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The importance of green value co-creation for green innovation

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Master in Business Administration

Supervisor:

Álvaro de Borba Cruz Lopes Dias

Departamento de Marketing, Operações e Gestão Geral

ISCTE - Instituto Universitário de Lisboa

September, 2023



BUSINESS
SCHOOL

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AGRADECIMENTOS

Agradeço imensamente a todos que estão comigo nesta caminhada.

Primeiramente, ao meu esposo, Gabriel Avezum, que sempre tem tempo para ouvir e ajudar nas minhas dificuldades,

Meus pais, Maria José Broglio Paiva e Valter Paiva Junior, que são a minha base, e por todos os ensinamentos, amor e cuidados,

Minha irmã, Morgana Broglio Paiva, que sei que posso sempre contar para tudo,

Minha tia ,Silvia Broglio, que é minha segunda mãe,

Minha prima ,Lidia Broglio, que é a minha prima-gêmea,

Meus cunhados ,Veronika Avezum, Lucas Avezum e sobrinha Beatriz Avezum, que nessa caminhada em Portugal fizeram tudo ser mais leve, divertida e em família,

Minha cunhada ,Luiza Avezum, por sempre ser uma ótima companhia,

Meus sogros ,Izabel Avezum e Flávio Avezum, que sempre tem tempo para uma boa conversa,

Meus Tios ,Luiza Buzato Moreto e Luiz Moreto, que foram fundamentais para o meu crescimento,

Simplesmente não chegaria até onde cheguei sem vocês ao meu lado (fisicamente ou não).

RESUMO

Esta pesquisa examina o impacto do empreendedorismo na cocriação de valor verde e na inovação verde no setor de PMEs de Beleza e Cuidados Pessoais. Ele preenche uma lacuna na literatura existente ao combinar os campos de cocriação verde, inovação verde e empreendedorismo dentro do contexto do setor de PMEs de Beleza e Cuidados Pessoais. Os dados de 71 PMEs em Portugal foram recolhidos através de questionários e analisados através da Modelação de Equações Estruturais de Mínimos Quadrados Parciais. Os resultados indicam que a cocriação de valor verde tem um efeito significativamente positivo na inovação verde. A percepção da capacidade empreendedora influencia positivamente a cocriação de valor verde e indiretamente a inovação verde. A atitude em relação ao empreendedorismo tem um efeito significativamente negativo na inovação verde. Além disso, a educação para o empreendedorismo tem um efeito negativo significativo na cocriação de valor verde. O estudo contribui para a compreensão dos fatores que influenciam a inovação verde e destaca a importância da educação para o empreendedorismo na promoção de práticas sustentáveis. Também fornece implicações gerenciais, como a necessidade de fornecer aos empreendedores conhecimento sobre práticas sustentáveis, promover a colaboração entre empreendedores estabelecidos e aspirantes, atualizar currículos de educação para o empreendedorismo e incentivar a cocriação de valor verde. Essas descobertas oferecem insights práticos para promover a sustentabilidade na indústria de Beleza e Cuidados Pessoais.

Palavras-chave: PMEs de Beleza e Cuidados Pessoais, Cocriação de valor verde, Inovação verde

Classificação JEL: O30, M0

ABSTRACT

This research examines the impact of entrepreneurship on green value co-creation and green innovation in the Beauty & Personal Care SMEs sector. It fills a gap in the existing literature by combining the fields of green co-creation, green innovation, and entrepreneurship within the context of the Beauty & Personal Care SMEs sector. Data from 71 SMEs in Portugal were collected through questionnaires and analyzed using Partial Least Squares Structural Equation Modeling. The findings indicate that green value co-creation has a significantly positive effect on green innovation. Perception of entrepreneurial capacity positively influences green value co-creation and indirectly green innovation. The attitude towards entrepreneurship has a significantly negative effect on green innovation. Furthermore, entrepreneurship education has a significant negative effect on green value co-creation. The study contributes to the understanding of the factors influencing green innovation and highlights the importance of entrepreneurship education in fostering sustainable practices. It also provides managerial implications, such as the need to provide entrepreneurs with knowledge on sustainable practices, promote collaboration between established and aspiring entrepreneurs, update entrepreneurship education curricula, and incentivize green value co-creation. These findings offer practical insights for promoting sustainability in the Beauty & Personal Care industry.

Keywords: Beauty & Personal Care SMEs sector, Green value co-creation, Green innovation

JEL classification: O30, M0

Summary

1. Introduction.....	1
2. Literature Review.....	2
2.1. Entrepreneurship.....	2
2.2. Entrepreneurship, Green value co-creation and Green innovation.....	5
2.2.1. Attitude toward Entrepreneurship (AE), Green Value Co-creation and Green innovation	6
2.2.2. Perceived Social Norm (PSN), Green Value Co-creation and Green innovation.....	7
2.2.3. Perceived Entrepreneurial Capacity (PEC), Green value co-creation and Green innovation	9
2.2.4. Entrepreneurship Education (EE), Green value co-creation and Green innovation ..	11
2.2.5. Green value co-creation and Green Innovation.....	12
2.3. Conceptual Model.....	14
3. Methodology	14
3.1. Participants	14
3.2. Variables/measures	15
3.3. Data collection.....	17
4. Results.....	18
4.1. Data analysis.....	18
4.2. Model quality.....	18
4.3. Hypotheses test.....	21
5. Discussion	22
6. Conclusion	26
6.1. Theoretical contributions/implications	26
6.2. Managerial implications	28
6.3. Limitations and future/further research	29
7. References.....	31

Figures Index

Figure 1:Conceptual model 14

Tables Index

Table 1: Description of variables 15
Table 2: Composite reliability, average variance extracted, correlations, and discriminant validity checks.
..... 19
Table 3: Structural model assessment. 20
Table 4: Bootstrap results for indirect effects..... 20

1. Introduction

In recent years, there has been a shift from a sole focus on product creation to a holistic focus on both product and value creation (Pargar et al, 2019). From a product and firm-centric view to a personalized customer experience. Mainly, in response to consumers that are dissatisfied, even though they have more choices of products and services than ever before (Prahalad & Ramaswamy, 2004). Also, the emphasis on innovation for environmental sustainability has had special importance for both entrepreneurs (Varadarajan, 2017) and stakeholders (Re & Magnani, 2022). As sustainability became a field of increasing research, in reaction to a growing environmental crisis and inequalities in global development (De Sordi, 2022).

To redefine the meaning of value and the process of value creation Prahalad & Ramaswamy (2004), came with the concept of co-creation of value, with the consumer-company interaction as the locus of this process. To approach the lack of green innovation and increase in pollution and environment damages, Yousaf (2021) studied green value co-creation on green innovation in Small and medium-sized enterprises (SMEs). Also, Moya-Clemente et al (2020) proved a positive impact of environmental and economic factors on sustainable entrepreneurship over time and Boubker et al (2021) proved that students' entrepreneurship education has statistically significant relationship with entrepreneurial intentions.

Although the literature about green co-creation and green innovation is growing, and the literature about entrepreneurship is already extensive, there is a scarcity of literature combining these two fields with the Beauty & Personal Care market in the SMEs sector, which face challenges toward sustainability due to their smaller scale (Amrina et al, 2021). To illustrate the magnitude of Beauty & Personal Care market, it was responsible for a revenue of US\$528.59 bn in 2022 (Statista, 2023). And SMEs contribute to approximately 63.3% of overall CO₂ and greenhouse gases emissions (European Commission, 2021) and produces 70% of all industrial pollution made by European companies (European Commission, 2012).

To fill this gap, this research aims to evaluate the impact of entrepreneurship education on green value co-creation and green innovation in Beauty & Personal Care's SMEs, and doing so, provide a more solid base for sustainability in the Beauty & Personal Care industry.

