreneurs, extending analysis to cultural social and material attributes (Muñoz et al., 2020). Similar to previous research, findings suggest unique results in a complex ecosystem. It builds up on the need for financial programs in support.

Literature also outlines difficulties in addressing cultural/social factors and entrepreneurship. However, it justifies their importance once societies are different by nature, and individual must also adopt different behaviors towards success achievement, shaping diverse values, consequently influencing in entrepreneurial behavior (Thornton et al., 2011).

Sociocultural distinct impacts can be supported by Schwartz's norm-activation theory of altruism, which has been applied to the environmental research body. The theory reasons that environmental behavior may be particularly connected to a variety of values, which may also include altruism and self-interest, individual norms and beliefs (Stern et al., 1999).

It can also be drawn by post-materialist values (Inglehart, 1977, 1990, 1997), which advocated such values and behavior would emerge from attitudes contrasting with materialist values, emphasizing quality of life and nature care (Stern et al., 1999). On this sense, Hechavarría et al. (2017) researched a large sample of over 15.000 entrepreneurs in 48 countries by studying the Global Entrepreneurship Monitor sample, finding gender and cultural values impact the types of value creation focused by the entrepreneurs. The research unfolded female entrepreneurs are more inclined to social goals than economic, not pointing to environmental value goals and female entrepreneurs though.

Sociocultural impacts on entrepreneurship are widely studied, as it has been approached by Azjen's Theory and named as social norms. Social norms unfold to the influence of social pressures, other individuals' behavior and opinions, being pointed in

several research as an impacting factor in fomenting action. According to Meek et al. (2010, p. 11), “if social norms differ across cultures and countries, and social norms are influential in individuals’ views of the natural environment and business, then social norms will impact both the emergence and performance of environmental entrepreneurship”, what is corroborated by Mondal et al. (2023).

Yet on the subject, when assessing enablers for green entrepreneurship, research revealed technology-based enablers – which assist business in creating cleaner value to society - and effective technological infra-structure facilities are key enablers, so were social norm and culture (Mondal et al., 2023).

According to Stam & van de Ven (2021), physical infrastructure refer to the physical context in which the ecosystem actors are enabled to meet other actors physically, being a crucial factor regarding *interaction.* For Audretsch et al. (2015), infrastructure is also a relevant factor in entrepreneurship, notwithstanding, we cannot fall short in mentioning that not all infrastructural element is detrimental in startups and KIE, as per the authors railways and highways are found less relevant than communications structure. Additionally, infrastructure is pointed as people mobility enabler, and knowledge and information exchange, being responsible for not only fostering interactions between entrepreneurship actors within the ecosystem, once it is capable of enhancing opportunity recognition (Audretsch et al., 2015).

EE configurations research has been done before (Alves et al., 2021; Muñoz et al., 2020) and it also included KIE (Alves et al., 2019) and infrastructure studies (Audretsch et al., 2015). The next sections will enlighten on Knowledge-intensive entrepreneurship, blended value creation and green entrepreneurship and then the hypotheses presentation.

3.2. KNOWLEDGE-INTENSIVE ENTREPRENEURSHIP

As major changes have affected the field, new business ideas and types of endeavors have become trends and they correspond to the advancements occurred within the entrepreneurial practice in our society (Sousa et al., 2019). Within the so-called knowledge economy (Caputo et al., 2019) which poses value creation, information and knowledge as correlated items, knowledge-intensive entrepreneurship emerges.

According to Malerba & McKelvey (2020, p. 508), knowledge-intensive entrepreneurship (KIE) can be defined as how organizations "use and transform existing knowledge and generate new knowledge in order to innovate within innovation systems". For the authors, KIE ventures are influenced by several factors, highlighting resources, institutions, founders, universities, the government, suppliers, amongst others. Such influences are found within the entrepreneurial ecosystem.

For Malerba & McKelvey (2020), four key dimensions can be defined in KIE:

1. KIE are new independent firms: according to the authors, KIE firms should be independent from other organizations and often considered an early stage firm.
2. KIE must be innovative: such aspect excludes firms that do not create and only sell standardized goods/services.
3. KIE are "knowledge intensive in the innovative and competitive process" (Malerba & McKelvey, 2020, p. 511): it refers to organizations which use knowledge to solve problems and obtain competitive advantages.
4. KIE exploit innovative opportunities: by combining innovation and design, KIE tend to attend emerging needs from a fast-paced market.

Considering those four dimensions, Malerba & McKelvey (2020, p. 511) complement their concept as: "KIE ventures are new firms that are innovative, have significant knowledge intensity in their activity, are embedded in innovation systems and exploit innovative opportunities in diverse evolving sectors and contexts". In terms of challenges, KIE firms face the same challenges as other traditional entrepreneurial firms, however, when compared to non-KIE firms, they differ intensively on how they innovate and compete in their ecosystem (Heidemann Lassen et al., 2018).

In research by Gifford et al. (2021), KIE entrepreneurs faced several challenges on systematic spheres, e.g. lack of direct investment, regulations, and technology acceptance issues, amongst others. Complimentarily, according to the authors, uncertainty is another factor surrounding either technology, financing and regulations, KIE entrepreneurs, however, are demanding more and more policy support (Gifford et al., 2021).

For Gifford & Mckelvey (2019), KIE has acted as a catalyst in the transformation within the new economy, once it relates intensively to new scientific and technological knowledge towards sustainability. That is attainable due to sustainable development enables both economic and social development by not depleting natural resources and keeping individuals' quality of life by not using ecosystems' capacity (Lotfi et al., 2018).

According to previous research, knowledge-intensive sustainable businesses seek either growth and survival by interacting with the ecosystem (Bertello et al., 2022). It has been displayed in the literature how pertinent it is for business to get involved with the ecosystem where they are embedded, by interacting with stakeholders, institutions, research institutes, incubators, amongst others, in order to obtain competitive advantage. That accomplishment, however, would depend on how these actors interact with ecosystems' factors (Bertello et al., 2022).

The literature builds up the emergence of KIE may vary according to regions and their conditions. That would represent the link with the entrepreneurial ecosystems, as per its several definitions, poses the linkage to the environment and its processes and members (e.g. institutions, universities, policies, innovative system, amongst others)(Ács et al., 2014; Mason & Brown, 2014).

Research has previously disclosed different trajectories and heterogeneous configurations in EE patterns, revealing, on the other hand, similar paths regarding the scientific and technological scenario, human capital and local market dynamics and KIE important within the entrepreneurial ecosystem (Alves et al., 2019). The authors assumed EE present certain configurations, or influential dimensions that may create similar outcomes in terms of entrepreneurship, as a 'recipe' to create business as KIE. Some aspects of these configurations will be stated below (Alves et al., 2019).

In the educational perspective, universities and research institutes availability are closely linked to the knowledge creation (Spigel, 2017), so that the proximity to those institutions could contribute for high-tech endeavors (Stam, 2015). Within market and financial dynamics, research, in general, present a diverse scenario especially when geographical issues are regarded. In the Brazilian context, this scenario is even more complex, once small and medium-sized enterprises are challenged to attain credit (Neto et al., 2014).

When investigating KIE configurations', Alves et al. (2021) findings suggest successful ecosystems present different arrangements and socioeconomic systems become more relevant as EE are placed in more developed regions, moreover, it displays the knowledge infrastructure has a central role. While technology transfer infrastructure remained as a strategy resource, research universities had their contribution lowered (Alves et al., 2021).

Adding up a green perspective, due to its orientation to address new opportunities, the literature conceives green entrepreneurship as a type of KIE (Fischer, Bayona-Alsina, et al., 2022). According to Thelken & Jong (2020), sustainable entrepreneurs play key roles as innovation drivers in the process of circular economy transitions by collaborating with larger companies, and the integration of external dynamic capabilities.

Therefore, the integration of knowledge-intensive entrepreneurship ecosystems with sustainable entrepreneurship takes place as sustainable entrepreneurs address complex socio-environmental issues through the implementation of innovative solutions based on the intensive use of knowledge (Anand et al., 2021; Gu et al., 2022). Moreover, it is acknowledged green entrepreneurship and sustainable business in general has been linked to value creation beyond the economic sphere (Gregori et al., 2019; Hechavarría et al., 2017; Terán-Yépez et al., 2020) as it will be approached in the next section.

In agreement with the theoretical background aforementioned within this and the previous section, it is possible to outline the ecosystem configurations have been previously linked to knowledge-intensive firms (Alves et al., 2021; Fischer, Salles-Filho, et al., 2022), thus, the following section approaches Blended value creation and it presents hypotheses combining with KIE.

3.3. BLENDED VALUE CREATION

In spite of the recognition entrepreneurship's capability of generating wealth, due to increasing debates regarding sustainable development, research points out that it should not base, solely, on wealth creation (Terán-Yépez et al., 2020). On top of that, it is possible to acknowledge crescent enlightening of consumers in face of their own needs and values, providing more incentives for entrepreneurs to pursue different and innovative paths (Lotfi et al., 2018; Sharma & Kushwaha, 2021). With rapid changes in society in both individual behavior and technology levels, organizations have been struggling with a fast-paced environment and shorter product life cycles. On top of such shifts, environmental changes, movements and United Nations Sustainable Development Goals emerged and showed organizations a whole new way of doing business.

According to Emerson (2003), ruptures and changes witnessed have spread to companies, which can be seen through the increase of enterprises with social purposes, and a significant number of debates towards social and environmental performance exploring the nature of value, delineating the so-called 'blended value creation'. In a traditional way, value creation is associated with the way companies offer their products and services, by portraying them in an attractive manner (Bowman & Ambrosini, 2000).

Blended value creation conceptualization dates back to 2000 (Emerson, 2000, 2003) when it has been displayed as a theory involving both organization and capital efforts to create value under a non-divided manner, that is, value can be understood as the interaction of three main components: social, economic and environmental. Nevertheless, other research can be found, referring to it as blended value creation (Emerson, 2003; Hechavarría et al., 2017), shared value creation (Sinthupundaja et al., 2019), and sustainable value creation (Lüdeke-Freund, 2020; Lüdeke-freund et al., 2020; Lüdeke-Freund & Dembek, 2017).

Understanding social value creation is considered relevant by authors (Korsgaard & Anderson, 2011). According to Korsgaard & Anderson (2011), individuals may perceive opportunities and be influenced by their social environment (i), and businesses are part of a social interactive web influenced by several other elements (ii) (Korsgaard & Anderson, 2011). Similarly, Di Domenico et al. (2010) discussed business with social purposes emerged and became significantly relevant due to society's changing

perceptions, and it is seen as a mechanism that supports economic activities in areas either neglected by the governments or deemed unprofitable.

Sinthupundaja et al. (2019) adopt the term *shared values* for social, environmental and financial dimensions. According to the authors, there is no magic formula for blended value creation, considering they can originate from several different combinations. For environmental value creation, it is argued it shapes entrepreneurial practice once it is focused on solving negative environmental impacts or issues (Gunawan et al., 2021) and it is, closely, linked to entrepreneurs' behaviors (Prado et al., 2022). Not depending solely on environmental process but also on economic and natural, such entrepreneurs would be capable of generating profit by combining both environmental and social benefits (Kuckertz et al., 2019; Prado et al., 2022)

Economic value, for instance, refers to value or profit in realization of products and services (Bowman & Ambrosini, 2000) and increasing cost-efficiency (Laukkanen & Tura, 2020). In regard to the value creation process in innovation ecosystems, Arena et al. (2021) defend a three-block process in which there are inputs, internal processes and outputs.

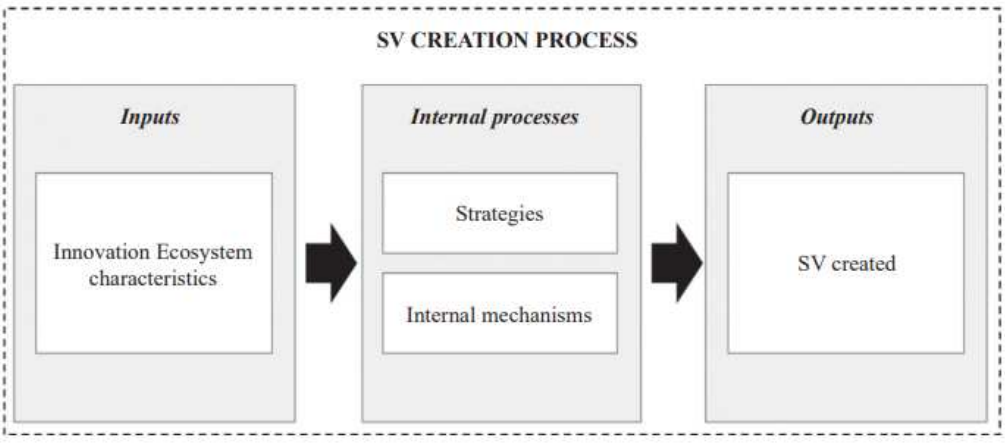

Figure 1. Shared Value creation process

Source: Arena et al. (2021)

On the process, inputs refer to the innovation system, which are similar to entrepreneurship ecosystems, formed by actors, networks, government and structure. Internal processes, in its turn, refer to organizations' mechanism to cope with the issue,

e.g. level of openness, formal versus informal strategies and actions, while outputs relate to the obtained value. Thus, considering this process, it is possible to infer que environment, that is, the ecosystem *per se*, affects the outputs obtained by the end of the process.

To understand value creation, it is relevant to highlight, for instance, its meaning and how to capture it. For Bowman & Ambrosini (2000), value creation is defined as the combination of resources and labor. Then, when it comes to consumer behavior, theorists and economists assess value as the upmost attempt consumers try to optimize their investments and satisfy their needs (Bowman & Ambrosini, 2000).

If other factors are considered in regard to consumers' satisfaction and what makes them content with a product of service, it is also far-reaching to highlight such value can be perceived by the costumers, namely *use value*, so it does not regard only what they actually invest on goods (monetary wise) (Bowman & Ambrosini, 2000). Therefore, in order to create such use values, organizations recur to their members and strategies to create ways of offering higher exchange value to the consumers.

