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New connections between brand and environmentally sustainable businesses in the Amazon forest and local business owner's perception

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Abstract

The debate surrounding entrepreneurship in the Amazon rainforest region highlights the importance of sustainable actions developed by local brands. However, limited attention has been given to entrepreneur's perspectives regarding the outcome of their applied practices. The objective of this study was to understand the entrepreneurs' perception based on their business models concerning the connection to the Amazon brand and the aspects of sustainable use of its natural resources. The study was performed through semi-structured interviews with seven Amazonian product brands entrepreneurs utilizing Grounded Theory. The results demonstrate that entrepreneurs understand that reaching the social dimension relies on the articulation of three main factors: entrepreneurs, the native people, and the shared traditional knowledge and culture. It is observed that the political dimension is still underdeveloped in the region with limited application of its effects on products. Additionally, the economic dimension is not significantly favored by the utilization of environmentally sustainable brands. Lastly, the territorial dimension depends on the establishment of permanent protection areas, as well as agroforestry systems.

Keywords Brand, Environmental sustainability, Marketing, Entrepreneur behavior, Traditional communities

Introduction

The conservation of the Amazon rainforest is crucial for the planet, as it is home to over half of the world's tropical forests and a quarter of its fauna. Particularly for Brazil, the Amazon rainforest holds even greater importance, as it plays a vital role in the hydrological cycle, supplying

aquifers to both local and more industrialized regions of South America [31, 75, 101]. Despite a drop in deforestation in the region between 2004 and 2012 due to federal control efforts [10], there was an unprecedented increase in 2015 and 2016. Concurrently, Brazil is facing its largest economic crisis in recent history and a severe political crisis, lacking research funds that could propose plausible solutions to mitigate the already perceived impacts [62]. One way to reduce such impact is through environmentally sustainable entrepreneurship in the region.

Entrepreneurship entails doing something new, different, and changing the current *status quo*, while relentless seeking new negotiations possibilities, focusing on innovation and value creation [89]. Additionally, Leite and Dias [44] depict entrepreneurship as a set of concepts,

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methods, instruments, and practices related to the creation, implementation, and management of new companies or organizations. Examining such concepts, an entrepreneurial company can be understood as an environment constantly seeking solutions to its weaknesses and threats in the surroundings, identifying advantages and opportunities within the constant changes of socio-economic development [84], generating value through the adoption of new technologies and processes identified according to the observed needs [16, 61, 96].

The relationship between entrepreneurs and local communities is particularly relevant for the Amazon region, the largest remaining contiguous rainforest that is home to over than 50 million people. It includes approximately 180 indigenous communities with a population of approximately 440,000 indigenous peoples, 1,000 quilombola communities and other traditional peoples such as *piçabeiros*, fishermen, and açai harvester, among others [9].

It is well known that global forest ownership is impacted by changes in population habits [87]. Given the spatial extent of unprotected forests, it is imperative to find management approaches that sustain their multiple environmental, economic, and cultural values and prevent their conversion to other uses [45].

Entrepreneurial companies must consider sustainability as a business activity, shedding light on the discussion regarding the stigma that businesses are often seen as the primary generators of environmental and social strains, hence the source of the lack of sustainable action in society [79]. Notwithstanding, while this view tends to overestimate the possibility for companies to solely pursue exploitative practices, this assumption underestimates and distorts the role of businesses in developing their operations within an ecosystem of organizations aiming to support social and environmental entrepreneurship [27], creating a distorted image about entrepreneurship in the context of promoting sustainability [5].

Entrepreneurship can also emerge as a mediating agent in promoting sustainable rural development [48]. When discussing public policy agendas that foster new enterprises, there is an opportunity to address environmental conservation and agricultural production flows before implementing planned activities. Then entrepreneurship becomes an agent of resignification of once traditional methods, converting them into environmental and socially less impact on products and services [78], fostering new forms of promotion or thinking between social activities and environmental resources [36]. It's important to understand that to grasp the concept of sustainability, a systemic perspective is necessary, encompassing various dimensions, including the economic, socio-cultural, political-institutional, and consumption habits.¹

In this regard, it is essential to understand how entrepreneurship adopts and implements strategies to achieve sustainability, in other words, to have sustainable entrepreneurship [34]. Sustainable entrepreneurship occurs by developing new businesses focused on consumer transition activities related to concern for well-being and recognizing the need to operate within the planet's ecological limitations [54].

The contribution of entrepreneurship to raising awareness of conscious consumption habits is a widely discussed issue [67], which is closely linked to consumers behavior and industrial production. Understanding actions that promote more conscious consumption contributes to the emergence of more sustainable business management plans by introducing anti-predatory innovations that meet consumers specific demands while consciously and sustainably dealing with self-sufficiency without depleting natural resources. Meeting the needs of the present without compromising the capacity of future generations of meeting their demands.