To empirically validate this idea, it was developed a questionnaires about entrepreneurship, green value co-creation and green innovation, that was applied to companies of Beauty & Personal Care field of Portugal. The data from 71 SMEs were analyzed using Partial Least Squares Structural Equation Modeling method. The findings suggest that not all variables are equally important. The results comprove some of existing literature, however contradicts others.

To reach these conclusions, first it was made a literature review about the main topics and their relevant ramifications. This theoretical knownlodge lead to a unexplored topic that was the basis for the development of the conceptual model and research hyposthesis, followed by data colection and data analysis. The results reached will be presented and discussed. Finally, it will be presented theoretical and managerial implications, and also the limitations of this research and suggestions for further research.

2. Literature Review

2.1. Entrepreneurship

The function of the entrepreneur is presumably as old as the institutions of trade and exchange. But it was only after capital needs became a focus for society that the conception of the entrepreneur took on vital significance. The historical use of the term started in the 14 th century with an earlier form, *entreprenneur*, a french origin word. And the current term, *entrepreneur*, firstly appeared in the early of eighteenth century, as defined as one who undertakes a project; a manufacturer; a master builder (Hébert et al, 2009).

In eighteenth century, Richard Cantillon, created the first formal theory about entrepreneurship, and the concept of the entrepreneur as a risk taker. These early theory anticipated a number of aspects of the entrepreneur that reappear in later writings, including the entrepreneur as one who supplies financial capital; is an industrial leader, manager, and coordinator of economic resources (Hébert et al, 2009).

Later on, in the twentieth Century, Schumpeter (1934) came the concept of entrepreneur as a innovator. Joseph Schumpeter, one of most the influential economists, proposed in 1912 the Theory of Economic Development, which focused on the role of entrepreneurship in economic development through innovation. In his words:

“The function of entrepreneurs is to reform or revolutionize the pattern of production by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry and so on.” (Schumpeter, p.132, 2013).

In this way, Schumpeter not only linkage the entrepreneur with innovation, but also proposes a definition for innovation, that it can be understood as a new combinations of resources, knowledge and equipment existing in a company and can modify the way of do something, or even create something different.

Another important dimension of entrepreneurship are the antecedents to became an entrepreneur, and which are studied on different levels of analysis (Clarysse et al, 2022), as several factors are likely to influence the young people to became an entrepreneur (Boubker et al, 2021). In the 1960s, the first researchers about entrepreneurship antecedents were focused on the analysis of the personality of the entrepreneur (Peng et al, 2013). During the 1980s and 1990s, it became relevant the individual intentions towards entrepreneurship as an entrepreneur’s antecedent, since it had a greater explanatory capacity to predict the entrepreneurial behaviour, therefore it was more effective. Amongst intentional models, one of the most influential is the Theory of Planned Behaviour (Barba-Sánchez et al, 2022).

The theory of planned behavior (TPB) explain that a person's future behavior is preceded by intention: “As a general rule, the stronger the intention to engage in a behavior, the more likely should be its performance” and it is based in three indicators of individual intention: attitude towards the concerned behavior, perception of social norms and perceived behavioral control (Ajzen, 1991, p.181).

The first indicator, known as *attitude toward the concerned behavior*, is defined as the positive or negative assessment that the person has about the behavior in question. The second of these, the *perception of social norms*, considers the individual’s personal values and norms, the society’s pressure or the influence of important people of the individual’s own circle, on the behavior under discussion (Vega-Gómez, 2020)

Finally, previously mentioned, the *perceived behavioral control* is a concept that overlaps Bandura’s (1986) definition of perceived self-efficacy, which referres to the individual’s faith to

achieve success, based on the perception of his or her capacities, aptitudes, skills, and also the information available and the individual's capacity to interpret it (Bandura, 1986).

In summary, the TPB theorise that: a positive attitude, a increased pressure from society and a increase control over the behavior under analyses, are the factors to increase the behavioral intention of the individual.

The academic research on entrepreneurship became more intense in the last decades and provided ideas about different aspects of entrepreneurship. It usually focuses on successful practices of entrepreneurs. Osborne (1995) reviews the essential elements of entrepreneurial success, and by giving examples of sucessful entrepreneurial strategies indicates that entrepreneurs are linkage with success.

Entrepreneurship can be successful and result in positive aspects, however it also can bring negative effects for the reason that organizations can contribute to social problems and environmental degradation (De Sordi et al, 2022). Consequently, sustainability is increasing importance in the entrepreneurship field.

Sustainability is defined by The United Nations (1978) as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”. To countries meet their development needs, in 2016, was created the Sustainable Development Goals (SDG), which “form the framework for improving the lives of populations around the world and mitigating the hazardous man-made effects of climate change” (United Nations, 2015).

And the entrepreneurship has a important role in the implementation of this sustentability, with practices such as sustainable entrepreneurship, which is concerned with meeting the needs of all stakeholders in opposition to conventional entrepreneurship, that prioritizes only shareholders. (Rosário et al, 2022).

However, the major scholarly literature about sustainability and entrepreneurship, as researched by Tiba et al (2019), has focus so far about how firms can benefit society through the sustainability, although firms also can be benefit from sustentability, as the approaches of sustainable entrepreneurship towards the people and profit dimensions have a significant positive influence on business performance (Soto-Acosta et al, 2016).

The reason for this positive impact in business is because the sustainable entrepreneurship is growing with the impulse of the current service-oriented business models, which encourage value co-creation by engaging all stakeholders throughout the production process, including supply

chains, customers, and employees. (Rosário et al, 2022). Which culminate in the creation of value with practices such as the green value co-creation and the green innovation.

2.2. Entrepreneurship, Green value co-creation and Green innovation

The green value co-creation is a concept that branch from the Value co-creation that “is the process by which products, services, and experiences are developed jointly by companies and their stakeholders, opening up a whole new world of value” (Ramaswamy, 2009, p.11). Which, at present, it happens in a global context of more connected and empowered customer, with the customer experience the central of enterprise value creation, innovation, strategy and executive leadership.

This new scenario brings new implications for business and society, developig a linkage of the concept of value co-creation, the “joint creation of value by the company and the customer” (Prahalad, 2004, p. 8), with the sustainability, thus originate the concept of green value co-creation. As defined by Chang (2019, p.332), “as the active sharing of environmental ideas between a company and its partners and participation in one or more production or consumption stages to create value”.

The concept of green value co-creation recognizes the importance of sustainability and environmental responsibility in business practices. It emphasizes the need for companies to work together with their partners to create innovative and environmentally-friendly solutions that benefit all parties involved. By engaging in green value co-creation, companies can enhance their environmental performance, reduce costs, and increase customer satisfaction and loyalty. Moreover, it can help to build stronger relationships with partners and stakeholders, which can lead to long-term success and competitive advantage.

This process of exchanging environmental ideas among customers and company from green value co-creation can bring improvements for the companies (Yousaf, 2021). Firstly, by the improvement of corporate sustainability, which addresses economic, social and environmental issues. Secondly, it goes in line with the current environmentally-friendly concerns of the consumers. In this way, consumers have direct or indirect impact to bring improvement for the companies (Gomes Silva et al, 2022).

Green innovation refers to the development and implementation of new ideas, products, services, and processes that are environmentally friendly, sustainable, and contribute to the conservation of natural resources. Entrepreneurship, on the other hand, involves the identification of business opportunities, the creation of new ventures, and the pursuit of innovative solutions to address market needs. Ebrahimi & Mirbargkar (2017) comproves that there is a significant relationship between green innovation and SMEs development with respect to the mediating role of green entrepreneurship, this is an important find to link green innovation and entrepreneurship, as it indicates they are interconnected.

2.2.1. Attitude toward Entrepreneurship (AE), Green Value Co-creation and Green innovation

The Attitude toward Entrepreneurship is defined as “a person's perception of the behavior envisaged, in this case the fact of becoming an entrepreneur”(Bachiri, 2016, p.118). And complementing this definition with Ajzen’s theory, that action can be measured by attitude, a psychological factor, it can be concluded that the entrepreneurial action can be measure by the attitude toward entrepreneurship (Ajzen, 1991) (Kolvereid,1996).