According to Emerson (2003), a massive mistake is made when blended value creation is separated and analyzed individually. According to the author, it is not right to consider the threefold elements as three different corporation strategies. The elements, in their turn, must be integrated to maximize blended value(s) perception. Blended value creation brings out challenges, change and innovation, and its successful execution will depend on many factors, e.g. the organization capacity of innovate, change, adapt and its constant ability to measure its efforts as well (Emerson, 2003).

Research on the subject also points to sustainable value creation generated in organizations throughout business models and it is understood through economic, environmental and social value creation, in agreement to what is determined as blended value creation in this research (Laukkanen & Tura, 2020; Zioło et al., 2023)

According to Vasilescu et al. (2023), in developing countries, the scenario for green entrepreneurship also faces lower development, meaning entrepreneurs would still focus more on profit than other value creation.

Thus, in agreement with the theoretical background from EE and blended value approached in this section, thus the following hypotheses to support this study:

H1 Access to finance positively influences blended value creation in knowledge-intensive entrepreneurship

H2 Government policies and regulation positively influence blended value creation in knowledge-intensive entrepreneurship

H3 Government programs and support positively influence blended value creation in knowledge-intensive entrepreneurship

H4 Access to physical infrastructure positively influences blended value creation in knowledge-intensive entrepreneurship

H5 Cultural factors positively influence blended value creation in knowledge-intensive entrepreneurship

H6 Social factors positively influence blended value creation in knowledge-intensive entrepreneurship

H7 Educational and training factors positively influence blended value creation in knowledge-intensive entrepreneurship

3.4. GREEN ENTREPRENEURSHIP

Entrepreneurship body of research is broad and approaches several topics of interest. Although natural environment and business seemed too different to reconcile (Vasilescu et al., 2022), in recent years, a growing amount of work can be found with contributions on different grounds: environmental, social and economic sustainability (Gregori et al., 2019), which, somehow helped transition to green economy.

The concept of green entrepreneurship is a new issue that has attracted attention since the late 1990s and has been growing steadily in recent years (Lotfi et al., 2018). A variety of terms can be found while investigating this phenomenon, e.g.: green entrepreneurship, ecopreneurship, environmental entrepreneurship (Dean & Mcmullen, 2007) and sustainable entrepreneurship (Dean & Mcmullen, 2007); which can be related despite minor differences which will be shown as follows.

According to Dean & McMullen (2007), environmental entrepreneurship emerges from an opportunity found in the market in which traditional entrepreneurship failed (by somehow failing the market and society). Such opportunity would emerge from the chance to *repair* mistakes caused to the environment.

For the authors, environmental entrepreneurship consists in discovering, evaluating and exploring economic opportunities environmentally wise found in the market and which are derived from market failures, while sustainable entrepreneurship would similarly explore them, especially the ones environmentally pertinent (Dean & Mcmullen, 2007). Major differences between the two terms lie on environmental entrepreneurship's attempt to repair environmental degradation caused by market failures.

Table 1 defines green entrepreneurship and entrepreneurs with their respective authorship information.

Table 1. Green entrepreneurs and entrepreneurship – definitions

Authorship	**Definition**
(Melay et al., 2017, p. 2)	"Green entrepreneurship is understood as profitable and innovative entrepreneurial activity, which seeks to positively use its influence on society, economy and the environment"
(Ndubisi & Nair, 2009, p. 22)	"[Green entrepreneurship] is the propensity to innovate or create a green organization"
(Silajdzic et al., 2015, p. 110)	"Green entrepreneurs, as catalyst of change … are individuals who develop an innovation that either reduces resource waste and impacts or improves efficiencies".
(Anghel & Anghel, 2022, p. 3)	"(…) green entrepreneurship can be defined as a business activity that generates profit that can be applied to environmental protection actions."

Source: Anghel & Anghel (2022); Melay et al. (2017); Ndubisi & Nair (2009); Silajdzic et al. (2015).

For this research, the term 'green entrepreneurship' was adopted, and at the individual level, 'green entrepreneurs', as mentioned in table above.

In the entrepreneurial field, motivations have been a long lasting debated topic of research. Such fact is due to individuals' necessities to express their values and make a difference in the world, and their often usage of their own business to do so (O'Neil & Ucbasaran, 2016).

In regard to green entrepreneurship motivations, the field falls short in addressing the matter, especially in differentiating from traditional entrepreneurs (Prado et al., 2022). However, it is acknowledgeable that motivations can rise from several personal issues, being either personal values or interest in the niche (Font et al., 2016), ethics and beliefs (O'Neil & Ucbasaran, 2016), while some research even investigate moral obligation and perceived social support (Prado et al., 2022). Moreover, self-efficacy and compassion are individual psychological factors also associated with social goals in entrepreneurship (Miller & Grimes, 2012). In education and young future entrepreneurs, the relationship between students' preoccupation with the issue is influenced by being capable of recognizing ideas for green business (Anghel & Anghel, 2022).

Regarding ecosystems and sustainable business (DiVito & Ingen-Housz, 2021), the literature presents sustainable opportunities emerge from a highly uncertain environment and this posed uncertainty would flourish within entrepreneurial ecosystems that provide access to resources and knowledge, foment entrepreneurial ventures, and reduce risk (Kuratko et al., 2017). However, for DiVito & Ingen-Housz (2021), as entrepreneurial ecosystems are defined by the literature, it remains unclear whether it supports sustainable entrepreneurship. Such lack of clarification arises from the need presented by such types of businesses, which may require a different support from traditional entrepreneurship. On the contrary to this stand, Grigore & Dragan (2020) defend the EE would not exist without sustainability, as displayed in the aforementioned section.

Unlike conventional entrepreneurship, green entrepreneurship stimulates the creation of economic, social and environmental value, benefitting society through business activities, financial gains maximization and ecological problems reduction (Rosário et al., 2022). In this sense, it is relevant to differentiate these fields. Social entrepreneurship relates to an entrepreneurial process that focuses on creating social value or value for people and communities (Schaefer et al., 2015). Green entrepreneurship, on the other hand, involves the creation of environmental value, that is, the preservation and regeneration of the natural environment, as well as the economic value of conventional entrepreneurship (Schaefer et al., 2015).

The green entrepreneurial typology is considered a unique type of entrepreneurship once its capable of evaluating opportunities that create both economic and ecological benefits (Schaefer et al., 2015). Thus, social entrepreneurship is considered distinct from ecological entrepreneurship because it involves an altruistic and supportive concern for resolving social issues, in addition to concern for financial return (Schaefer et al., 2015). Sustainable entrepreneurship, in turn, encloses activities that "embraces" the economic, ecological and social dimensions of sustainability as part of its core business. Thus, it can put organizations into a sustainable path by adding it up to its business model (Bischoff, 2021; Schaefer et al., 2015).

When comparing to traditional entrepreneurs, the literature points to several differences in respect to finance access, government policies and programs, physical infrastructure, education and other dimensions of EE, according to Randjelovic et al.,

(2003), traditional and green entrepreneurship differ on volume of investment, and also on type of investment source, considering traditional entrepreneurs would rely more on pension funds, while green would rely on high net-worth individuals. In early research, authors show green enterprises invest in innovation differently from traditional ones, besides facing challenges in reaching their market potential, attaining credit, amongst others (Randjelovic et al., 2003).

Based on the literature presented above and as defended by Demirel et al. (2019) which state the existence of similarities between green and non-green entrepreneurs within KIE context, the following hypotheses are presented for this thesis:

H8 There are differences in the relationships between green and non-green entrepreneurs

H8a There are differences in the influence of access to finance on blended value creation between green and traditional entrepreneurs

H8b There are differences in the influence of government policies and regulation on blended value creation between green and traditional entrepreneurs

H8c There are differences in the influence of govern programs and support on blended value creation between green and traditional entrepreneurs

H8d There are differences in the influence of access to physical infrastructure on blended value creation between green and traditional entrepreneurs

H8e There are differences in the influence of cultural factors on blended value creation between green and traditional entrepreneurs

H8f There are differences in the influence of social factors on blended value creation between green and traditional entrepreneurs

H8g There are differences in the influence of education and training on blended value creation between green and traditional entrepreneurs

4. RESEARCH METHODOLY

In order to shed light on methodological procedures for this thesis proposal, this section presents Conceptual Model (4.1), Methodological procedures (4.2), Measurement instrument (4.3), and Sample aspects (4.4).

4.1. CONCEPTUAL MODEL

Based on the aforementioned theoretical background, a conceptual model (Figure 2) was developed to support this thesis' goals to investigate the influence of entrepreneurship ecosystem elements on the creation of social, environmental and economic value (blended value creation) on the perception of knowledge-intensive entrepreneurs from PIPE FAPESP participants. For Whetten (1989), visual representation of research conceptual model contributes to better research objectives understanding.

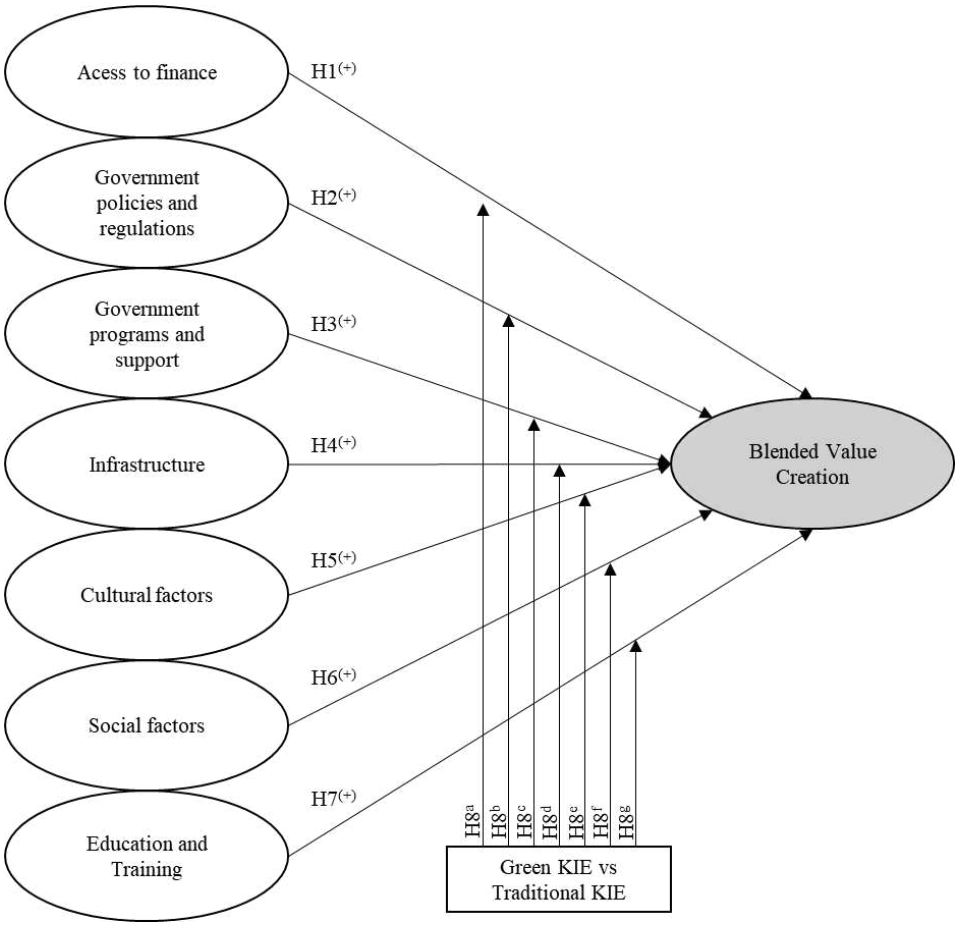

Figure 2. Research conceptual model

The conceptual model is formed by eight constructs (latent variables), one dependent variable (blended value creation) and seven independent variables (access to finance, government policies and regulations, government programs and support, infrastructure, cultural factors, social factors, education and training). Besides, it presents a binary variable (green KIE or traditional KIE), which analyzes the difference between its relationships through a multigroup analysis.

As aforementioned in previous section, there are some literature which display existing differences when comparing KIE and green entrepreneurship. However, recent study emphasizes that, in spite of needs to analyze blended value creation, there are not existing research which concurrently analyze the three pillars in BVC (Audretsch et al., 2024), demonstrating the need to direct focus on these elements and the configurations of the ecosystem.

Table 2 arranges the research hypotheses, as previously present along with its theoretical background in previous section.

Table 2. Research hypotheses

Hypothesis	Description
H1	Access to finance positively influences blended value creation in knowledge-intensive entrepreneurship
H2	Governenment policies and regulation positively influence blended value creation in knowledge-intensive entrepreneurship
H3	Governement programs and support positively influence blended value creation in knowledge-intensive entrepreneurship
H4	Access to physical infrastructure positively influences blended value creation in knowledge-intensive entrepreneurship
H5	Cultural factors positively influence blended value creation in knowledge-intensive entrepreneurship
H6	Social factors positively influence blended value creation in knowledge-intensive entrepreneurship
H7	Educational and training factors positively influence blended value creation in knowledge-intensive entrepreneurship
H8	There are differences in the relationships between green and non-green entrepreneurs
H8a	There are differences in the influence of access to finance on blended value creation between green and traditional entrepreneurs
H8b	There are differences in the influence of government policies and regulation on blended value creation between green and traditional entrepreneurs
H8c	There are differences in the influence of govern programs and support on blended value creation between green and traditional entrepreneurs
H8d	There are differences in the influence of access to physical infrastructure on blended value creation between green and traditional entrepreneurs
H8e	There are differences in the influence of cultural factors on blended value creation between green and traditional entrepreneurs
H8f	There are differences in the influence of social factors on blended value creation between green and traditional entrepreneurs
H8g	There are differences in the influence of education and training on blended value creation between green and traditional entrepreneurs

Source: own authorship

4.2. METHODOLOGICAL PROCEDURES

First methodological procedure for this proposal was the development of a bibliometric analysis on the topic. The bibliometric analysis is a proper method of mapping studies on a specific topic of interest, enabling the identification, analysis and interpretation of main research aspects with trusting and replicable results (Donthu et al., 2021). Due to the capacity of handling large volumes of scientific articles and to produce high impact research, such method has gained popularity in Business Management research (Khan et al., 2021).