A push to change patterns of consuming environmental resources relies on substantial adjustments throughout the entire process of production and commercial promotion of products [85]. Marketing strategies serve as a mediator toward this objective [35], as the performance of marketing strategy takes into account disruptive social impacts, a dependent variable on managerial feedback [2]. In order to develop social intervention to raise awareness about the needs for sustainable consumption, brands can become activists for the environment cause by mobilizing debates around a political issue, promoting these discussions that legitimize emerging business practices [38].

Consumers tend to purchase brands² or products whose image matches their ethical and moral principles, which is a significant factor in forming an emotional and sentimental relationship between a consumer and a brand [47]. In this context, the brand should be understood as the main asset for shaping consumer perception, encompassing labels, symbols and descriptions, and perceptions that involve meanings and associations, resulting in a flexible contract with the customer regarding the execution of the product or service [53, 74]. These attributes are designed to create identity

¹ According to Sachs, [72] sustainable development is only effective when it considers all dimensions: ecological, economic, social, cultural, psychological, territorial, national, and international politics, simultaneously.

² According to Aaker, [1] Brand equity is a set of assets and liabilities for a brand or its linked name, which represents a symbol of a product or subtraction for a company and/or customers. The assets and liabilities are: brand loyalty, brand positioning, perceived quality, brand associations beyond quality and other brand assets (brands, relationships through other channels).

awareness and build the reputation of a product, service, person, place, or organization [73]. Consequently, the brand becomes both a vital tangible and intangible asset for its bearer, determining the extent to which consumers accept the product of the brand's endorsing company, significantly impacting its commercial performance [88]. To become a valuable asset in raising awareness of sustainable consumption, business management seeking a strategic positioning focused on sustainability must adopt a well-defined positioning. This Brand Equity can be achieved through a sustainability-focus branding plan, enabling the company to remain competitive and environmentally responsible without sacrificing profitability or commercial performance with its products or services [102].

The role of entrepreneurs is often emphasized in discussions of sustainable development [43]. One example is the United Nations (UN) initiative "Supporting Entrepreneurs for Sustainable Development" [81]. However, for those who already have established economic activity, transitioning from the exploratory stage to a sustainable stage proves to be challenging [32]. At this entrepreneurial stage, most already consolidated companies tend to loosen up these procedures after achieving the maturity in terms of perceived performance in profits, sales, and customer satisfaction, but not in sustainability [33]. In other words, this transition presents a significant challenge for companies in developing countries when it comes to building a sustainable-based brand. Many companies, especially small and medium-sized ones, operating in less populated or rural areas, decline or liquidate their management plans when they reach maturity and entering in the competitive market, which could pay lower attention to environmental sustainability subjects [21].

Traditionally, strategies for environmental sustainability in companies have primarily focused on the demand side. Control over material resources and financial progress has been measured using business-related metrics, such as profitability, revenue generation, and income. However, one way to understand the effective attitudes towards transitioning to environmental sustainability, it is important to consider the entrepreneurial personality traits that mediate the relationship between entrepreneurial motivations and the commitment to environmental sustainability [33].

Prior to implementing business modifications and establishing new prices for its products/services, companies need to carefully consider their branding strategy [20]. Specifically, companies should assess how their brand directly aligns with customer's perception of the company. This includes corporate branding efforts that address consumers' ethical and moral values [17]. The

marketing and branding sectors have focused on shaping the mental images associated with brands, which influence consumer behavior and increase their willingness to purchase products [80].

Brands have increasingly become the core dimension and most important strategic Marketing asset for organizations across all industries, and many companies now incorporate various forms of green marketing activities as part of their strategies [60, 65]. Making branding decision-using innovative approaches often requires extensive research and is time-consuming, making it challenging for researchers to interpret and limited by entrepreneurs' empirical knowledge, which is gained through trial and error over time [77]. To gain a better understanding of this knowledge, it is necessary to examine the current scenario of the management technologies, particularly those related to brand marketing and environmental sustainability. By doing so, more strategic decisions can be made to engage new entrepreneurs in effective environment sustainability [49]. Acquiring this knowledge significantly impacts all areas of the business, directly influences its competitive capacity. However, this topic remains underexplored in academic literature, particularly in relation to promoting environmental sustainability in forest environments.

The objective of this study was to understand the entrepreneurs' perception based on their business models concerning the connection to the Amazon brand and the aspects of sustainable use of its natural resources.

Background

Human consumption activities have detrimental effects on nature throughout various processes, often causing irreversible damage. The associated risks and harms highlight the need for a business policy that prioritizes sustainability [50]. Sustainable practices aim to utilize natural resources in a cyclical manner, minimizing interference with the environment. Respecting the environment is crucial, particularly in industries where raw materials and energy resources are extracted from nature, which is limited and requires restoration to ensure long-term sustainability [11].

To mitigate environmental damage without compromising financial viability, many companies, especially those reliant on forest resources, have implemented Corporate Social Responsibility (CSR) policies centered on environmental sustainability [57]. These policies are closely tied to practices that leverage natural landscapes without causing harm. By actively promoting such initiatives, companies enhance their competitiveness and reputation [95]. However, implementing CSR policies depends on resources that often bring about modifications in production, business process, impacting product

cost and the profitability. To address these challenges, companies have invested in building brands that cater for environmentally conscious consumers [40].