The researches prove that attitude toward entrepreneurship education has a positive impact in entrepreneurship intention (Boubker et al, 2021). And this variable is so important that some authors suggest that entrepreneurship education programs should focus on this variable if they want to increase entrepreneurship intentions (Fayolle & Gailly, 2015).

The attitude toward entrepreneurship can be linkage with green value co-creation through the service-dominant logic theory, which explain how value is co-created by companies and clients trough the service idea, a perspective that introduces a new way for synthesizing and articulating the view of exchange and value creation in markets (Vargo et al, 2020). Moreover, the stakeholder theory (Freeman, 1984) suggests that companies should consider the interests of stakeholders, including environmentalists, when formulating strategies. In a way that when companies engage in green value co-creation have more probably to gain support from stakeholders and culminate in a long-term success.

Also, Attitude toward Entrepreneurship (AE) encompasses the willingness to take risks, confidence in the abilities to start and manage a business, and the perception of the value and

benefits of entrepreneurship. Thus, the AE can influence an individual's inclination towards engaging in green innovation as those with a positive attitude toward entrepreneurship are more likely to explore opportunities, such as developing environmentally friendly solutions which it is encompassed in the green innovation. In agreement with this idea, Yasir et al (2023) comprove that entrepreneurs with prior experience might expect a stronger correlation between their environmental values and their desire to launch a sustainable venture.

Thus, the goal of this project is to comprove that the attitude toward entrepreneurship, a psychological factor of entrepreneur, is positively associated with the green value co-creation and green innovation. And also there is an indirect effect of Attitude toward entrepreneurship on green innovation via the mediator of green value co-creation

Hypothesis 1a: Attitude toward entrepreneurship positively influences green value co-creation

Hypothesis 1b: Attitude toward entrepreneurship positively influences green in-novation

Hypothesis 1c: Green value co-creation mediates the relationship between Attitude toward entrepreneurship and green innovation

2.2.2. Perceived Social Norm (PSN), Green Value Co-creation and Green innovation

The perceived social norm “refers to the perceived social pressure to perform or not to perform the behavior”(Ajzen, 1991, p.188) and according to Krueger (1993, p.325) “This construct taps subjects' perceptions of what the important people in their lives think about performing the behaviour”.

This means that social norms can have a significant impact on the decision to become an entrepreneur or not (Kolvereid,1996)(Boubker et al, 2021). This can be exemplified as if people around us, such as family, friends, or colleagues, perceive entrepreneurship as a desirable or valuable career path, we may be more likely to consider starting a business ourselves. Conversely, if the currently acceptable is that entrepreneurship is risky or not a stable career choice, we may be less inclined to pursue it.

In the same way, in the service-dominant logic, the institutions have an important role to achieve the value co-creation (Ng & Vargo, 2018). And, if consider that the instutions are human rules, norms, and beliefs, which enable and constrain action and make social life predictable and

meaningful (Vargo et al, 2020), then it is possible to make a connection between perceived social norm and green value co-creation, as they both are based on social norms.

Edvardsson (2011) emphasizes that service exchange and value co-creation are social phenomena that are embedded in social systems. Service exchange is a social process that involves the interaction between service providers and customers, and value co-creation is the joint creation of value between customers and service providers.

Edvardsson (2011) argues that social systems, such as culture, norms, and values, have a significant impact on service exchange and value co-creation. For example, cultural differences can affect the expectations of customers and service providers, and social norms can influence the way people interact and communicate during service encounters. By recognizing the social embeddedness of service exchange and value co-creation, organizations can better understand the context in which their services are provided and design strategies that are more relevant and effective in different social contexts.

Also, when individuals perceive that a behavior or innovation is widely accepted and valued by their social group or society, they are more likely to adopt and support it, for example, the perceived social pressure to apply sustainable technology, such as cleaner production standards, plays an important role in their implementation (Yasir et al, 2023). This supports that PSN can shape people's attitudes and behaviors towards environmentally friendly practices and technologies. It also demonstrates the relationship between PSN and green innovation, as this second one encompasses all the environmentally friendly innovation.

Subjective norms indicate the social environment's influence on individual behavior. However, researchers prove that subjective norms had the least impact on conventional entrepreneurial intentions (Dao et al, 2021, Krueger et al, 2000)

The results of Krueger et al. (2000) suggested that subjective norms had the least impact compared to other factors, such as, attitudes and perceived behavioral control. This conveys the idea that when starting a conventional business, the opinions and expectations of others may not play a significant role in shaping an individual's intention to become an entrepreneur.

Dao et al. (2021) conducted a similar study built upon previous research to further explore the impact of subjective norms on conventional entrepreneurial intentions. Their findings seemingly align with the notion that subjective norms may have a relatively weaker influence in this specific domain.

While subjective norms may have a relatively lesser impact on conventional entrepreneurial intentions, they can still play a significant role in other contexts, such as green innovation and sustainable practices. In these domains, where environmentally friendly practices and technologies are seen as socially desirable and the norm, positive influences of subjective norms can have several effects.

To gain a more comprehensive understanding of the topic and get specific findings, it will be researched if the social norm is positively associated with the green value co-creation and green innovation. And also, if there is an indirect effect of perceived Social Norm on Green innovation via the mediator of Green value co-creation

Hypothesis 2a: Perceived social norm positively influences green value co-creation.

Hypothesis 2b: Perceived social norm positively influences green innovation.

Hypothesis 2c: Green value co-creation mediates the relationship between perceived social norm and green innovation.

2.2.3. Perceived Entrepreneurial Capacity (PEC), Green value co-creation and Green innovation

The perceived behavioral control is a key concept in the theory of planned behavior (TPB), which refers to an individual's perception of the ease or difficulty of performing a specific behavior. Applied in the entrepreneurship, perceived entrepreneurial capacity (PEC) is a concept that refers to an individual's belief in their ability to successfully create and manage a business (Boissin et al, 2009), which encompasses both cognitive and affective components such as self-efficacy and locus of control. To illustrate the importance of PEC, researchers proved that PEC was positively related to the intention to set up one's own business (Chen et al, 1998).

Meanwhile, green value co-creation, as defined by Chang (2019), is a collaborative process between a company and its partners to create value while considering the environmental impact of their actions. This involves engaging with customers, suppliers, and other partners to develop innovative solutions in one or more production or consumption stages that reduce environmental impact while still meeting customer needs.

The relationship between PEC and green value co-creation is complex and multifaceted as individuals who have higher levels of perceived entrepreneurial capacity may be more likely to

engage in green value co-creation. This is because individuals who have high levels of perceived entrepreneurial capacity may also have a greater sense of self-efficacy and belief in their ability to execute behaviors necessary to produce specific achievements (Krueger, 1993), including those related to environmental sustainability.

However, some researchers such as Hoogendoorn et al (2019) found out that sustainable entrepreneurs perceive more institutional barriers in terms of a lack of financial, administrative, and informational support at business start-up than regular entrepreneurs. Additionally, no significant differences between sustainable and regular entrepreneurs were found in terms of their risk attitudes or perceived financial risks

Altogether, individuals with high PEC may be more likely to engage in environmentally-friendly business practices and seek out opportunities to co-create green value with their stakeholders, as researchers such as Díaz-Casero et al (2012) confirms the outstanding role of cultural and social norms in entrepreneurial capacity .

Also, studies comproved that environmental concern and perceived ease of use are positively and significantly associated with adoption of green innovation (Polas et al, 2013). This can be explained by perceived entrepreneurial capacity playing a crucial role in recognizing entrepreneurial opportunities, including those related to green innovation, in a way that individuals with high PEC are more likely to identify environmental challenges as business opportunities and develop innovative solutions to address them. This entrepreneurial mindset allows them to see potential in sustainability-related issues and take action to create green innovations. (Yasir et al, 2023).