In the following, a multimethod approach was used, with the combination of symmetrical and asymmetrical technique. The symmetrical technique was Partial Least Squares Structural Equation Modeling (PLS-SEM). This technique enables the theoretical hypotheses validation, with a predictive perspective. PLS-SEM enables complex model analysis with latent constructs and multigroup analysis (Hair et al., 2022).

Amongst the several reasons to use PLS-SEM, both linked to this proposal and in resonance with Hair et al. (2022), are: (i) testing a theoretical model with a predictive perspective; (ii) analyzing complex models, with many latent variables and relationships; (iii) understanding the complexity of crescent development areas; (iv) analyzing formative construct models; (v) analyzing different groups in the same model (multigroup analysis).

The asymmetrical approach was Necessary Conditions Analysis (NCA) and fuzzy-set Qualitative Comparative Analysis (fsQCA) of Ragin (1987), which enables more subtle insights, through the configuration presentation of complex and causal relations, involving the model's variables (Rasoolimanesh et al., 2021). FsQCA is a technique used to identify sufficient and needed conditions to obtain results combining certain variables (Ragin, 2006) .

For the results analysis, SmartPLS 4.0 (Ringle et al., 2015) and fsQCA 3.1b were used and will enable statistic validations and calculations. Methodological procedures will be shown in Figure 3.

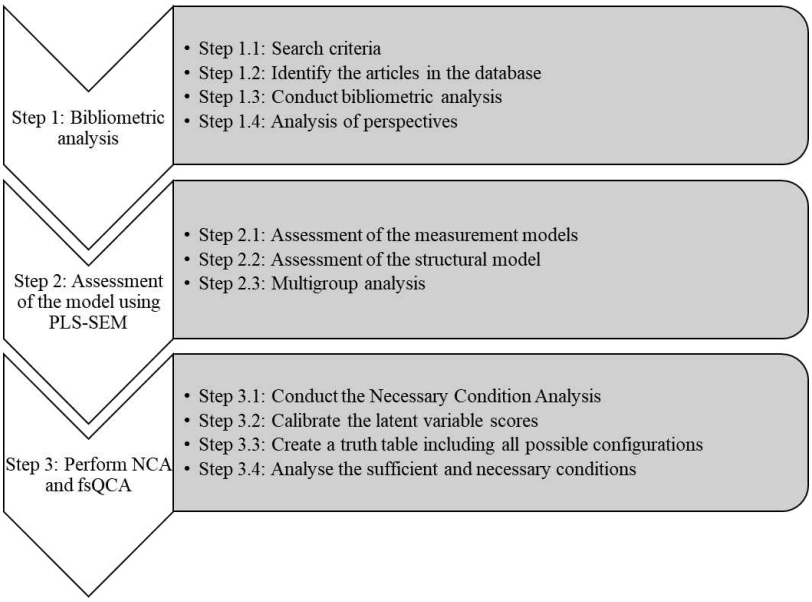

Figure 3. Methodological procedures

As displayed in Figure 3., the first step on the bibliometric analysis (step 1.1) was a bibliographic search on entrepreneurship ecosystem and value creation to better comprehend associated terms and themes and establish a theoretical foundation. This first step enabled the next ones.

In the following, step 1.2 is to identify possible findings in Web of Science database, considering key words and period previously defined. It is important to reinforce Web o of Science is one of the most important and meaningful scientific database in the world (Santana & Cobo, 2020). At this stage, content analysis was done by using title, summary and key word criteria in order to screen the findings.

Step 1.3 consists in the bibliometric analysis itself, which was done through the use of VOSviewer. The first activity within this step is creating a file named 'thesaurus', so that the software can count the words which do not present significant differences. The bibliometric analysis identified the following aspects: the numbers of documents published a year; co-authorship network among countries; co-authorship networks among authors; most cited journals; most cited references; co-occurrence network of words and thematic cluster identification. co-occurrence of words, showing average year of terms by color. The last step (step 1.4) consisted of discussions for conclusion and final considerations.

After the bibliometric analysis, PLS-SEM, a causal predictive approach used in recent Administration research, was used (Hair et al., 2014). The technique emphasizes prediction in estimating models created to provide causal explanations (Hair et al., 2019)

PLS-SEM analysis can unfold in two stages. At the first one (step 2.1), measurement models were be evaluated. Since the model has reflexive constructs (Access to finance, government policies and regulations, government programs and support, infrastructure, cultural factors, social factors, and education and training) and formative (blended value creation), the evaluation considered specific criteria for each type of model.

Next, the structural model was analyzed (step 2.2). In the evaluation of the structural model, the statistical significance and relevance of the path coefficients and the coefficient of determination (R^2) of the dependent variable was evaluated (Hair et al., 2022). The last stage of the PLS-SEM (step 2.3) was the multigroup analysis, to verify differences in the relationships between the groups of green and non-green entrepreneurs.

The final step of the methodological procedures (step 3) was the NCA and fsQCA, which were carried out through four sub-steps. Step 3.1 is to conduct the NCA. Step 3.2 required the calibration of latent variable scores. The factor scores were obtained in PLS-SEM and were calibrated before being inserted in the fsQCA 3.1b software. The second step (step 3.3) was creating a truth table with the combinations of all independent variables. The truth table must be refined by excluding rows with no cases and rows with consistency less than 0.8 to ensure that sufficient and necessary settings are satisfactory. The fourth step (step 3.4) was calculating the consistency and coverage of each configuration, which made it possible to identify the necessary conditions and sufficient configurations to obtain high levels of blended value creation.

4.3. MEASUREMENT INSTRUMENT - QUESTIONNAIRE

This section intends to show the measurement instrument proposed by this research. First, the questionnaire about the entrepreneurial ecosystem is presented with its theoretical background.

The measurement instrument was built considering two main blocks: Entrepreneurship ecosystems and Blended Value Creation. In the first section, the statements were adapted from questionnaire and insights obtained in GEM (2022) and Neto et al. (2014), Audretsch et al. (2015), Thornton et al. (2011) and Stam (2015).

Table 3 presents the measurement instrument for the entrepreneurial ecosystem. The statements complemented the sentence: "Considering the support and encouragement for Knowledge-Intensive Entrepreneurship, indicate your degree of agreement with the following statements." Response options are a 5-point Likert scale of agreement: 1 – Strongly Disagree; 2 – Disagree; 3 – Indifferent; 4 – Agree; 5 – Strongly Agree; 6 – Not applicable.

Table 3. Measurement instrument – questionnaire (Entrepreneurship ecosystem)

	Access to Finance	
AF1	Individual investors are willing to financially support entrepreneurial venturing.	Adapted from GEM (2022) and Neto et al. (2014).
AF2	Banks work to help entrepreneurs obtain financing.	

AF3	Information on funding programs for entrepreneurs is easily accessible.	
AF4	A sufficient number of banks are willing to lend to entrepreneurs.	
	Government Policies and Regulations for new and growing firms	
GPR1	Supporting new and growing companies is a high priority for government policies.	Adapted from GEM (2022)
GPR2	New companies can obtain most of the necessary permits and licenses quickly.	
GPR3	The government actively seeks to create and promote legislation favorable to entrepreneurship.	
GPR4	The government has programs to help new entrepreneurs, such as seed funding programs or entrepreneurship training programs.	
	Government Programs and Support	
GPS1	Science parks and business incubators adequately support new and growing companies.	Adapted from GEM (2022)
GPS2	There are adequate government programs to help new and growing companies.	
GPS3	People working for government agencies are competent and effective in supporting new and growing businesses.	
	Access to Physical Infrastructure	
API1	Physical infrastructure (roads, utilities, communications, waste disposal) supports new and growing businesses well.	Adapted from Audretsch et al. (2015) and GEM (2022).
API2	It is not very expensive for a new or growing company to get good access to communications (phone, Internet, etc.).	
API3	New and growing companies can afford the cost of essential services (gas, water, electricity).	
	Cultural Factors	
CF1	The regional culture is highly favorable to the individual success achieved through personal efforts.	Adapted from Thornton et al. (2011)
CF2	The regional culture emphasizes self-sufficiency, autonomy, and personal initiative.	
CF3	The regional culture encourages taking business risks.	
CF4	The regional culture encourages creativity and innovation.	
	Social Factors	
SF1	Creating new ventures is considered an adequate way to get rich.	Adapted from Thornton et al. (2011) and GEM (2022).
SF2	Most people consider becoming an entrepreneur as a desirable career choice.	
SF3	Successful entrepreneurs have a high level of status and respect.	
	Education and Training	
ET1	Primary and secondary education pays adequate attention to entrepreneurship and the creation of new businesses.	Adapted from Alves et al. (2021), GEM (2022) and Stam (2015).
ET2	Colleges and universities provide excellent and adequate preparation for starting and developing new businesses.	
ET3	Vocational, professional, and continuing education systems provide excellent and adequate preparation for starting and developing new businesses.	

In continuance, the second part of the measurement instrument evaluate the three elements of Blended Value Creation: environmental, social and cultural value creation. The instrument was adapted from research developed by research in the field, such as Domenico, et al. (2010), Malerba & McKelvey (2020); Jiang et al. (2020); Anghel & Anghel (2022) and Bojica et al. (2018), and Ethos report (2019).

In the following, Table 4 displays the measurement instrument related to Blended value creation is presented. The statements complemented the sentence: "Considering that shared value concerns the simultaneous creation of environmental, social and economic value, evaluate your perception of each element." The response options are a 5-point Likert scale of agreement: 1 – Strongly Disagree; 2 – Disagree; 3 – Indifferent; 4 – I agree; 5 – I totally agree.

Table 4. Measurement instrument – questionnaire (Blended Value Creation)

Environmental Value Creation		
EVC1	My company uses discarded, unused or unwanted resources for new purposes.	Adapted from Domenico, et al. (2010); Malerba & McKelvey (2020); Jiang et al. (2020); Anghel & Anghel (2022); Bojica et al. (2018).
EVC2	In my company, we use untapped resources that other organizations fail to recognize, value, or use.	
EVC3	We are confident in finding workable solutions to new challenges using our existing resources.	
EVC4	When dealing with new problems or opportunities, we act in an environmentally correct way, assuming we will find a viable solution.	
EVC5	My company's operations, products, and services do not harm the environment.	
EVC6	In my company, there is a structure to operate reverse logistics.	
Social Value Creation		
SVC1	In my company, the health and safety of employees/customers/communities are ensured.	Adapted from Laukkanen & Tura (2020) and Ethos (2019)
SVC2	In my company, laws, standards, regulations, and individual rights are respected.	
SVC3	In my company, the rights of individuals, employees and stakeholders are respected.	
SVC4	My company's operations, products, and services do not harm people or communities.	
SVC5	In my company, ethical principles are followed to increase social well-being.	
SVC6	In my company, employee diversity is ensured (for example, gender, race, PCD, sexual orientation, gender identity, generational, religious, and cultural diversity).	
SVC7	In my company, there are promotions of internal diversity campaigns, combating child labor, and encouraging volunteering.	
Economic Value Creation		

EcVC1	In recent years, there has been, in my company, an (general) increase in efficiency and cost reduction.	Adapted from Laukkanen & Tura (2020)
EcVC2	In recent years, my company has seen an increase in profits and the creation of new business opportunities and markets.	
EcVC3	In recent years, my company has seen increases in long-term stability and reductions in risk.	
EcVC4	Recently, my company has seen its reputation and brand value increase.	
EcVC5	In recent years, there have been increases in economic well-being in my company.	
EcVC6	Recently, my company adopted good accountability and transparency practices.	

The suggested questionnaire and research have been submitted to the Ethics committee and received its approval (CAAE 61274422.2.0000.8142).

4.4. SAMPLE ASPECTS

Regarding the sample, this research aimed at knowledge-intensive entrepreneurs from Brazil's green and traditional companies. Excluding factors considering gender, social status, sexual orientation and ethnical groups will not be applied.

Participants are part of the PIPE program (Innovative Research in Small Enterprises) managed by the São Paulo Research Foundation (FAPESP), which are knowledge-intensive entrepreneurs. The PIPE program started in 1997, inspired by an American Small Business and Innovations (SBIR). It fosters entrepreneurial projects with knowledge-intensive activity and innovation (Fischer, Salles-Filho, et al., 2022). This dataset can glimpse the Brazilian scenario once considered a consistent source (Fischer, Bayona-Alsina, et al., 2022; Moraes et al., 2023).

To carry out analyses on sample size, it is recommended that analyses be carried out a priori (before collection) and a posteriori (after collection). The G*Power 3.1 software (Faul et al., 2009) was used to verify the sample size and statistical power of the analyses (Hair et al., 2022). The analysis considers the largest number of predictors in the model, which is 7, with a significance level of 5%, a statistical power of 0.8, and a medium effect size ($f^2 = 0.15$, equivalent to $r^2 = 13\%$). Thus, the minimum sample size

was 103 respondents. The sample used was 245 respondents, which is suitable for estimation by Partial Least Squares Path Modeling (PLS-PM).

A posteriori (post hoc) analyses for the sample obtained indicate that:

- Any r^2 greater than 5.68% must be detected as significant (maintaining a power of 0.8 and a significance level of 5%);

- For the medium effect size, the power is 0.997, a value higher than the value of 0.8 recommended by (Chin & Newsted, 1999) and (Hair et al., 2022).

The SmartPLS 4 software (Ringle et al., 2022) was used to calculate and validate the statistical tests developed using the multivariate analysis technique of structural equation modeling.

For data collection, all entrepreneurs responsible for projects approved by PIPE FAPESP were considered. All existing projects were downloaded on the official FAPESP website, with information from those responsible. Initially, data was cleaned by excluding projects with the same responsible entrepreneur.

The final list contained 1580 PIPE entrepreneurs. The entrepreneurs' email addresses were collected through institutional websites, government websites, and entrepreneurs' social networks. Individual and personalized emails were sent, inviting entrepreneurs to participate in the research. Data collection occurred between April 6, 2023, and June 14, 2023, and 286 responses were obtained, of which 245 were considered valid and complete (a response rate of 15.5%).

Of the respondents, 164 were male, and 81 were female. The average age was 45. 115 declared themselves traditional entrepreneurs, and 130 green entrepreneurs. On average, green entrepreneurs said they had 3.7 years of experience working on environmental problems. The descriptive information of the sample is presented in Table 5.

Table 5. Sample descriptive information

Characteristics		Total		Green		Traditional	
Gender		**N**	**%**	**n**	**%**	**n**	**%**
	Male	164	66,9%	82	63,1%	82	71,3%
	Female	81	33,1%	48	36,9%	33	28,7%
Age		**N**	**%**	**n**	**%**	**n**	**%**
	<30 years	4	1,6%	0	0,0%	4	3,5%
	30-39	75	30,6%	41	31,5%	34	29,6%
	40-49	90	36,7%	48	36,9%	42	36,5%
	50-59	41	16,7%	20	15,4%	21	18,3%
	>60	24	9,8%	12	9,2%	12	10,4%
	No reply	11	4,5%	9	6,9%	2	1,7%
Marital status		**N**	**%**	**n**	**%**	**n**	**%**
	Single	67	27,3%	29	22,3%	38	33,0%
	Married	134	54,7%	78	21,5%	56	48,7%
	Separated	32	13,1%	18	13,8%	14	12,2%
	Widowed	1	0,4%	0	0,0%	1	0,9%
	Not reply	11	4,5%	5	3,8%	6	5,2%

5. RESULTS

The results of the thesis are divided into three blocks: bibliometric analysis (5.1), model analysis using PLS-SEM (5.2), and NCA and fsQCA analysis (5.3).

5.1 STEP 1: BIBLIOMETRIC RESEARCH

Popularly used when analyzing large volumes of scientific data, the bibliometric research and analysis consists in a rigorous method that enables exploring nuances of specific fields of research in both quantitative and qualitative analyses (Donthu et al., 2021).The scope of analysis can be developed regarding co-authorship, citation, co-word, amongst others.

The bibliometric research was done in June 11th. After preliminary results displayed in the Table 6, the articles' titles and summaries were read in order to better the articles chosen for this analysis. Whilst reading titles and summaries, the theme of the thesis was considered and the articles were chosen accordingly, resulting in 113 articles.

Table 6. Search details

Database	**Type of documents**	**Key-words**	**Area filters**	**Preliminary results**
Web of Science	Article	Entrepr* ecosystem AND Value creation	Business Green Sustainable Science technology Management Environmental Science Environmental studies	324
Scopus			Business, management and accounting Environmental Science Economics, econometrics and finance Social Sciences	174

Source: Author (2023).

The key words were chosen by evaluating recent research. KIE-related words were considering, however, the specification of the key words did not result enough articles to conduct this bibliometric analysis.

Using Vosviewer, the research was analyzed and the results were obtained as the following figure, considering the co-word (key-word occurrence) analysis, as proposed by the literature (Donthu et al., 2021).

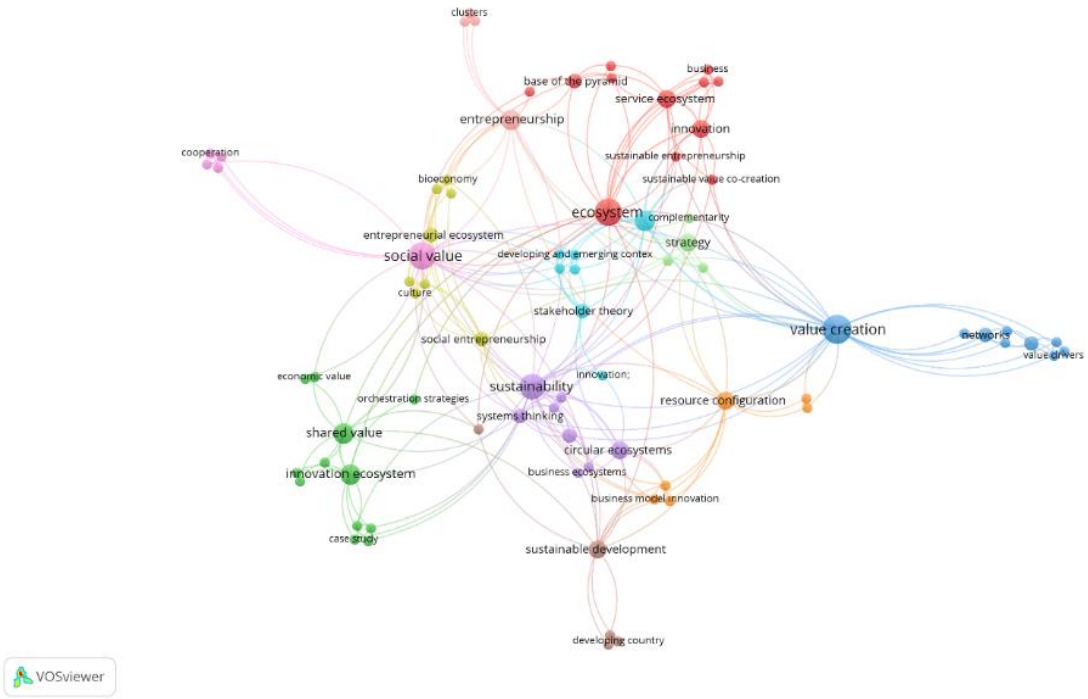

Figure 4. Key-words analysis – Co-word analysis

Source: Vosviewer; Original data.

The analysis of key-words presented in the previous figure is represented in eleven clusters, however, for the relevance of this research, the following is highlighted:

- Cluster 1: the first cluster strongly relates the base of pyramid, business-government relation, co-creation; ecosystem, fintech, innovation, the service ecosystem, sustainable entrepreneurship and value-cocreation and value.
- Cluster 2: the second cluster relates to economic value creation, so it creates connections with shared value, process-based logic, the innovation ecosystem and industrial alliance.
- Cluster 3: the following cluster, for instance, connects value in several dimensions (value creation, drivers and value-based management) with networks, open and process innovation, amongst others.

- Cluster 4: the fourth cluster creates connections amongst bioeconomy, culture, entrepreneurial ecosystems, gender, policy, social entrepreneurship, etc.
- Cluster 5: the fifth cluster links business ecosystems with models, circular ecosystems, sustainability and local government.

In regard to its content, several studies entail in contributions for this research. In Brazilian research developed by Câmara et at. (2022), knowledge-intensive entrepreneurship is described as a multidimensional and systemic phenomenon which relies on their context. This paper focused on the examination of factors that could impact the progress of technological and innovative initiatives within knowledge-intensive enterprises. Analyzing the various forms of capital that hold significance for such companies when engaged in the development of innovative projects, they dived into the significance of human capital, scrutinizing its role in shaping the technical and scientific knowledge of project teams, alongside the exploration of social capital and how it influences interconnections and social bonds among team members. The findings underscored that the effectiveness of public funding programs hinges on the extent to which the project teams have amassed knowledge, expertise, and technical competencies—commonly referred to as the human capital of these teams.

By looking into cases, Gifford et al. (2021), researched several fronts, in which one of the studies (maritime cluster) was capable of identifying KIE entrepreneurs face systematic challenges in face of political commitment, technological resistance, lack of direct investment and regulations. According to the authors, effective governance of KIE occurs when there is coordination in knowledge, norms and institutions, by not only regulating but stimulating needs in the entrepreneurial field in order to solve emerging challenges.

Evaluating similar ecosystem configurations adopted by this thesis, Aliabadi et al. (2019) found that political, cultural, and social capital criteria presented the highest weighted importance, respectively, demonstrating such domains can be interpreted as sources of sustainability enablers in knowledge-intensive entrepreneurship in their research. However, the authors emphasize the need for configurations' articulation and integration.

Getting closer to the Brazilian ecosystem, research evaluated the state of Santa Catarina in south region of the country. According to the researchers, the evidence would point to the influence of urban development and sustainability attachment to influence innovation, and the entrepreneurial ecosystem. Moreover, the research pointed to certain configurations of the state to enable better articulation in the ecosystem, such as: integration of ecosystem actors, digitalization and legislation for investments (Dubou et al., 2022).

Aligned with this, by analyzing GEM and Sustainable Development Goals, Moya-Clemente et al. (2020) stated sustainable entrepreneurship relies on several aspects related to community and state support, relating their results towards SDG (Moya-Clemente et al., 2020).

Within Brazilian context, Rocha et al. (2022) , evaluating green and non-green traditional knowledge-intensive entrepreneurship and the impact of knowledge and socioeconomic dimensions, findings confirmed the positive impact of both on the entrepreneurial dynamics. In addition, researchers' remarks emphasized the homogeneity found in both green and non-green KIE, indicating that, in spite of assumptions, ecosystems configurations and dynamics follow the same trajectories.

5.2 STEP 2: ASSESSMENT OF THE MODEL USING PLS-SEM

The model introduces a single hierarchical latent variable in which Blended Value Creation serves as a second-order construct, categorized as High Order Constructs (HOCs), comprising first-order constructs known as Low Order Constructs (LOCs) (Hair et al., 2019). Notably, the relationship between HOCs and LOCs is characterized by hierarchy rather than dependence, as highlighted by Becker et al. (2012) and Crocetta et al. (2021); the existence of the HOC is contingent upon the LOCs.

Our research model is designated as a hierarchical latent variable model of a reflexive-formative nature, as per the conceptualization and operationalization of the hierarchical model (Becker et al., 2012; Crocetta et al., 2021). The LOC constructs exhibit reflexivity, while the HOC construct is formative.

The estimation of model parameters followed the two-stage approach proposed by (Becker et al., 2012), Hair et al. (2024), and Crocetta et al. (2021). In the initial stage (Figure 5), latent variable scores for LOCs were derived in a model that did not incorporate the HOC.

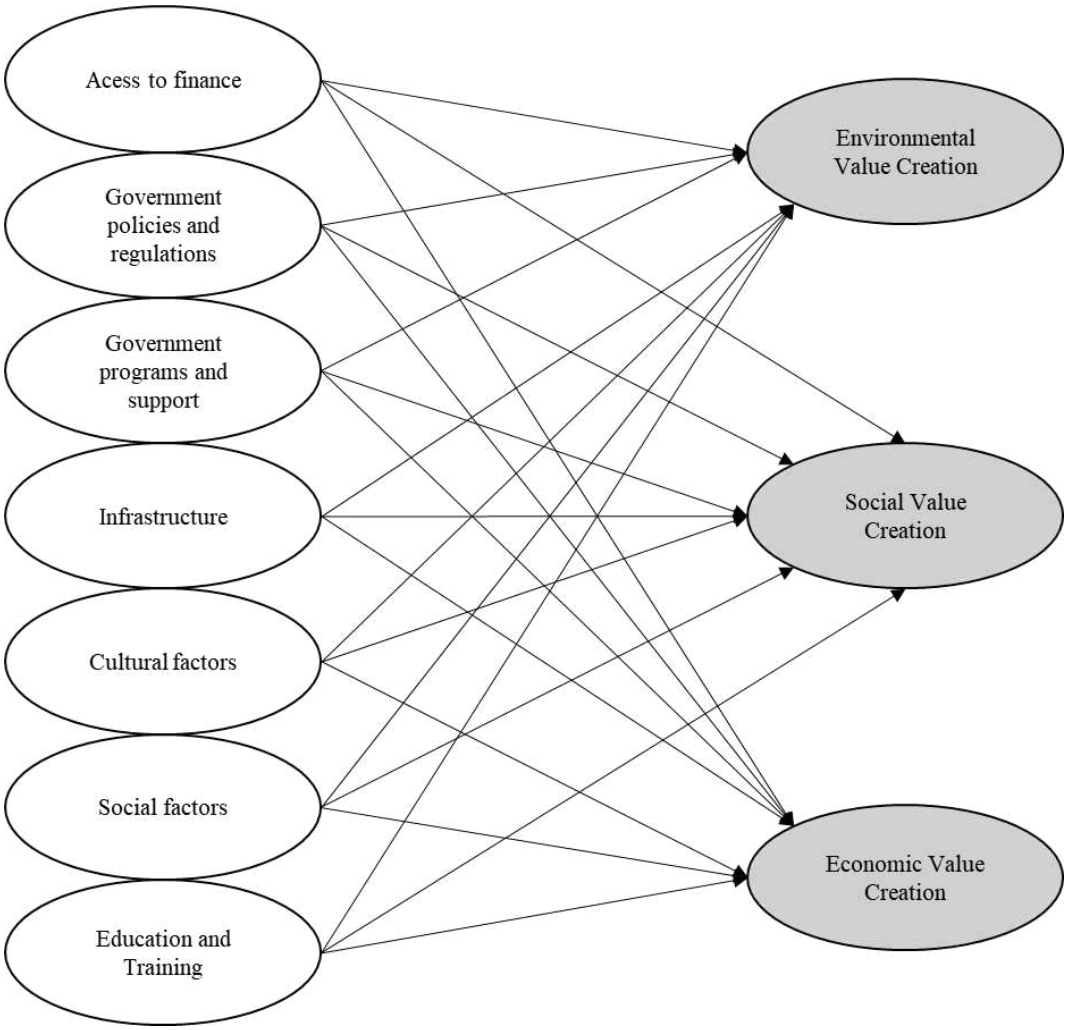

Figure 5. First stage model in the two-stage approach

In the second stage (Figure 6), the latent variable scores obtained in the initial stage served as indicators for the HOC construct. The two-stage approach offers the advantage of estimating a more parsimonious model by eliminating the need to explicitly represent LOCs (Crocetta et al., 2021; Hair et al., 2024). This method is particularly suitable when the researcher's primary focus is solely on the relationships between the HOCs, aligning with the emphasis of our model (Becker et al., 2012; Hair et al., 2024).