Thus, this project hypothesize that there may be a positive association between perceived entrepreneurial capacity and green value co-creation and green innovation. And also there is an indirect effect of perceived etrepreneurial capacity on green innovation via the mediator of green value co-creation

Hypothesis 3a: Perceived entrepreneurial capacity positively influences green value co-creation

Hypothesis 3b: Perceived entrepreneurial capacity positively influences green innovation.

Hypothesis 3c: Green value co-creation mediates the relationship between perceived entrepreneurial capacity and green innovation.

2.2.4. Entrepreneurship Education (EE), Green value co-creation and Green innovation

According to Linán (2004, p. 163) entrepreneurship education refers to “the set of all training activities, regulated or not, that try to develop in the participants the intention of being an entrepreneur, or some of the elements that affect that intention, such as entrepreneurial knowledge, desirability of the entrepreneurial activity, or its feasibility”. Researches prove that entrepreneurship education increases entrepreneurial intention, as the role of entrepreneurship education in the entrepreneurial behavior is linkage with the Theory of Planned Behavior (Sánchez, 2013).

Entrepreneurship education can influence all three components of entrepreneurial intention, by providing knowledge and skills related to entrepreneurship, it can improve attitudes toward entrepreneurship and increase the perceived feasibility of starting a business. Additionally, entrepreneurship education can expose individuals to entrepreneurial role models and create a supportive community, which can positively impact subjective norms (Adeel et al, 2023).

Overall, the evidence suggests that entrepreneurship education can be an effective tool for increasing entrepreneurial intention and improving entrepreneurial behavior. In this way, EE can play a key role in green value co-creation by equipping entrepreneurs with the knowledge and skills they need to create and implement environmentally sustainable business models. By providing education on sustainable business practices, environmental regulations, and green technologies, EE programs can help entrepreneurs identify opportunities to create value while also minimizing their impact on the environment. Which goes in line with Ramasky concept of value co-creation, where the idea of co-creation goes beyond the exchange process of traditional business transactions. It involves ongoing interactions, dialogue, and transparency between all parties (Ramaswamy, 2011), where the focus is on development, which is the same core as entrepreneurship education.

Furthermore, entrepreneurship education can raise environmental awareness among individuals and emphasize the importance of sustainability and environmental responsibility. This increased awareness can lead to the development and promotion of environmentally friendly products, services, and technologies. Also, entrepreneurship education equips individuals with the skills to identify market gaps and opportunities, and thus, lead to green innovation, which is

the practice of develop and promote environmentally friendly products, services, and technologies.

Despite the considerable evidence supporting the positive influence of entrepreneurship education on various aspects of innovation and value creation, the entrepreneurship education effect on the intention to become an entrepreneur can be negative (Oosterbeek et al, 2010). Also, it is crucial to analyze the emphasis of entrepreneurship education on sustainability, as the traditional entrepreneurship education programs may not adequately address environmental sustainability or the importance of green practices.

On the other side, when individuals face limited resources and opportunities for traditional entrepreneurship, they may be compelled to explore alternative solutions that address urgent environmental issues (Weber, 2022). This necessity-driven innovation has the potential to spur the development of green technologies, products, and services. By seeking innovative ways to tackle environmental challenges, individuals can actively contribute to green value co-creation. And thus, the green value co-creation came from the necessity-driven and not by the influence of the entrepreneurship education.

To gain a more comprehensive understanding of the topic and get specific findings, it will be researched if the entrepreneurship education is positively associated with the green value co-creation green innovation. Additionally, it would be valuable to investigate whether green value co-creation acts as a mediator between entrepreneurship education and green innovation, indirectly influencing the relationship between the two.

Hypothesis 4a: Entrepreneurship Education positively influences green value co-creation

Hypothesis 4b: Entrepreneurship Education positively influences green innovation.

Hypothesis 4c: Green value co-creation mediates the relationship between Entrepreneurship Education and green innovation.

2.2.5. Green value co-creation and Green Innovation

The concept of green innovation is “The innovation brought with the purpose of reducing adverse effect on environment through green methods” (Yousaf, 2021, p. 54869). And encompasses notions associated with the concepts of: green innovation, eco/ecological innovation, sustainable innovation and environmental innovation.

The existing body of literature focuses on various factors that contribute to enhancing green innovation, including green core competence (Chen, 2008), green management (Schiederig et al., 2012), corporate environmental ethics (Chang et al., 2015), green organizational identity (Chang and Chen, 2013), political capital (Lin et al., 2014) and stakeholders' influences (Guoyou et al., 2013).

Another factor is the Green value co-creation (Yousaf, 2021), which it is an important aspect for green innovation, as it involves collaboration among organizations and customers to create value that is both sustainable and beneficial for all stakeholders. The two dimensions of green value co-creation are green co-production and green value in use. Green value in use refers to the sustainable use and consumption of these products and services by customers, while Green co-production involves the joint efforts of organizations and customers to develop sustainable products and services, which impact directly the green innovation.

Some example of green innovation that have been developed in the Beauty & Personal Care sector are:

- Packaging innovation: Companies are switching to sustainable packaging solutions like biodegradable, compostable, or recyclable packaging to reduce waste. For instance, L'Oreal has developed a shampoo bottle made from recycled plastic and has committed to making all of its packaging reusable, refillable, or compostable by 2025 (L'Oréal Group : We Protect the Beauty of Our Planet by Reducing Plastic Packaging, n.d.).
- Plant-based ingredients: Brands are incorporating natural, plant-based ingredients in their products instead of synthetic ones to reduce the use of harmful chemicals. For example, The Body Shop has a range of products that use Community Fair Trade ingredients sourced from sustainable farming practices. (The Body Shop, n.d.)
- Waterless products: Water is a scarce resource, and the beauty industry is one of the biggest consumers of water. Waterless beauty products like shampoo bars, solid moisturizers, and dry shampoos are gaining popularity as they eliminate the need for water and reduce the carbon footprint of the products (Ledesma, 2021).
- Green energy: Beauty & Personal Care companies are investing in renewable energy sources like wind and solar power to reduce their carbon footprint. For example, Lush has installed solar panels in their factories and stores to power their operations (Lush Solar Panels - Clean Energy Case Study - Solarsense Solarsense, 2022).

- Refillable products: Refillable products are gaining popularity as they reduce waste and encourage customers to reuse the packaging. For instance, Kjaer Weis offers refillable makeup products (Sustainability, n.d.).

Thus, the goal of this project is to confirm that the green value co-creation is positively associated with the green innovation.