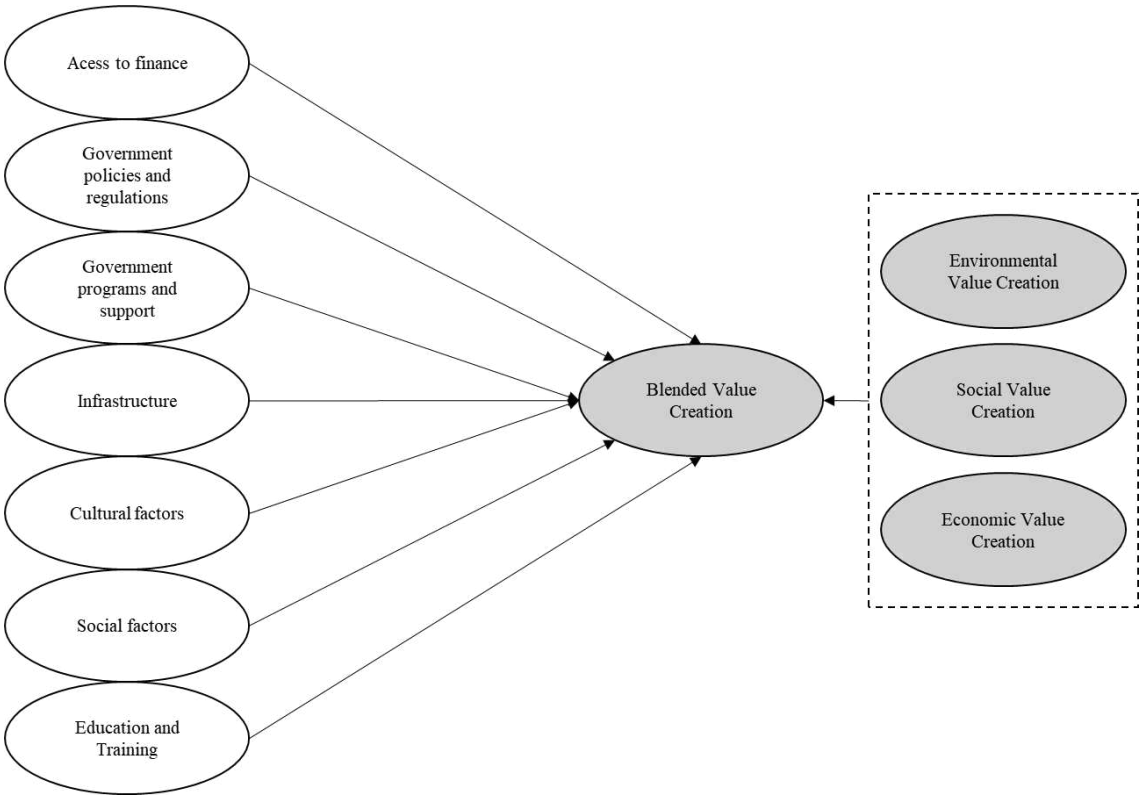

Figure 6. Second stage model in the two-stage approach

5.2.1 Step 2.1: Assessment of the measurement models

The evaluation of the measurement models was carried out in two stages. First, the measurement model of the first stage model was evaluated, and then the second stage model. For Hair et al. (2022), reflexive models, such as the one used in the first stage research model, are recommended to use convergent and discriminant validity, reliability and internal consistency.

Convergent validity refers to the extent to which a set of indicators in a given model should be theoretically correlated. Simply put, it gauges the degree to which indicators converge or share variability (Hair et al., 2022). Since each construct is gauged by a specific set of items (such as questions on a questionnaire), these items should exclusively measure the constructs they are intended for and nothing else. Convergent validity is a metric for identifying this alignment of measurement items with their respective constructs.

On the other hand, discriminant validity assesses the extent to which the indicators in a model represent a singular construct and are distinct from one another

(Hair et al., 2022). While convergent validity evaluates the convergence of items towards a particular construct, discriminant validity examines how much indicators diverge from each other. Both types of validity are scrutinized at the indicator level of latent variables.

We performed a cross-loading analysis of each one to assess whether the indicators associated with the constructs were reflexes of the concepts they represent (Hair et al., 2022). To keep an indicator on the model, the value of its factorial load should be equal to or greater than 0.7 and, simultaneously, more significant than the cross loads with other constructs (Hair et al., 2022). When an indicator's factorial load is smaller than 0.4, this indicator should be automatically eliminated from the model. However, if this value falls within the range of 0.4 and 0.7, it is necessary to assess the impact of its exclusion on AVE and CR (Hair et al., 2022). No indicator had to be eliminated at this point. Table 7 presents the results of the cross-loadings.

Table 7. Cross-loading – first stage

Indicator	AF	GPR	GPS	API	CF	SF	ET	EVC	SVC	EcVC
AF1	**0.757**	0.234	0.247	0.173	0.289	0.286	0.124	0.174	0.248	0.237
AF2	**0.736**	0.395	0.396	0.247	0.293	0.300	0.283	0.149	0.097	0.119
AF3	**0.685**	0.513	0.414	0.334	0.220	0.276	0.275	0.163	0.163	0.107
AF4	**0.707**	0.482	0.394	0.329	0.315	0.283	0.449	0.174	0.044	0.081
GPR1	0.354	**0.836**	0.427	0.294	0.178	0.215	0.338	0.243	0.234	0.247
GPR2	0.372	**0.656**	0.352	0.371	0.269	0.248	0.365	0.157	0.047	0.200
GPR3	0.441	**0.818**	0.594	0.383	0.375	0.287	0.451	0.221	0.113	0.205
GPR4	0.453	**0.696**	0.556	0.311	0.227	0.224	0.281	0.170	0.170	0.102
GPS1	0.346	0.393	**0.798**	0.272	0.199	0.351	0.358	0.230	0.234	0.200
GPS2	0.470	0.602	**0.835**	0.412	0.305	0.426	0.371	0.243	0.192	0.156
GPS3	0.331	0.541	**0.788**	0.346	0.256	0.393	0.349	0.221	0.140	0.164
API1	0.370	0.441	0.471	**0.785**	0.283	0.313	0.392	0.200	0.193	0.164
API2	0.282	0.345	0.294	**0.835**	0.253	0.221	0.294	0.073	0.194	0.145
API3	0.208	0.285	0.258	**0.854**	0.266	0.280	0.266	0.122	0.155	0.223
CF1	0.348	0.274	0.247	0.262	**0.856**	0.374	0.263	0.349	0.109	0.226
CF2	0.355	0.321	0.281	0.269	**0.892**	0.341	0.315	0.330	0.076	0.157
CF3	0.305	0.294	0.216	0.290	**0.843**	0.291	0.268	0.252	0.017	0.122
CF4	0.314	0.282	0.315	0.310	**0.878**	0.337	0.208	0.383	0.137	0.242
SF1	0.410	0.361	0.438	0.285	0.338	**0.813**	0.299	0.273	0.237	0.306
SF2	0.203	0.195	0.291	0.171	0.314	**0.693**	0.348	0.280	0.076	0.183
SF3	0.277	0.167	0.373	0.301	0.268	**0.812**	0.288	0.262	0.290	0.268
ET1	0.362	0.468	0.377	0.327	0.245	0.328	**0.834**	0.145	0.030	0.119
ET2	0.277	0.345	0.389	0.295	0.177	0.351	**0.857**	0.076	-0.025	0.087
ET3	0.258	0.388	0.390	0.363	0.306	0.343	**0.892**	0.227	0.061	0.065
EVC1	0.172	0.132	0.131	0.053	0.248	0.260	0.169	**0.744**	0.373	0.297
EVC2	0.205	0.293	0.234	0.135	0.363	0.277	0.214	**0.781**	0.274	0.317
EVC3	0.210	0.278	0.235	0.054	0.247	0.225	0.070	**0.764**	0.502	0.369
EVC4	0.127	0.149	0.253	0.174	0.276	0.315	0.126	**0.784**	0.643	0.386
EVC5	0.156	0.172	0.215	0.190	0.244	0.237	0.133	**0.726**	0.556	0.474
EVC6	0.149	0.141	0.202	0.135	0.332	0.225	0.144	**0.665**	0.284	0.364
SVC1	0.123	0.148	0.174	0.169	0.124	0.255	0.069	0.550	**0.783**	0.565
SVC2	0.185	0.123	0.185	0.204	0.087	0.285	-0.001	0.455	**0.898**	0.488
SVC3	0.214	0.183	0.227	0.234	0.122	0.268	0.022	0.472	**0.926**	0.498
SVC4	0.190	0.146	0.193	0.184	0.096	0.211	-0.059	0.512	**0.841**	0.430
SVC5	0.198	0.176	0.201	0.174	0.056	0.230	-0.015	0.46	**0.863**	0.489
SVC6	0.169	0.193	0.225	0.126	0.016	0.158	0.049	0.425	**0.713**	0.435
SVC7	0.167	0.202	0.126	0.106	0.122	0.079	0.068	0.453	**0.500**	0.361
EcVC1	0.177	0.240	0.186	0.238	0.234	0.287	0.153	0.456	0.469	**0.783**
EcVC2	0.205	0.215	0.129	0.148	0.181	0.290	0.111	0.334	0.403	**0.866**
EcVC3	0.167	0.246	0.155	0.205	0.179	0.230	0.143	0.392	0.432	**0.856**
EcVC4	0.164	0.166	0.216	0.147	0.182	0.325	0.041	0.382	0.511	**0.875**
EcVC5	0.218	0.219	0.211	0.160	0.22	0.301	0.044	0.443	0.460	**0.878**
EcVC6	0.111	0.198	0.174	0.191	0.113	0.211	0.015	0.433	0.620	**0.718**

Source: own elaboration

The convergent validity of the model is also assessed using the average variance extracted and internal consistency measures (Hair et al., 2022), which should score above 0.5, and rho_a, which should be above 0.7 (Hair et al., 2022). In contrast, internal consistency, measured by Cronbach's alpha, is considered acceptable for exploratory studies if it scores between 0.6 and 0.7 and for more advanced studies if it scores between 0.7 and 0.9 (Hair et al., 2022).

Besides the evaluation of factorial loads, another measure was utilized to assess the measurement model: the composite reliability of each construct (Hair et al., 2022), referenced by the threshold of 0.7 and described as the degree to which the indicators represent a common latent construct. Table 8 presents this indicator's results.

Concerning discriminant validity, the result of the square root of AVE is another valid measure. Results of this calculation are presented in Table 8, displayed on the highlighted diagonal. The recommendation for this value is that it should always be higher than the correlation between latent variables (Fornell & Larcker, 1981).

Table 8. Discriminant Validity – first stage

Constructs	AF	GPR	GPS	API	CF	SF	ET	EVC	SVC	EcVC
AF	**0.722**									
GPR	0.522	**0.755**								
GPS	0.475	0.628	**0.807**							
API	0.351	0.438	0.422	**0.825**						
CF	0.382	0.335	0.311	0.326	**0.867**					
SF	0.394	0.315	0.481	0.335	0.391	**0.775**				
ET	0.345	0.471	0.446	0.390	0.299	0.393	**0.861**			
EVC	0.229	0.267	0.287	0.167	0.388	0.346	0.194	**0.745**		
SVC	0.221	0.199	0.238	0.219	0.107	0.276	0.013	0.580	**0.801**	
EcVC	0.212	0.257	0.216	0.217	0.225	0.333	0.102	0.489	0.577	**0.831**
Cronbach's Alpha	0.714	0.749	0.734	0.766	0.892	0.670	0.834	0.839	0.902	0.909
rho_A	0.738	0.794	0.738	0.769	0.914	0.692	0.901	0.846	0.932	0.914
Composite Reliability	0.813	0.840	0.849	0.864	0.924	0.817	0.896	0.882	0.924	0.930
AVE	0.521	0.571	0.652	0.68	0.752	0.600	0.742	0.555	0.641	0.691

Source: own elaboration

According to the results in Table 8, all indicators are within those established by Hair et al. (2022). Next, the measurement model of the second stage was evaluated.

The latent variable scores obtained in the initial stage served as indicators for the HOC construct.

Tables 9 and 10 present the same indicators for the first stage, updated for the second stage.

Table 9. Cross-loading – second stage

Indicator	AF	GPR	GPS	API	CF	SF	ET
AF1	**0.692**	0.202	0.211	0.136	0.308	0.218	0.204
AF2	**0.792**	0.41	0.356	0.174	0.389	0.267	0.291
AF3	**0.551**	0.456	0.391	0.264	0.208	0.235	0.272
AF4	**0.794**	0.488	0.376	0.32	0.369	0.278	0.486
GPR1	0.38	**0.822**	0.472	0.234	0.284	0.209	0.308
GPR2	0.419	**0.799**	0.388	0.394	0.423	0.317	0.42
GPR3	0.432	**0.800**	0.638	0.418	0.428	0.317	0.476
GPR4	0.413	**0.579**	0.646	0.223	0.267	0.109	0.201
GPS1	0.329	0.297	**0.618**	0.210	0.302	0.306	0.351
GPS2	0.452	0.539	**0.923**	0.320	0.387	0.389	0.354
GPS3	0.351	0.594	**0.882**	0.294	0.317	0.385	0.407
API1	0.362	0.439	0.419	**0.780**	0.382	0.26	0.375
API2	0.226	0.362	0.226	**0.787**	0.361	0.244	0.337
API3	0.152	0.248	0.177	**0.875**	0.330	0.251	0.296
CF1	0.358	0.378	0.309	0.379	**0.846**	0.452	0.402
CF2	0.370	0.427	0.297	0.341	**0.881**	0.412	0.411
CF3	0.426	0.388	0.281	0.333	**0.854**	0.473	0.387
CF4	0.39	0.377	0.436	0.417	**0.816**	0.527	0.302
SF1	0.344	0.326	0.368	0.32	0.508	**0.829**	0.306
SF2	0.214	0.24	0.327	0.17	0.408	**0.791**	0.404
SF3	0.261	0.222	0.313	0.242	0.381	**0.768**	0.321
ET1	0.476	0.507	0.416	0.328	0.384	0.348	**0.866**
ET2	0.322	0.343	0.349	0.349	0.388	0.403	**0.926**
ET3	0.354	0.437	0.331	0.422	0.414	0.400	**0.870**

Source: own elaboration

Table 10. Discriminant Validity – second stage

Constructs	AF	GPR	GPS	API	CF	SF	ET	BVC
AF	**0.714**							
GPR	0.514	**0.756**						
GPS	0.445	0.622	**0.776**					
API	0.300	0.420	0.339	**0.815**				
CF	0.453	0.461	0.389	0.434	**0.850**			
SF	0.346	0.336	0.424	0.308	0.549	**0.796**		
ET	0.432	0.48	0.412	0.408	0.444	0.431	**0.888**	
BVC	0.203	0.177	0.165	0.135	0.403	0.401	0.275	**FORMATIVE**
Cronbach's Alpha	0.682	0.773	0.733	0.753	0.872	0.714	0.865	FORMATIVE
rho_A	0.698	0.797	0.760	0.783	0.879	0.727	0.877	1
Composite Reliability	0.803	0.840	0.805	0.856	0.912	0.838	0.918	FORMATIVE
AVE	0.510	0.572	0.602	0.664	0.722	0.634	0.788	FORMATIVE

Source: own elaboration

In the second stage model, the Blended Value Creation construct is formative. The criteria for evaluating formative models are (Hair et al., 2022) convergent validity, analysis of multicollinearity, significance, and relevance.

Convergent validity was performed through redundancy analysis. This analysis was done by correlating the formative construct variables with a global indicator measure. The construct was modeled as the independent variable and the global measure as the dependent variable. According to Hair et al., (2022), a path coefficient above the threshold of 0.800 supports the formative construct's convergent validity. In the case of the Technology construct, the value was 0.890, providing support for convergent validity.

The VIF (Variance Inflation Factor) was used to evaluate the collinearity of the indicators. According to Hair et al. (2022), these values must be below 5, and all VIF values of the indicators are within the established range.

To analyze the significance and relevance, the bootstrapping technique was used in the SmartPLS 4 software (Ringle et al., 2022). All variables were significant according to the T statistics of external weights and external loads ($p < 0.01$). In this case, the recommendation is that the variables be maintained in the model.

5.2.2 Step 2.2 Assessment of the structural model

The analysis of the collinearity of the structural model was carried out before its evaluation. The VIF values for each subpart of the structural model were analyzed to assess collinearity. All VIF values are within those (Hair et al., 2022) established, being below 5.

The bootstrapping technique was used to analyze the indicators' significance based on Efron & Tibshirani(1998). Student's t statistic analyzes the hypothesis that the correlation coefficients equal zero. If the results indicate values greater than 1.96, the assumption is rejected, and the correlation is significant (Efron & Tibshirani, 1998; Hair et al., 2022). Table 11 presents the structural coefficients of the measured model and Student's t statistics. According to the results, it is possible to verify that the indicators were significant.

Table 11. Structural coefficients of the measurement model and Student's t statistics

Relationship	Sample Mean	Standard Deviation	T Statistics	P Values
AF1 <- AF	0.754	0.108	7.018	0.000
AF2 <- AF	0.715	0.105	7.010	0.000
AF3 <- AF	0.659	0.110	6.229	0.000
AF4 <- AF	0.678	0.121	5.834	0.000
API1 <- API	0.777	0.064	12.172	0.000
API2 <- API	0.834	0.042	19.679	0.000
API3 <- API	0.851	0.046	18.672	0.000
CF1 <- CF	0.857	0.021	41.346	0.000
CF2 <- CF	0.892	0.021	43.365	0.000
CF3 <- CF	0.842	0.032	26.561	0.000
CF4 <- CF	0.878	0.018	50.139	0.000
ET1 <- ET	0.821	0.089	9.396	0.000
ET2 <- ET	0.846	0.085	10.078	0.000
ET3 <- ET	0.874	0.087	10.235	0.000
EcVC1 <- EcVC	0.784	0.039	20.005	0.000
EcVC2 <- EcVC	0.867	0.018	49.049	0.000
EcVC3 <- EcVC	0.856	0.024	36.030	0.000
EcVC4 <- EcVC	0.874	0.022	40.620	0.000
EcVC5 <- EcVC	0.880	0.017	53.042	0.000
EcVC6 <- EcVC	0.711	0.047	15.338	0.000
EVC1 <- EVC	0.745	0.034	21.934	0.000
EVC2 <- EVC	0.778	0.027	29.162	0.000
EVC3 <- EVC	0.764	0.037	20.442	0.000
EVC4 <- EVC	0.782	0.030	25.729	0.000
EVC5 <- EVC	0.725	0.038	19.290	0.000
EVC6 <- EVC	0.661	0.048	13.738	0.000

GPR1 <- GPR	0.834	0.033	25.385	0.000
GPR2 <- GPR	0.653	0.073	8.985	0.000
GPR3 <- GPR	0.811	0.044	18.608	0.000
GPR4 <- GPR	0.683	0.072	9.727	0.000
GPS1 <- GPS	0.800	0.043	18.409	0.000
GPS2 <- GPS	0.830	0.040	20.712	0.000
GPS3 <- GPS	0.776	0.061	12.941	0.000
SF1 <- SF	0.815	0.039	20.658	0.000
SF2 <- SF	0.685	0.066	10.448	0.000
SF3 <- SF	0.808	0.038	21.240	0.000
SVC1 <- SVC	0.782	0.039	20.075	0.000
SVC2 <- SVC	0.898	0.020	44.359	0.000
SVC3 <- SVC	0.924	0.014	66.432	0.000
SVC4 <- SVC	0.839	0.040	21.115	0.000
SVC5 <- SVC	0.859	0.026	33.523	0.000
SVC6 <- SVC	0.712	0.053	13.379	0.000
SVC7 <- SVC	0.499	0.070	7.166	0.000

Source: own authorship

Table 12 presents the values of the coefficients between the constructs and the respective Student's t statistics. According to the results, only the relationships between Cultural Factors and Social Factors with Blended Value Creation presented students' t values greater than 1.96 (significance level = 5%), supporting the corresponding hypotheses.

Table 12. Structural model coefficients – between constructs

Relationship	Sample Mean	Standard Deviation	T Statistics	P Values
Access to Finance -> BVC	-0.021	0.086	0.653	0.514
Government Policies and Regulation -> BVC	0.137	0.087	1.777	0.076
Government Programs and Support -> BVC	0.027	0.087	0.287	0.774
Access to Physical Infrastructure -> BVC	-0.011	0.085	0.462	0.645
Cultural Factors -> BVC	0.281	0.096	3.088	0.002
Social Factors -> BVC	0.239	0.089	2.688	0.007
Education and Training -> BVC	-0.022	0.094	0.195	0.846

Source: own authorship

The evaluation of the coefficient of determination (R^2) was based on f^2 values, where values of 0.02, 0.15, and 0.35 are considered, respectively, as small, medium, and large effects (Cohen, 1998). These f^2 values represent R^2 values equal to 2%, 13%, and

25%, respectively. According to the analyses, the BVC construct presented an R^2 of 0.241, considered medium.

In addition to evaluating the magnitude of the R^2 values as a criterion for predictive accuracy, the Q^2 value was evaluated, which indicates the model's predictive relevance. The Q^2 measure applies an example reuse technique that omits part of the data matrix and uses model estimates to predict the omitted part. Specifically, when a PLS-SEM model has predictive relevance, it accurately predicts indicator data points in reflective measurement models. For SEM models, Q^2 values greater than zero for a specific reflective endogenous latent variable indicate the predictive relevance of the path model. In the case of the present study, the values were more significant than zero. Table 13 presents the values of R^2, adjusted R^2, and Q^2.

Table 13. Structural model coefficients – between constructs

Construct	R^2	R^2 Adjusted	Q^2
Blended Value Creation	0.241	0.218	0.165

Source: own authorship

5.2.3 Step 2.3: Multigroup analysis

In order to test existing differences between green and non-green entrepreneurs in regard to the goals of this research, a multigroup analysis (Table 14) was carried out (Hair et al., 2024).

Table 14. Multigroup analysis

Relationship	Path Coefficients-diff (GREEN vs TRADITIONAL)	P Values
Access to Finance -> Blended Value Creation	-0.021	0.609
Government Policies and Regulation -> Blended Value Creation	0.137	0.247
Government Programs and Support -> Blended Value Creation	0.027	0.737
Access to Physical Infrastructure -> Blended Value Creation	-0.011	0.438
Cultural Factors -> Blended Value Creation	0.281	0.025
Social Factors -> Blended Value Creation	0.239	0.507
Education and Training -> Blended Value Creation	-0.022	0.480

Source: own authorship

The results are presented in Table 14 and demonstrate differences between the groups only in the relationship between Cultural Factors and Blended Value Creation. To analyze the differences between the groups in more depth, we present in Tables 15 and 16 the coefficients of the structural models for each group.

Table 15. Structural model coefficients – Green sample

Relationship	Sample Mean	Standard Deviation	T Statistics	P Values
Access to Finance -> BVC	0.021	0.121	0.008	0.993
Government Policies and Regulation -> BVC	0.003	0.132	0.152	0.879
Government Programs and Support -> BVC	-0.046	0.144	0.401	0.689
Access to Physical Infrastructure -> BVC	-0.024	0.126	0.653	0.514
Cultural Factors -> BVC	0.263	0.139	2.032	0.043
Social Factors -> BVC	0.249	0.123	2.099	0.036
Education and Training -> BVC	0.097	0.122	0.865	0.387

Source: own authorship

Table 16. Structural model coefficients – Traditional sample

Relationship	Sample Mean	Standard Deviation	T Statistics	P Values
Access to Finance -> BVC	0.134	0.121	0.693	0.489
Government Policies and Regulation -> BVC	0.229	0.137	1.482	0.139
Government Programs and Support -> BVC	-0.004	0.137	0.010	0.992
Access to Physical Infrastructure -> BVC	0.094	0.127	0.372	0.710
Cultural Factors -> BVC	0.200	0.119	1.749	0.081
Social Factors -> BVC	0.374	0.117	3.098	0.002
Education and Training -> BVC	-0.114	0.253	0.301	0.763

Source: own authorship

The results clarify that in the green group, as well as in the total sample, the relationships between Cultural Factors and Social Factors with Blended Value Creation are significant. In the traditional sample, only the relationship between Social Factors and Blended Value Creation is significant.

The model resulting from the research is presented in Figure 7.

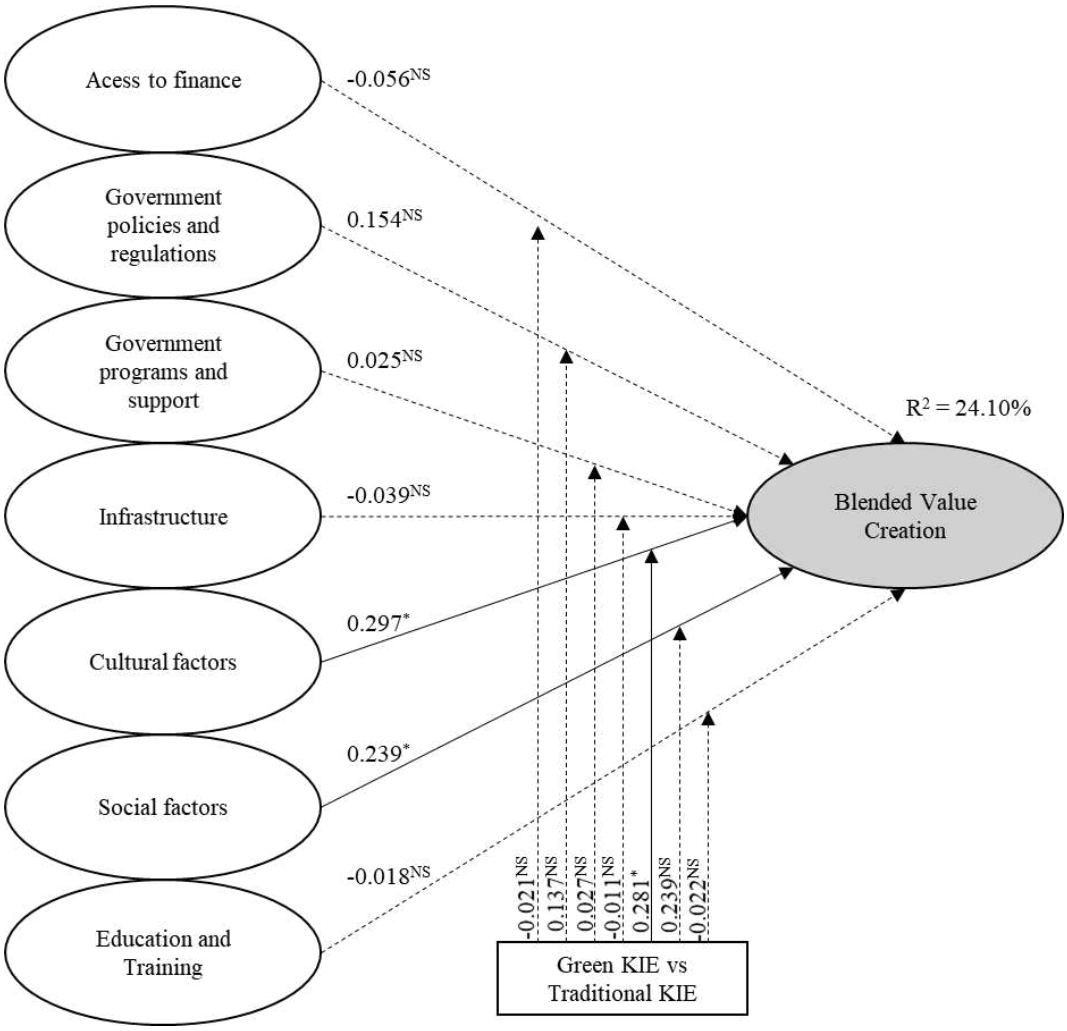

Figure 7. The model resulting from the research

Notes: * = significant at 5%; ** = significant at 1%; *** = significant at 0.1%; NS = not significant.