Hypothesis 5: Green value co-creation positively influences green innovation

2.3. Conceptual Model

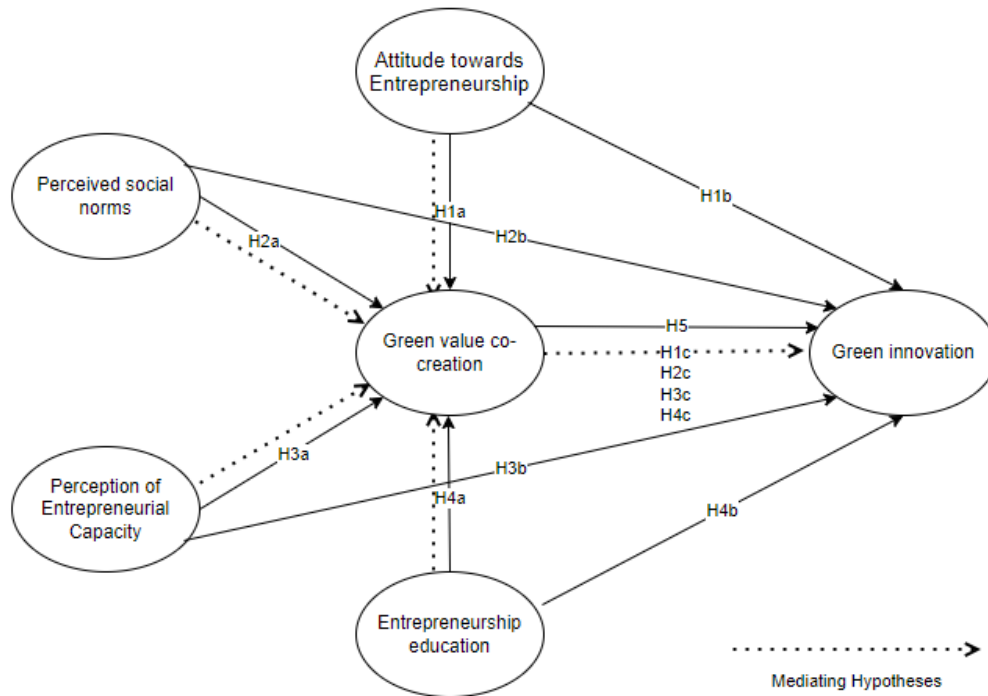


Figure 1: Conceptual model

3. Methodology

3.1. Participants

The Beauty & Personal Care sector is characterized by its dynamism. As a fast-passed development sector has great relevance to the global economy and thus, it was chosen for data collection.

In this research will be focused on the SMEs of the Beauty & Personal Care sector of Portugal. The sample frame of this study consisted of 71 SMEs of the Beauty & Personal Care sector, to identify a representative sample, a list of SMEs was obtained from Empresite (Empresite Portugal, 2023) from a total population of 164 empresies.

As this research has to be generalized for overall SME industry and dealt with sample size of 71 (20-30 sample size is enough for a quantitative research). Thus, a quantitative research design is very appropriate in this case. The data was collected from a portion of SME industry and was generalized to the overall industry. Of the respondents, 52,9% were male, 44,1% were female and 3% were other gender identities. About the age group: 14,7% were between 16 to 30 years old, 67,6% were between 31 to 55 years old and 17,6% were between 56 to 65 years old.

3.2.Variables/measures

A total of six variables were used in this study: attitude towards entrepreneurship, perceived social norms, perception of entrepreneurial capacity, and entrepreneurship education were independent variables; green value co-creation as mediating; and green innovation as dependent variable. The necessary details of these variables are shown in Table 1.

Table 1: Description of variables

Variable	Itens	Abreviations	Autors	Scale
Attitude towards Entrepreneurship	01.If I have the opportunity and the resouces, I will start a business	AE_1	Bachiri (2016)	Likert-type seven-point
	02. Among the different options, I prefer to be an entrepreneur	AE_2		
	03. Being an entrepreneur would bring great satisfactions to me.	AE_3		
	04. A career as an entrepreneur is attractive to me	AE_4		
	05. Being an entrepreneur means more benefits for me	AE_5		
Perceived social norms	01.Family opinion/business creation	PSN_1	Boissin, et al (2017)	Likert-type seven-point scale
	02. Friends opinion/business creation	PSN_2		
	03. Teachers opinion/business creation	PSN_3		
	04.People who are important for you	PSN_4		

	opinion/business creation			
Perception of Entrepreneurial Capacity	01. Identify relevant market and customer information	PEC_1	Boissin, et al (2009)	Likert-type seven-point scale
	02. Identify relevant competitor information	PEC_2		
	03. Estimate project risks	PEC_3		
	04. Estimate the financial needs of the project	PEC_4		
	05. Obtain local funds (friends, family, etc.)	PEC_5		
	06. Attract shareholders	PEC_6		
	07. Obtain bank financing	PEC_7		
	08. Carry out the administrative formalities related to the creation of the organization	PEC_8		
	09. Find competent people and organizations to help you and advise you (administrative, legal, commercial, etc.)	PEC_9		
	10. Dedicate yourself body and soul to the project	PEC_10		
	11. Identify a product or service idea	PEC_11		
	12. Find competent people to work with you	PEC_12		
	13. Plan your creative process (know what you need to do and when)	PEC_13		
	14. People manager (coordinating and motivating other people)	PEC_14		
Entrepreneurship education	01. I feel great to be part of the entrepreneurship training and development courses offered by this University	EE_1	Adekiya and Ibrahim (2016)	Likert-type five-point scale
	02. This course is one of the best around here	EE_2		
	03. I have learnt so much from this course on entrepreneurship development	EE_3		
	04. With this course, my life will never be the same again.	EE_4		
	05. The course instructors does everything to ensure that knowledge is adequately disseminated to students	EE_5		
	06. This course has equipped me with the necessary skills and expertise to start my own business	EE_6		
	07. The introduction of entrepreneurship	EE_7		

	development courses in this University is highly commendable			
	08. Overall I am satisfied with the entrepreneurship development courses in this University	EE_8		
Green value co-creation	01. The provider lets the customer decide how he/she receives the service/product offering	GVCC_1	Albinsson et al. (2016)	Likert-type seven-point scale
	02. The customer has many options to choose how he/she experiences the service/ product offering	GVCC_2		
	03. It is easy for the customer to receive the service/product offering when, where, and how he/she wants it	GVCC_3		
Green innovation	01. The company chooses the materials of the product that produce the least amount of pollution for conducting the product development or design	GI_1	Song and Yu (2018)	Likert-type seven-point scale
	02. The company uses the fewest amount of materials to comprise the product for conducting the product development or design	GI_2		
	03. The company would circumspectly deliberate whether the product is easy to recycle, reuse, and decompose for conducting the product development or design	GI_3		
	04. The manufacturing process of the company reduces the consumption of water, electricity, coal, or oil	GI_4		
	05. The manufacturing process of the company effectively reduces the emission of hazardous substances or waste	GI_5		
	06. The manufacturing process of the company reduces the use of raw materials	GI_6		

3.3.Data collection

This research has selected a quantitative research design for data collection and analysis. Quantitative analysis allows to take a broader view, deal with large sample, enhance result

generalization, and give accurate results. The questionnaire technique can collect both close and open ended responses so it is most suitable data collection instrument of quantitative research, in this research it was applied an close ended questionnaire.

The questionnaire was initially developed through a review of the literature to find the articles that have the same variables of this research and also that it was applied an close ended questionnaire. The result were: Bachiri (2016), Boissin, et al (2017), Boissin, et al (2009), Adekiya and Ibrahim (2016), Albinsson et al. (2016) and Song and Yu (2018). After that, the questionnaire was constructed using the same questions and with their respective scale, followed by a double-checked validity of the questionnaire items with an entrepreneurship professor. Then the data was collected by applying the questionnaire in the sample.

4. Results

4.1.Data analysis

To test the conceptual model it was used structural equation modelling (SEM). More Specifically, the partial least squares (PLS), which is a variance-based structural equation modelling technique, by with the SmartPLS 4 Software. The analysis and interpretation of the results followed a two-stage approach. First, it was evaluated the reliability and validity of the measurement model and then assessed the structural model. Secondly, it was properly analysed the results.

4.2.Model quality

To assess the quality of the measurement model, it was examined the individual indicators of reliability, convergent validity, internal consistency reliability, and discriminant validity. The results showed that the standardized factor loadings of all items were above 0.08 (with a minimum value of 0.082), and some items were significant at $p < 0.001$, while others were not significant. Internal consistency reliability was confirmed because all the constructs' Cronbach alphas and composite reliability (CR) values surpassed the cut-off of 0.7 (See Table 2) (Hair et al., 2017).

Convergent validity was also confirmed for three key reasons. First, as noted before the items loaded positively and significantly on their respective constructs. Second, all items had CR values higher than 0.70 (Hair et al., 2017). Third, as Table 2 shows, the average variance extracted (AVE) for all constructs exceeded the threshold of 0.50 (Fornell & Larcker, 1981). The discriminant validity was assessed using two approaches. First, we used the Fornell and Larcker criterion. This criterion requires that a construct's square root of AVE (shown on the diagonal with bold values in Table 2) is larger than its biggest correlation with any construct (Fornell & Larcker, 1981). Table 2 shows that this criterion is satisfied for all constructs. Second, we used the heterotrait-monotrait ratio (HTMT) criterion (Hair et al., 2017; Henseler et al., 2015). As Table 2 shows, all items has HTMT ratios are below the more conservative threshold value of 0.85 (Henseler et al., 2015), with exception for the correlation between green innovation - green value co-creation and green value co-creation - perception of entrepreneurial capacity which passed in the first test of discriminant validity. As mentioned before, the sample size is of 71, the size of the sample has impact in the values meaning that a larger sample size tends to reduce sampling error and increase the precision of the result. (Iacobucci, 2010) The items below 0.85 indicate that the constructs are more related to their own items than to items from other constructs, and provide additional evidence of discriminant validity.

Table 2: Composite reliability, average variance extracted, correlations, and discriminant validity checks.

Latent Variables	α	CR	AVE	1	2	3	4	5	6
(1)Attitude towards Entrepreneurship	0,964	0,972	0,874	0.935	0.589	0.381	0.230	0.127	0.209
(2)Entrepreneurship education	0,937	0,947	0,691	0.552	0.831	0.568	0.800	0.509	0.426
(3) Green innovation	0,900	0,925	0,677	-0.378	-0.564	0.823	1.023	0.781	0.309
(4) Green value co-creation	0,719	0,842	0,642	-0.200	-0.708	0.817	0.801	1.015	0.531
(5) Perception of entrepreneurial capacity	0,949	0,958	0,636	-0.004	-0.522	0.712	0.869	0.798	0.436
(6) Perceived social norms	0,858	0,904	0,704	0.208	0.413	-0.278	-0.438	-0.389	0.839

Note: α – Cronbach Alpha, CR – Composite reliability, AVE- Average variance extracted. Bolded numbers are the square roots of AVE. Below the diagonal elements are the correlations between the constructs. Above the diagonal elements are the HTMT ratios.

The structural model was assessed using the sign, magnitude, and significance of the structural path coefficients, the magnitude of R^2 value for each endogenous variable as a measure of the model’s predictive accuracy (Hair et al., 2017). However, it was checked for collinearity before evaluating the structural model (Hair et al., 2017). All the VIF values ranged from 1.00 to 6,432, which was below the indicative critical value of 10 (Craney & Surles, 2002). The coefficient of the determination R^2 for the two endogenous variables of green value co-creation and green innovation were 84.5% and 76.7%, respectively. These values surpassed the threshold value of 10% (Falk & Miller, 1992). It was used used bootstrapping with 5,000 subsamples to evaluate the significance of the parameter estimates (Hair et al., 2017).

Table 3: Structural model assessment.

Path	Path coefficient	Standard errors	<i>t</i> statistics	<i>p</i> values
Attitude towards Entrepreneurship → Green innovation	-0,398	0,161	2,470	0,014
Attitude towards Entrepreneurship → Green value co-creation	-0,005	0,108	0,043	0,966
Entrepreneurship education → Green innovation	0,299	0,176	1,704	0,088
Entrepreneurship education → Green value co-creation	-0,336	0,135	2,483	0,013
Green value co-creation → Green innovation	0,852	0,267	3,197	0,001
Perception of entrepreneurial capacity → Green innovation	0,173	0,273	0,636	0,525
Perception of entrepreneurial capacity → Green value co-creation	0,680	0,092	7,425	0,000
Perceived social norms → Green innovation	0,122	0,138	0,886	0,376
Perceived social norms → Green value co-creation	-0,034	0,090	0,374	0,708

Table 4: Bootstrap results for indirect effects.

Indirect effect	Estimate	Standard errors	<i>t</i> statistics	<i>p</i> values
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Attitude towards Entrepreneurship → Green value co-creation → Green innovation	-0,004	0,097	0,041	0,968
Perceived social norms → Green value co-creation → Green innovation	-0,029	0,080	0,356	0,722
Entrepreneurship education → Green value co-creation → Green innovation	-0,286	0,153	1,865	0,062
Perception of entrepreneurial capacity → Green value co-creation → Green innovation	0,580	0,213	2,727	0,006

4.3.Hypotheses test

The results of the hypothesis show that not all paths were significant and acceptable (see Table 3). The results show that attitude towards entrepreneurship has a negative effect on green value co-creation ($\beta = -0,005$, n.s.) and significantly negative effect on green innovation ($\beta = -0,398$, $p < 0.05$), thus H1a and H1b are denied and the results of H1b means that 1% increase attitude towards entrepreneurship can decrease 0.398% in green innovation. Perceived social norms has a negative effect on green value co-creation ($\beta = -0,034$, n.s.) and a positive effect in green innovation ($\beta = 0,122$, n.s.), thus H2a and H2b are denied. Perception of entrepreneurial capacity positive effect on green value co-creation ($\beta = 0,680$, $p < 0.0001$) and positive effect on green innovation ($\beta = 0,173$, n.s.), thus H3a is accepted and H3b is denied. This means that 1% improvement in perception of entrepreneurial capacity will enhance a 0.680% increase in green value co-creation. Entrepreneurship education is negatively associated with green value co-creation ($\beta = -0,336$, $p < 0.05$) and positive effect in green innovation ($\beta = 0,299$, n.s.) H4a and H4b are denied. This means that 1% increase entrepreneurship education can decrease 0.336 % in green value co-creation. Green value co-creation is positively and significantly associated with green innovation ($\beta = 0.680$, $p < 0.0001$), and H5 is accepted, this means that 1% positive change in green value co-creation can increase 0.680% in green innovation.

To test the mediation hypotheses (H1c, H2c, H3c, H4c), it was followed the recommendations of Hair et al.(2017; p. 232). Thus, it was used a bootstrapping procedure to test the significance of the indirect effects via the mediator (Preacher & Hayes, 2008). Table 4 presents the results of the mediation effects.

The indirect effects of perception of entrepreneurial capacity on green innovation via the mediator of green value co-creation are significant with ($\beta = 0,580$; $p < 0,01$), this result provide support for the mediation hypotheses H3c.

In the other side, the indirect effects of attitude towards entrepreneurship, perceived social norms and entrepreneurship education on green innovation via the mediator of green value co-creation are not significant with ($\beta = -0,004$; n.s.), ($\beta = -0,029$; n.s.) and ($\beta = -0,286$; n.s.), respectively. These results denied the mediation hypotheses for H1c, H2c and H4c, respectively.

5. Discussion

The overarching goal of this study is to explore and analyze the mechanisms through which SMEs can foster green innovation by engaging in green value co-creation. By investigating green value co-creation, the study aims to uncover how SMEs can effectively engage with stakeholders and leverage these collaborative efforts to foster green innovation. The researchers seek to understand the factors that influence the success of such collaborations and how they contribute to the development and adoption of sustainable practices and innovations within the SME context. By understanding this process better, the research intent to provide insights and recommendations for businesses, policymakers, and other stakeholders interested in promoting sustainable practices and environmental initiatives within SMEs. The research focuses on four specific factors: attitudes towards entrepreneurship, perceived social norms, perceived entrepreneurial capacity, and entrepreneurship education. The investigation aims to contribute to the field by uncovering how these factors interact and influence the creation and adoption of green innovations in the entrepreneurial context. This study developed a model for SMEs based on five hypotheses.