Source: own authorship

Table 17 presents a summary of the validation of the hypotheses.

Table 17. Validation of the hypotheses

Hypothesis	Description	Result
H1	Access to finance positively influences blended value creation in knowledge-intensive entrepreneurship	Not confirmed
H2	Governenment policies and regulation positively influence blended value creation in knowledge-intensive entrepreneurship	Not confirmed
H3	Governement programs and support positively influence blended value creation in knowledge-intensive entrepreneurship	Not confirmed
H4	Access to physical infrastructure positively influences blended value creation in knowledge-intensive entrepreneurship	Not confirmed
H5	Cultural factors positively influence blended value creation in knowledge-intensive entrepreneurship	Confirmed
H6	Social factors positively influence blended value creation in knowledge-intensive entrepreneurship	Confirmed
H7	Educational and training factors positively influence blended value creation in knowledge-intensive entrepreneurship	Not confirmed
H8	There are differences in the relationships between green and non-green entrepreneurs	Not confirmed
H8a	There are differences in the influence of access to finance on blended value creation between green and traditional entrepreneurs	Not confirmed
H8b	There are differences in the influence of government policies and regulation on blended value creation between green and traditional entrepreneurs	Not confirmed
H8c	There are differences in the influence of govern programs and support on blended value creation between green and traditional entrepreneurs	Not confirmed
H8d	There are differences in the influence of access to physical infrastructure on blended value creation between green and traditional entrepreneurs	Not confirmed
H8e	There are differences in the influence of cultural factors on blended value creation between green and traditional entrepreneurs	Confirmed
H8f	There are differences in the influence of social factors on blended value creation between green and traditional entrepreneurs	Not confirmed
H8g	There are differences in the influence of education and training on blended value creation between green and traditional entrepreneurs	Not confirmed

Source: own authorship

5.3 STEP 3: PERFORM NCA AND FSQCA

In step 3, NCA was first used to test whether ecosystem factors are necessary conditions for BVC. Secondly, we use the fsQCA method to explore the complex causal mechanism behind value creation by KIE (Rihoux & Ragin, 2009).

5.3.1 Step 3.1: Conduct the NCA

NCA not only determines the necessity of a specific condition for a particular outcome but also assesses the effect size of this essential condition. In NCA, the effect size is termed the bottleneck level, indicating the minimum requirement of necessary conditions to achieve a specific outcome. The effect size value ranges from 0 to 1, with a higher value signifying a more substantial effect. Conversely, a value below 0.1 indicates that the effect magnitude is negligible (Dul, 2016). The NCA approach is applicable to both continuous and discrete variables.

Tables 18, 19, and 20 present the results of the NCA analysis for the complete, green, and traditional samples, including the effect size obtained by two different estimation methods: ceiling region and ceiling envelope. In the NCA method, the conditions necessary to meet two conditions are as follows: the effect size (d) is not less than 0.1 (Dul, 2016), and Monte Carlo simulations of permutation tests show that the effect size effect is significant (Dul, 2020).

In the complete and traditional samples, the effect sizes (d) are less than 0.1, and the p-value is insignificant. But, in the green sample, the effect size is greater than 0.1, and the P value is significant for Social Factors.

Table 18. Necessary condition analysis (NCA) – Complete sample

GPR	CR	99.59%	0.002	1	0.002	0.899
	CE	100%	0.004	1	0.004	0.898
GPS	CR	99.59%	0.022	1	0.022	0.779
	CE	100%	0.030	1	0.030	0.784
API	CR	99.59%	0.016	1	0.016	0.609
	CE	100%	0.026	1	0.026	0.512
CF	CR	99.59%	0.022	1	0.022	0.326
	CE	100%	0.021	1	0.021	0.480
SF	CR	98.77%	0.083	1	0.083	0.082
	CE	100%	0.100	1	0.100	0.002
ET	CR	100%	0.001	1	0.001	0.577
	CE	100%	0.003	1	0.003	0.577

Note: $0.0 \leq d \leq 0.1$: low level; $0.1 \leq d$: high level

Note: $0.0 \leq d \leq 0.1$: low level; $0.1 \leq d$: high level

Source: own authorship

Table 19. Necessary condition analysis (NCA) – Green sample

GPR	CR	99.23%	0.035	1	0.035	0.666
	CE	100%	0.055	1	0.055	0.604
GPS	CR	98.46%	0.047	1	0.047	0.879
	CE	100%	0.070	1	0.070	0.788
API	CR	96.92%	0.080	1	0.080	0.338
	CE	100%	0.093	1	0.093	0.359
CF	CR	99.23%	0.055	1	0.055	0.784
	CE	100%	0.085	1	0.085	0.710
SF	CR	95.38%	0.201	1	0.201	0.017
	CE	100%	0.185	1	0.185	0.038
ET	CR	99.23%	0.031	1	0.031	0.215
	CE	100%	0.048	1	0.048	0.240

Note: $0.0 \leq d \leq 0.1$: low level; $0.1 \leq d$: high level

Source: own authorship

Table 20. Necessary condition analysis (NCA) – Traditional sample

Antecedent Variable	Method	C-accuracy	Ceiling zone	Scope	Effect Size (d)	P-value
AF	CR	91.30%	0.106	1	0.106	0.041
	CE	100%	0.059	1	0.059	0.306
GPR	CR	97.39%	0.048	1	0.048	0.085
	CE	100%	0.044	1	0.044	0.083
GPS	CR	94.78%	0.087	1	0.087	0.074
	CE	100%	0.083	1	0.083	0.096
API	CR	95.65%	0.046	1	0.046	0.130
	CE	100%	0.048	1	0.048	0.106
CF	CR	99.13%	0.000	1	0.000	0.789
	CE	100%	0.001	1	0.001	0.789
SF	CR	95.65%	0.066	1	0.066	0.324
	CE	100%	0.058	1	0.058	0.218
ET	CR	98.26%	0.021	1	0.021	0.862
	CE	100%	0.034	1	0.034	0.825

Note: $0.0 \leq d \leq 0.1$: low level; $0.1 \leq d$: high level

Source: own authorship

5.3.2 Step 3.2: Calibrate the latent variables scores

The analysis with fsQCA was carried out based on the scores of the latent variables extracted from the analysis with PLS-SEM. The standardized scores were calibrated between 0 (no set membership) and 1 (full set membership), with 0.5 being the crossover point.

5.3.3 Step 3.2: Create a truth table including all possible configurations

Next, truth tables were created, considering all possible configurations for the three samples, considering the BVC variable as Outcome and the ecosystem variables as antecedents. Tables 21, 22 and 23 present the truth tables for the configurations.

Table 21. Truth table – Complete sample

AF	GPR	GPS	API	CF	SF	ET	number	BVC	raw consist.	PRI consist.	SYM consist
0	1	1	1	1	1	0	4	1	0.989	0.957	0.957
1	1	1	0	1	1	0	3	1	0.982	0.919	0.919
1	1	1	1	1	1	0	10	1	0.976	0.916	0.929
1	1	1	1	1	0	0	6	1	0.975	0.863	0.905
0	0	1	1	1	1	0	4	1	0.975	0.894	0.894
1	1	1	1	1	1	1	24	1	0.970	0.932	0.949
1	1	1	0	0	0	0	4	1	0.967	0.740	0.740
1	0	0	1	1	1	0	3	1	0.965	0.822	0.822
0	0	1	0	1	1	0	8	1	0.965	0.855	0.858
0	0	0	1	1	1	0	3	1	0.965	0.824	0.838
1	0	1	1	1	1	0	4	1	0.959	0.832	0.832
0	0	1	0	1	0	0	3	1	0.956	0.765	0.765
0	0	0	0	1	1	0	3	1	0.952	0.765	0.765
1	1	1	1	0	1	1	5	1	0.950	0.753	0.753
0	0	1	0	0	1	0	4	1	0.948	0.758	0.758
0	0	0	0	1	0	0	8	1	0.943	0.724	0.724
0	0	0	1	0	0	0	5	1	0.939	0.576	0.589
0	0	0	0	0	1	0	9	1	0.932	0.672	0.674
0	0	1	0	0	0	0	6	1	0.917	0.589	0.598
0	0	0	0	0	0	0	19	1	0.837	0.401	0.414

Source: own authorship

Table 22. Truth table – Green sample

AF	GPR	GPS	API	CF	SF	ET	number	BVC	raw consist.	PRI consist.	SYM consist
1	1	1	1	1	1	1	19	1	1	1	1
1	0	1	0	1	1	1	7	1	1	1	1
1	1	1	1	0	0	1	3	1	1	1	1
1	1	1	0	1	1	1	3	1	1	1	1
1	0	1	1	1	1	1	3	1	1	1	1
0	1	0	0	1	1	0	3	1	0.843	0	0
0	0	0	0	0	1	1	4	0	0.794	0	0
0	1	0	0	0	0	1	4	0	0.763	0	0
0	0	0	0	0	0	0	8	0	0.726	0	0

Source: own authorship

Table 23. Truth table – Traditional sample

AF	GPR	GPS	API	CF	SF	ET	number	BVC	raw consist.	PRI consist.	SYM consist
1	1	1	1	0	1	0	4	1	0.958	0.897	0.897
0	1	1	1	0	1	1	2	1	0.948	0.831	0.831
0	1	1	1	0	1	0	2	1	0.945	0.845	0.845
1	1	1	1	1	0	0	2	1	0.939	0.804	0.804
1	0	1	0	0	1	0	2	1	0.936	0.828	0.828
0	0	1	1	0	1	0	3	1	0.933	0.818	0.818
1	0	1	0	0	0	0	2	1	0.932	0.796	0.796
1	0	0	1	1	1	0	2	1	0.922	0.730	0.732
1	1	1	1	1	1	0	6	1	0.922	0.782	0.787
1	0	0	0	0	0	0	2	1	0.908	0.704	0.717
0	0	0	0	0	1	0	5	1	0.897	0.736	0.736
0	0	1	0	1	1	0	2	1	0.888	0.676	0.676
0	0	0	1	0	0	0	3	1	0.862	0.556	0.556
0	0	0	0	0	0	0	14	0	0.676	0.330	0.333

Source: own authorship

5.3.4 Step 3.2: Analyze the sufficient and necessary conditions

The necessary conditions were also analyzed using the fsQCA method, which tests the necessary conditions for high BVC levels. Tables 24, 25, and 26 show that the consistency of the need for a single condition is generally less than 0.9, which is not necessary for the search results.

Table 24. Necessity test for a single condition – Complete sample

Conditions tested:	Consistency	Coverage	Consistency	Coverage
AF	0.620	0.883	0.655	0.542
~AF	0.678	0.771	0.858	0.568
GPR	0.598	0.894	0.582	0.505
~GPR	0.669	0.733	0.878	0.559
GPS	0.780	0.837	0.767	0.479
~GPS	0.514	0.792	0.739	0.661
API	0.628	0.846	0.644	0.504
~API	0.632	0.753	0.803	0.557
CF	0.735	0.883	0.671	0.468
~CF	0.557	0.744	0.833	0.647
SF	0.761	0.852	0.717	0.466
~SF	0.523	0.761	0.772	0.653
ET	0.420	0.895	0.444	0.550
~ET	0.789	0.709	0.915	0.478

Source: own authorship

Table 25. Necessity test for a single condition – Green sample

	BVC		~BVC	
Conditions tested:	**Consistency**	**Coverage**	**Consistency**	**Coverage**
AF	0.644	0.898	0.508	0.475
~AF	0.475	0.508	0.655	0.877
GPR	0.717	0.717	0.657	0.614
~GPR	0.613	0.657	0.697	0.697
GPS	0.858	0.725	0.664	0.524
~GPS	0.437	0.582	0.652	0.811
API	0.535	0.880	0.353	0.543
~API	0.722	0.544	0.922	0.649
CF	0.744	0.773	0.544	0.527
~CF	0.545	0.561	0.766	0.737
SF	0.842	0.720	0.692	0.552
~SF	0.477	0.623	0.649	0.793
ET	0.844	0.694	0.718	0.551
~ET	0.454	0.632	0.601	0.783

Source: own authorship

Table 26. Necessity test for a single condition – Traditional sample

	BVC		~BVC	
Conditions tested:	**Consistency**	**Coverage**	**Consistency**	**Coverage**
AF	0.623	0.864	0.562	0.463
~AF	0.613	0.702	0.835	0.569
GPR	0.546	0.892	0.486	0.473
~GPR	0.677	0.689	0.889	0.538
GPS	0.715	0.823	0.634	0.434
~GPS	0.508	0.700	0.742	0.608
API	0.593	0.853	0.522	0.447
~API	0.615	0.684	0.828	0.547
CF	0.491	0.793	0.594	0.570
~CF	0.734	0.7527	0.784	0.478
SF	0.750	0.852	0.583	0.394
~SF	0.466	0.653	0.781	0.650
ET	0.485	0.826	0.583	0.591
~ET	0.760	0.754	0.829	0.489

Source: own authorship

Next, we analyze the sufficient configurations. Settings that have acceptable consistency (>0.8) and coverage (>0.2) are considered sufficient settings. Tables 27, 28 and 29 show the configurations and configurational paths sufficient for high levels of BVC. The complete sample presented eight paths for high levels of BVC, the green sample three paths and the traditional sample nine paths.

Table 27. Configuration of EE for high levels of BVC – Complete sample

Condition	Path1	Path2	Path3	Path4	Path5	Path6	Path7	Path8
AF					●	●	●	●
GPR					●	●	●	●
GPS			●		●	●	●	●
API		●	●		●		●	
CF		●	●		●	●		
SF		●	●			●	●	
ET							●	
Raw coverage	0.481	0.310	0.352	0.323	0.289	0.301	0.305	0.222
Unique coverage	0.093	0.010	0.014	0.007	0.010	0.008	0.102	0.004
Consistency	0.812	0.943	0.957	0.831	0.967	0.974	0.952	0.967
Solution coverage	0.744							
Solution consistency	0.832							

Note: ● = core condition (present).