The first subsection analyzes the importance of attitudes towards entrepreneurship in driving green value co-creation and its indirect effect on green innovation. Surprisingly, the results indicate that a positive attitude towards entrepreneurship has an insignificant impact on green value co-creation and a counterintuitive negative impact on green innovation, this means that the increase on attitude towards entrepreneurship decreases the green innovation and the other way around. This finding raises interesting questions about the role of knowledge and awareness in driving green innovation. The study highlights the potential hurdle posed by a lack of understanding of the benefits and opportunities associated with green innovation among

entrepreneurs. To support this insight, Wang et al. (2022) confirm that knowledge mediates the relationship between green innovation and green entrepreneurial orientation, a concept closely related to attitude towards entrepreneurship. This means that the lack of knowledge apparently is an important factor on attitude towards entrepreneurship, and it can cause the decrease in green innovation as the entrepreneurs may be less informed about the potential benefits and opportunities associated with green innovation. And also, they might not be aware of the positive environmental and economic impacts of adopting sustainable practices or lack the necessary knowledge to implement them effectively.

The second subsection delves into the effects of perceived social norms on green value co-creation and green innovation, the results demonstrate that it has no effect on green value co-creation, on green innovation and also no indirect effect on green innovation mediated by green value co-creation. These findings goes in line with Dao et al (2021) and Krueger et al (2000) that subjective norms had the least impact on conventional entrepreneurial intentions. This suggests that while perceived social norms may play a role in shaping general attitudes and behaviors, they may not be as influential in guiding SMEs' specific engagement in green value co-creation activities or their development of green innovations. This alludes to the SMEs' decisions regarding green innovation and value co-creation are influenced by factors beyond perceived social norms. Other factors, such as perceived entrepreneurial capacity and attitudes towards entrepreneurship, may have more substantial impacts on driving sustainable practices and innovations within SMEs.

The third objective is to comprove the effects of perceived entrepreneurial capacity. The results indicates that it has a positve effect on green value co-creation and indirect effects of on green innovation via the mediator of green value co-creation. But the effect of perceived entrepreneurial capacity on green innovation, is insignificant. These results goes in line with the literature and support the positive link between perceived entrepreneurial capacity and green value co-creation comproved by other researchers, such as by Schaltegger et al (2016), which found that entrepreneurs with a higher perceived entrepreneurial capacity were more likely to engage in sustainability-oriented activities. This suggests that individuals with entrepreneurial beliefs are more inclined to contribute to green value co-creation.

Also, the research by Dangelico and Pujari (2010) highlighted the role of entrepreneurial orientation in fostering environmental innovation. They argued that entrepreneurial individuals

are more likely to pursue innovative solutions that contribute to environmental sustainability. This aligns with the concept of green value co-creation, where stakeholders collaborate to create sustainable value. And the concept of sustainability-oriented entrepreneurship, as discussed by Zahra et al (2009), emphasizes the importance of entrepreneurial capacity in driving environmental initiatives. Entrepreneurs who possess a higher perceived entrepreneurial capacity are more likely to engage in activities that promote sustainability and co-create green value. Build on these researchs with the results, and considering that the most relevant question among the variables it was PEC_8, which evaluate the perception of the entrepreneur to “Carry out the administrative formalities related to the creation of the organization”, this findings suggests that using this variable as a focal point in entrepreneurship programs or support initiatives, program developers can address potential challenges that entrepreneurs may face during the early stages of starting a business and enhance entrepreneurs' abilities to deal with administrative tasks, thereby potentially improving the overall success rate of new business ventures.

About indirect effects of perceived entrepreneurial capacity, it occur when the relationship between perceived entrepreneurial capacity and green innovation is mediated or influenced by green value co-creation. In other words, green value co-creation acts as a bridge or intermediary variable that links the entrepreneur's perception of their capacity with the actual development and implementation of green innovations. When perceived entrepreneurial capacity influences green value co-creation, and in turn, green value co-creation impacts green innovation, it establishes an indirect relationship between perceived entrepreneurial capacity and green innovation. In this pathway, the entrepreneur's belief in their own capacity indirectly affects their ability to drive green innovation by shaping their engagement in value co-creation activities. This results goes in line with Yousaf (2021), which comproves the mediating role of green value co-creation between green practices and green innovation. The study further emphasizes that green value co-creation is connected through the behavior of entrepreneurs. This study complements by demonstrating that belief in the entrepreneurial abilities influences the active engagement in green value co-creation, which in turn impacts their capacity to drive green innovation indirectly. This insight highlights the importance of collaborative efforts and entrepreneurial confidence in fostering sustainable practices and innovations in the context of SMEs.

The fourth subsection explores the impact of entrepreneurship education on green value co-creation and green innovation. Surprisingly, the study finds a negative effect of entrepreneurship

education on green value co-creation, challenging the Theory of Planned Behavior (Ajzen, 1991). This result contradicts the expected positive relationship between entrepreneurship education and sustainable entrepreneurial intentions and it suggests that a more suitable model should be use the the linkage between entrepreneurship and green value co-creation. Between the possibilities, this result maybe due a more realistic view by entrepreneurs, a lack of specific knowledge, a counter-cyclical pattern or even a pro-cyclical pattern. As this result goes in line with Oosterbeek et al (2010), that proves the entrepreneurship education effect on the intention to become an entrepreneur is even negative. The negative impact of entrepreneurship education on the green value co-creation can be due a more realistic view (Oosterbeek et al, 2010) or even to the lack of specific knowledge of what is needed to start an own business (Kourilsky & Walstad, 1998).

To understand the counter-cyclical pattern, the research considers the context of necessity-driven entrepreneurship, particularly relevant in economies with high unemployment rates. Necessity entrepreneurship (NE) “describes the process of venturing a business out of need when alternative options are seemingly absent” (Weber, 2022), this means that necessity entrepreneurship refers to starting a business out of necessity or desperation, rather than out of choice or opportunity. It is the opposite of opportunity entrepreneurship, which refers to starting a business to pursue a perceived opportunity or to take advantage of a gap or need in the market (Fairlie & Fossen, 2020). The necessity entrepreneurship typically occurs when individuals lack viable alternatives for generating income, such as when they are unemployed, underemployed, or facing economic hardships, this can be linked with the economic environment where the sample of this study was taken, Portugal. The country's unemployment rate is still relatively high, particularly among young people, as in 2021 the youth unemployment rate was 23,42% (Statista, 2023) and it goes line with the age of the sample: 14,7% were between 16 to 30 years old, 67,6% were between 31 to 55. Indicating there are still several areas where Portugal needs to make more progress to achieve the SDGs.

However, in recent years, Portugal has made significant progress in reducing poverty and inequality, increasing access to education and healthcare, and promoting gender equality. The country's economy has also been growing steadily, with a focus on innovation and entrepreneurship, as can be seen in 2022 the increase in SDG8 - Decent Work and Economic Growth and SDG9 - Industry, Innovation and Infrastructure (Sustainable Development Report, 2022). The countries which invest more efforts to consolidate their economic factors increase

their sustainable entrepreneurship. In prosperous economies, people are encouraged to become their own bosses by - the pro-cyclical - opportunity entrepreneurship. Therefore the entrepreneurship is strengthened, and they take advantage of economic strength to enhance their ventures (Moya-Clemente et al, 2020), this means that the results can be a indicative of a opportunity entrepreneurship, where the sustainable entrepreneurship lead to innovative solutions.

The fifth subsection examines the positive link between green value co-creation and green innovation. Drawing on Schiederig et al (2012) work, the research emphasizes the significance of engaging stakeholders in the innovation process for achieving sustainable and environmentally friendly outcomes. This correlation is based on the understanding that through the collaborative process of value co-creation, entrepreneurs are able to gain valuable insights, ideas, and resources from stakeholders. This input facilitates the development of green innovations by enabling entrepreneurs to tap into a broader knowledge base, receive feedback on their ideas, and integrate sustainable practices into their products or services. Thus, by involving stakeholders who have diverse perspectives and expertise, entrepreneurs can leverage their knowledge and insights to identify opportunities for green innovation and this collaborative approach facilitates the development of green innovations, aligning with the findings of previous researchers in the field.