Source: own authorship

Table 28. Configuration of EE for high levels of BVC – Green sample

Condition	Path1	Path2	Path3
AF	•	○	●
GPR		•	•
GPS	•	○	●
API		○	•
CF	●	●	○
SF	•	•	○
ET	•	○	•
Raw coverage	0.625	0.205	0.215
Unique coverage	0.389	0.107	0.040
Consistency	1.000	0.843	1.000
Solution coverage	0.676		
Solution consistency	0.946		

Note: ● = core condition (present); • = contributing causal conditions (present); ○ = contributing causal conditions (absent).

Source: own authorship

Table 29. Configuration of EE for high levels of BVC – Traditional sample

Condition	Path1	Path2	Path3	Path4	Path5	Path6	Path7	Path8	Path9
AF	●	●	○	○	●	○	○	•	
GPR	○	○		•	•	○	○	○	•
GPS		•	•	•	•	○	•	○	•
API	○	○	•	•	•	○	○	•	•
CF	○	○	○	○	•	○	•	•	○
SF	○		●	●		●	●	•	●
ET	○	○	○		○	○	○	○	○
Raw coverage	0.270	0.303	0.293	0.260	0.257	0.298	0.245	0.201	0.303
Unique coverage	0.011	0.016	0.020	0.014	0.0467	0.038	0.010	0.014	0.030
Consistency	0.914	0.935	0.939	0.942	0.919	0.897	0.888	0.922	0.948
Solution coverage	0.600								
Solution consistency	0.904								

Note: ● = core condition (present); • = contributing causal conditions (present); ○ = contributing causal conditions (absent).

Source: own authorship

Based on the results of this section, considering both techniques employed to reach the objectives of this research, the next section developed the discussion of results.

6. DISCUSSION

This thesis addressed knowledge-intensive entrepreneurs in a developing country, Brazil, applying a conceptual model validated through symmetric and asymmetric methods. This empirical perspective made it possible to investigate the specificities of ecosystems that have an impact on the creation of economic, social and environmental value jointly, generating new knowledge to contribute to academics, creators and political decision-makers in the design of initiatives and strategies to promote eco-entrepreneurship and increase the possibilities of success.

Results are displayed by employing two complimentary methodologies. Firstly, PLS-SEM results are partially different from previous research. For the complete sample, the results demonstrated that only Social Factors and Cultural Factors influenced the BVC.

In this sense, the research results disagree with prior study which had results pointing towards the relevance of financial resources (Neto et al., 2014; Zhao et al., 2023), formal institutions – government regulations and programs (Stam & van de Ven, 2018, 2021), access to physical infrastructure (Alves et al., 2019; Audretsch et al., 2015), and educational and training (Acs et al., 2017; Alves et al., 2019; Stam & van de Ven, 2021).

However, it is essential to emphasize that the studies with different results did not analyze the impact on blended value creation. In a recent article, Audretsch et al. (2024) did not find articles that concurrently analyzed the economic, social, and environmental dimensions of sustainable development. Thus, these differences may be due to the study objective (KIE), the investigated context (Brazil), or the analyzed result (blended value creation). The complexity of analyzing entrepreneurial ecosystems dramatically reduces the possibility of generalizations between contexts and cases (Donaldson, 2021).

Regarding social and cultural factors results, several studies can corroborate our findings. In their research, Aliabadi et al. (2019) evaluated political and cultural dimensions, social and human capital, market, financial and supportive dimensions, obtaining similar results when it comes to cultural dimensions. According to the authors, cultural factors play crucial role in entrepreneurial ecosystems, impacting whether encouraging or weakening entrepreneurship, dictating entrepreneurs' attitudes, values

and social norms. Donaldson (2021) places culture as a fundamental element for analyzing the entrepreneurial ecosystem, considering the way in which entrepreneurship is experienced and understood, and reinforces the importance of analyzing cultural aspects for green entrepreneurship.

However, when comparing green and traditional KIE groups, the results of this thesis demonstrated significant differences in the relationship between Cultural Factors and BVC. For green KIEs, it is possible to identify Cultural Factors are essential for creating value, whereas traditional ones are not. Social Factors, on the other hand, are essential for both groups. According to Sinthupundaja et al. (2019) there is no magic formula for blended value creation, considering they can originate from several different combinations, that is, in agreement with our results, for green entrepreneurs from our sample, social and cultural dimensions foment blended value creation significantly.

Aliabadi et al. (2019) found that political, cultural, and social capital criteria presented the highest weighted importance, respectively, demonstrating such domains can be interpreted as sources of sustainability enablers in knowledge-intensive entrepreneurship in their research. However, the authors emphasized the need for configurations' articulation and integration.

In this sense, in the green context, it is essential to underscore the pronounced influence of cultural and social factors. Such results indicate the pivotal role these factors play in shaping entrepreneurial behavior, and fostering stronger commitment and development of environment solutions and so-called blended value creation. In addition, this result can be linked to entrepreneurs' behavior and eager to positively impact the environment and create values aligned to the so-called blended values in this research. Thus, cultural and social factors emerge as key determinants in aligning entrepreneurial endeavors with the ethos of sustainable development and the creation of multifaceted value propositions

Then, the NCA results reinforce the importance of Social Factors since this was the only factor that appeared as necessary for the BVC, and only in the green sample. fsQCA results provide more detailed and nuanced insights into the complex causal relationships between ecosystem elements and the BVC, considering different configurations that exert heterogeneous effects.

Although the PLS-SEM results demonstrated that only Social Factors and Cultural Factors impact BVC, fsQCA shows that several paths, considering other ecosystem elements, lead to high levels of BVC. By comparing and contrasting different configurations of conditions for BVC, it is possible to analyze these patterns in more depth, identifying heterogeneous trajectories that can generate equifinal results. The first significant result is that in the fsQCA analysis, no isolated condition (considered essential) is necessary or sufficient to create high levels of BVC, suggesting that the creation of blended value consists of a complex process that depends on the interaction and combination of multiple factors rather than any single factor in isolation.

In the complete sample, the results showed eight paths that contain KIE with high levels of BVC. These paths have different configurations, which consider all elements of the ecosystem. The negative highlight is for Education and Training, which is present in a single path, and the positive highlight is for Government Programs and Support, which appears in five paths. In KIE, similar results regarding government programs and support were also obtained (Aliabadi et al., 2019).

The green KIE sample showed a more well-defined pattern of configurations, with only three paths (Table 28) leading to high levels of BVC. The first path contains Access to Finance, Government Programs and Support, Cultural Facts, Social Factors, and Education and Training. Along this path, Cultural Factors present themselves as core conditions. Path two offers Government Policies and Regulations, Cultural Factors, and Social Factors, with Cultural Facts also being a core condition. Path three is Access to Finance, Government Policies and Regulations, Government Programs and Support, Access to Physical Infrastructure, and Education and Training. Access to Finance and Government Programs and Support are core conditions in this path.

The traditional sample already presents a significant heterogeneity of configurations, presenting nine paths. The analysis has shown Social factors are core conditions in 5 paths, and Access to Finance as a core condition in 3 paths. We can highlight government programs and support as contributing conditions in six paths and Access to Physical Infrastructure in five paths.

Some similarities between the PLS-SEM results can be analyzed, such as the presence of social and cultural factors in the paths. However, some differences need to be highlighted, such as the presence of all other dimensions in different paths that lead to

high levels of blended value creation for the two subsamples. Education and training appear as a contributing causal condition for two green sample paths, and for none of the traditional sample, demonstrating the importance of this dimension for green companies. Access to Physical Infrastructure appears in 6 of the 9 paths for traditional KIEs and only 1 for green ones, a more relevant dimension for traditional KIEs. Access to finance, government policies and regulations, and government programs and support appear similarly in both subsamples and are essential for both.

6.1 IMPLICATIONS FOR THEORY AND PRACTICE

Theoretically, this research contributes to filling a gap in research that relates the entrepreneurial ecosystem to simultaneously creating value at the economic, social, and environmental levels (Audretsch et al., 2024). It also contributes to presenting practical results related to KIE in a developing country, as most research with this focus presents the experience of developed countries (Moraes et al., 2022). Another theoretical contribution was the advancement in the literature on blended value creation, which is poorly defined and has several different terms (Zioło et al., 2023), and the integration of green entrepreneurship with the field of innovation research (Demirel et al., 2019).

Research on green entrepreneurship often focused on internal aspects, such as individual characteristics, rather than external contexts as socio-cultural factors, highlighting this thesis contributions to fill in this gap of shedding light towards understanding the role of socio-cultural impact on green entrepreneurship (Koe & Majid, 2014). Moreover, culture has been extensively approached in entrepreneurial research body (Autio et al., 2013), however, it has not been extensively linked to configurational aspects of the entrepreneurial ecosystem (Donaldson, 2021) and under green firms and KIE perspectives.

About practical contributions, the results of the thesis demonstrate a lack of alignment between the entrepreneurial ecosystem and the green KIE, in which in this sample, except social and cultural factors and some combinations of elements that in some locations lead to high levels of economic, social and environmental value creation. This result provides essential guidelines for formulating public policies and regulations for

sustainable companies (Bozhikin et al., 2019; Cheah et al., 2019; Gali et al., 2020; Guerrero et al., 2021; Islam, 2020).

Developing a more positive entrepreneurial ecosystem to sustainable challenges is only possible with the collaboration of different actors, such as companies, society, government, academia, and companies (Siqueira et al., 2023), and the results indicate that society wants this change. Thus, government projects to support the execution of scientific and technological research in small companies, such as PIPE FAPESP, may have as a selection criterion organizations that are more sustainable from a social and environmental point of view. Sustainable transitions can also occur with changes in the incentives and priorities of companies' and governments' innovation activities, generating sustainable enterprises and contributing to structural changes in the entrepreneurial ecosystem with more responsible actions and forms of production.

Additionally, as the education and training dimension is only present for green KIEs, educational initiatives and training programs that focus on developing skills and knowledge for green entrepreneurs can be proposed. It is also possible to encourage the creation of collaborative networks and platforms for green KIEs, exploring the crucial role that social and cultural factors play in promoting blended value creation. Thus, exploring new ways to encourage collaboration within the green entrepreneurial ecosystem is possible.

Finally, research is aligned with the sustainable development of countries, contributing to some of the SDGs, such as SDG 8 - Decent Work and Economic Growth: research can contribute to SDG 8 by promoting entrepreneurship, specifically green KIE, which can create decent work opportunities and promote economic growth; SDG 9: Industry, Innovation and Infrastructure: the article's emphasis on the entrepreneurial ecosystem and the importance of education and training highlights the role of innovation and infrastructure development in promoting sustainable entrepreneurship; SDG 4: Quality Education: research results highlight the importance of education and training for green entrepreneurs. Support for educational initiatives is aligned with SDG 4, promoting inclusive and quality education; SDG 5: Gender Equality: the article can contribute to gender equality by addressing factors that influence mixed value creation, potentially identifying areas where gender disparities can be handled in the entrepreneurial ecosystem; SDG 11: Sustainable Cities and Communities: advocating for the development of infrastructure and the promotion of sustainable entrepreneurship

contributes to the creation of sustainable and resilient communities, aligning with the objectives of SDG 11; SDG 13: Climate Action: green entrepreneurship directly aligns with SDG 13, promoting climate action through environmentally friendly practices and solutions. The paper can provide insights into how entrepreneurial ecosystems can support such initiatives. SDG 17: Partnerships for the Goals: The article's recommendations for collaboration, networking, and stakeholder engagement contribute to SDG 17 by emphasizing the importance of partnerships to achieve sustainable development goals. SDG 12: Responsible Consumption and Production: green entrepreneurship often involves sustainable and responsible production practices. The article can contribute to SDG 12 by promoting awareness and adherence to sustainable consumption and production; SDG 15: Life on Land: the focus on green entrepreneurship suggests a commitment to sustainable practices that can positively impact terrestrial ecosystems, contributing to the objectives of SDG 15.

By addressing these SDGs, the thesis contributes to a holistic and integrated approach to sustainable development, emphasizing the interconnection of economic, social, and environmental objectives. Policymakers and stakeholders can use the insights to design initiatives that align with these global sustainability goals.

7. FINAL REMARKS

There is an escalating awareness and acknowledgment regarding the critical importance of spearheading and actively promoting sustainable transitions within the intricate frameworks of entrepreneurial ecosystems (Audretsch et al., 2024; Demirel et al., 2019; Meissner et al., 2024; Pinkse et al., 2024). This acknowledgment signifies an evolving understanding among stakeholders about the imperative need to integrate sustainable practices, not merely as an ethical obligation but as a strategic imperative for long-term success and resilience in the face of global challenges. The burgeoning emphasis on sustainability reflects a paradigm shift where businesses are increasingly recognizing their pivotal role in fostering environmental stewardship, social responsibility, and economic viability, aligning with the broader goals of global sustainability and resilience.

By combining a multi-method methodology with symmetric and asymmetric techniques and with a relevant number of KIE respondents, the results demonstrated a lack of alignment between the entrepreneurial ecosystem and blended value creation. The research contributes to understanding the contextual dynamics of the knowledge-intensive green ecosystem in a developing country, allowing the promotion of this type of entrepreneurship, which is aligned with the United Nations Sustainable Development Goals (SDGs). The results can contribute to policymaking processes that link knowledge-intensive entrepreneurship with sustainable transitions within business ecosystems.

Nevertheless, the findings have limitations. The sample exhibits a certain bias, as it is exclusively comprised of funded projects sourced from the PIPE FAPESP initiative, which displays the context of the State of São Paulo, in addition, it shows the *perception* of these two groups of entrepreneurs. Furthermore, the cross-sectional nature of the data collection method employed impedes the examination of longitudinal patterns, precluding an in-depth analysis of the evolving dynamics in the relationship among the scrutinized dimensions over time. Thus, some suggestions for future research can be considered: carry out in-depth qualitative research with experts on the perception of the impact of the entrepreneurial ecosystem for green KIEs; carry out longitudinal research, which allows us to collect more concrete evidence about relationships.

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