6. Conclusion

6.1.Theoretical contributions/implications

This study contributes to the theory in several ways. First, this study examines the Green value co-creation by the optic of entrepreneurship from two diferents perspectives: as a factor that impacts but also it is impacted. The impact it is on green innovation and the factors that impacted are from the theory of planned behavior (TPB), plus the entrepreneurship education. Additionally, the study evaluates this theoretical model within the context of the Portuguese Beauty & Personal Care sector, specifically focusing on small and medium-sized enterprises (SMEs). By investigating these factors, this research aims to shed light on the field and provide insights for sustainable solutions.

First, this study contributes to the theory by considering entrepreneurship as a factor that impacts and is impacted by green value co-creation. The impact of entrepreneurship is observed in the context of green innovation, which refers to the development and implementation of environmentally friendly practices. The Theory of Planned Behavior (TPB) is employed as a framework for understanding human attitudes and behaviors. By applying TPB to the concept of Green value co-creation, this study expands the understanding of the factors influencing green innovation. The research highlights that entrepreneurship education, along with TPB, plays a vital role in encouraging individuals to adopt positive social and environmental behaviors within a business organization.

The study further suggests that planned behavior has both direct and indirect effects on green innovation. It asserts that planned behavior can introduce green innovation by responding to stakeholder pressure and facilitating green value co-creation. This finding reinforces the significance of incorporating planned behavior strategies in promoting sustainable practices within organizations.

Second, this study contributes to the existing literature by confirming the role of green value co-creation as an antecedent of green innovation (Yousaf, 2021). The concept of green value co-creation refers to the collaborative efforts of various stakeholders in creating environmental value within a business context. By exploring the relationship between green value co-creation and green innovation, this research validates previous findings and provides additional empirical evidence. The study emphasizes that fostering green value co-creation can positively influence the development and implementation of environmentally friendly innovations, supporting the goal of sustainability.

Third, another significant contribution of this study is its evaluation of the proposed model within the Portuguese Beauty & Personal Care sector, with a specific focus on SMEs. This sector-specific analysis provides valuable insights into the challenges and opportunities of integrating green value co-creation and green innovation in a particular industry. By examining SMEs, the study recognizes the importance of understanding the dynamics of smaller businesses in achieving sustainability goals. The findings of this research can contribute to a better understanding of the field and offer practical solutions to enhance sustainability within the Portuguese Beauty & Personal Care sector.

In conclusion, this study makes several contributions to the existing theory. It expands the understanding of green value co-creation and entrepreneurship by investigating their reciprocal impact, emphasizing the role of entrepreneurship education and the Theory of Planned Behavior.

The research confirms the significance of green value co-creation as an antecedent of green innovation. Additionally, the sector-specific evaluation within the Portuguese Beauty & Personal Care sector provides valuable insights for sustainable practices in SMEs. Overall, this study contributes to the existing literature by advancing the understanding of green entrepreneurship and providing practical implications for achieving sustainability in the Beauty & Personal Care industry and beyond.

6.2. Managerial implications

This research has useful implications for managers. It examines the concept of green value co-creation from the perspective of entrepreneurship and explores its impact on green innovation. The study also investigates the factors that influence green value co-creation, including attitude towards entrepreneurship, perceived social norms, perception of entrepreneurial capacity, and entrepreneurship education. By studying these relationships, the research expands the understanding of how entrepreneurship and entrepreneurial characteristics can drive green innovation.

The findings of the study reveal some interesting results. First, the study shows that attitude towards entrepreneurship has no significant direct impact on green value co-creation or green innovation. However, it is found that attitude towards entrepreneurship has a negative indirect impact on green innovation through the mediator of green value co-creation. This implies that an increase in attitude towards entrepreneurship decreases green innovation, possibly due to a lack of knowledge about the potential benefits and opportunities associated with green innovation. Thus, it is recommendable to develop initiatives to provide entrepreneurs with knowledge and resources on sustainable practices and their positive environmental and economic impacts.

Second, this study demonstrates that perceived entrepreneurial capacity has a positive and significant effect on green value co-creation. However, it does not have a significant direct impact on green innovation. This suggests that individuals who perceive themselves as having higher entrepreneurial capacity are more likely to engage in value co-creation activities related to sustainability. However, the indirect effect of perceived entrepreneurial capacity on green

innovation through green value co-creation is significant. Thus, it is highly recommendable to foster collaborations between established green entrepreneurs and aspiring entrepreneurs to share experiences, knowledge, and resources, thereby strengthening perceived entrepreneurial capacity.

Third, the study shows that entrepreneurship education has negative effects on green value co-creation. These findings contradict the Theory of Planned Behavior, which suggests that entrepreneurship education should have a positive impact on entrepreneurial intentions. The negative association between entrepreneurship education and green value co-creation may be attributed to a more realistic view gained through education or a lack of specific knowledge about starting a business. These results give insights to evaluate and update entrepreneurship education curricula to incorporate modules on green innovation and sustainability and/or support entrepreneurship education initiatives that focus on practical knowledge and skills needed to start and operate green businesses.

Finally, the study confirms the positive link between green value co-creation and green innovation. When entrepreneurs engage in value co-creation with stakeholders, they can access diverse perspectives, ideas, and resources that contribute to the development of sustainable and environmentally friendly innovations. The collaborative process of value co-creation enables entrepreneurs to tap into a broader knowledge base, receive feedback, and integrate sustainable practices into their products or services. Thus, it is appropriate to provide financial incentives or grants for entrepreneurs engaged in green value co-creation and developing sustainable innovations. Also, to encourage the inclusion of stakeholders in the innovation process by fostering open dialogue, consultation, and involvement in decision-making related to green innovation.

By implementing these policy-making ideas, public/local decision-makers can create an environment that supports entrepreneurs in developing their perceived entrepreneurial capacity, fosters collaboration and value co-creation, and promotes green innovation. These measures will contribute to the growth of sustainable businesses, the adoption of environmentally friendly practices, and the achievement of environmental and economic goals.

6.3.Limitations and future/further research

The study has a some limitations that should be taken into consideration. Firstly, the sample size, with only 71 SMEs from the Beauty & Personal Care sector in Portugal, it can be considered small sample. Although efforts were made to ensure the sample was representative, this sample size had impact in the results and a larger sample size tends to reduce sampling error and increase the precision of the results. Thus in future research, it would be advantageous to include a larger sample size to increase the validity of the study.

Also, future investigations could compare the findings from the Portuguese SMEs with those from SMEs in other countries or regions. This comparative analysis would help identify potential variations or similarities in the factors influencing green innovation and entrepreneurship within the Beauty & Personal Care industry and it will be helpful to further enhance the understanding of this sector.

Another suggestion for future research is to adopt a longitudinal approach. Instead of a cross-sectional design, a longitudinal study would track changes in attitudes, social norms, entrepreneurial capacity, entrepreneurship education, green value co-creation, and green innovation over time. This would provide insights into the dynamics and potential causal relationships between these variables.

In addition to quantitative research, incorporating qualitative methods such as interviews or focus groups would enrich the understanding of the motivations, challenges, and experiences of SMEs in the Beauty & Personal Care sector regarding green innovation and entrepreneurship. A mixed methods approach can provide a deeper and more comprehensive understanding of the subject matter.

To capture a more holistic view of the factors influencing green innovation and entrepreneurship in the Beauty & Personal Care sector, future studies could consider including additional variables. Factors such as government policies, access to finance, market demand, and industry-specific characteristics could be explored to provide a more comprehensive context for SME operations.

Finally, conducting a analysis with macro-level factors would contribute to a better understanding. As by considering both industry trends and regulatory frameworks in the analysis, a more comprehensive understanding of the complex dynamics of the Beauty & Personal Care sector can be obtained.

By addressing these limitations and incorporating the suggestions for future research, we can further advance our understanding of green value co-creation, green innovation and entrepreneurship in the Beauty & Personal Care sector and contribute to the development of more effective strategies and policies in this area.

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