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Brands have increasingly become the core dimension and most important strategic Marketing asset for organizations across all industries, and many companies now incorporate various forms of green marketing activities as part of their strategies [60, 65]. Making branding decision-using innovative approaches often requires extensive research and is time-consuming, making it challenging for researchers to interpret and limited by entrepreneurs' empirical knowledge, which is gained through trial and error over time [77]. To gain a better understanding of this knowledge, it is necessary to examine the current scenario of the management technologies, particularly those related to brand marketing and environmental sustainability. By doing so, more strategic decisions can be made to engage new entrepreneurs in effective environment sustainability [49]. Acquiring this knowledge significantly impacts all areas of the business, directly influences its competitive capacity. However, this topic remains underexplored in academic literature, particularly in relation to promoting environmental sustainability in a forest environment.

Small companies that present lack of capacity to invest in Research and Development (R&D), a decline in competitiveness has been observed over the years, primarily due to changes in consumer behavior and needs [103]. Hence, examining brands that already implement sustainable policies within their organizations, it becomes advantageous to explore the insights and experiences of established entrepreneurs regarding decision-making processes at the branding level. By sharing this knowledge, new entrepreneurs can optimize their time and efforts.

Therefore, conducting research that analyzes and develops an effective model for guiding brand development based on the knowledge and opinions of entrepreneurs who already prioritize corporate social responsibility, will identify key indicators that contribute to successful positioning strategies and, consequently, effective sales reach. These findings can also inspire future scientific

and technological advancements that can positively impact the field, by anticipating potential issues related to the acceptance of environmental sustainable products. Furthermore, this research can enable responsible development practices that do not harm existing forest environments, thereby promoting sustainable growth and benefiting local communities.

Methods

Search context

The present study aims to establish an empirically grounded model as an assumption to explain how entrepreneurs interpret the dimensions of sustainable development and the relationship with the Amazon region. To achieve this objective a Data-based theory was employed [91, 92], which is particularly suitable for qualitative exploratory studies and is often used to study sociotechnical behaviors in emerging research domains [19]. This method performs the following phases: (i organization of the analysis; (ii open coding; (iii axial coding; (iv selective coding and (v theory delimitation.

As the data source, interviews were conducted with entrepreneurs from 7 (seven) brands of Amazonian products who have developed their products with a focus on forest sustainability. The study specifically focused on 6 socially productive chains in the region: tourism, gastronomy, biotechnology, agroforestry systems, non-timber forest products and sustainable fashion.

Organization phase

Interview script development

A structured interview script was prepared for the study (Appendix 1). The interviews with brand owners were conducted via video calls from February 15th, 2022 to June 16th, 2022. The initial instrument is based on the dimensions of sustainability proposed by Sachs [72], which include as follows: economic (source of raw materials, products, etc.), social (gender equality in numbers, awareness of local communities, etc.), and environmental (reduction of packaging, reduction of CO₂ emissions, etc.). Adjustments were made based on the *Triple bottom line* questionnaire proposed by Postel et al. [64]. Cultural, ecological, territorial, political (nationwide), and political (internationally) dimensions were evaluated using adaptations of the questionnaire proposed by Grigorescu et al. [26].

To comply with ethical principles in research involving human subjects, the study was submitted to the Research Ethics Committee under the code CAAE: 55,999,722.1.0000.5546, in accordance with Resolution 466/2012 of the National Health Council. Participants who agreed to participate in the study were informed about the objectives, data collection procedures, and the

information contained in the Free and Informed Consent Term (FICT). Ensuring the ethical integrity of the research, interviews were conducted with the participants who provided their consent and these interviews were then identified, recorded and transcribed.

The cross-cultural adaptation of the initial instrument involved three phases. In the first phase, two independent translators performed the translation of the original device, and the most appropriate translation for each item was selected. After this, the second phase involved used the Content Validity Coefficient (CVC) method. This technique included seeking consensus among a panel of judges who were professionally actively involved in the research area [29].

In the third phase, a back-translation was conducted, which was validated by the translators fluent in the native language. This step was conducted in order to verify if the newly proposed questionnaire was aligned with the original objectives. The final interview script consisted of 22 (twenty-two) questions addressing the 8 dimensions of sustainable development proposed by Sachs [72]. The interviews, on average, lasted 30 to 45 min.

Grounded theory

For data analysis, the *grounded theory approach* was adapted to align with the goal of the study. This approach consists of four steps: open coding, axial coding, selective coding, and theory delimitation [24, 51].

Open coding

During the open coding phase (ii), the process of comparing the textual occurrences of the questionnaires was initiated. A data analysis was conducted using R software with the IRaMuTeQ package. The package facilitates the analysis of the speech structures and organization within the textual corpus, enabling the identification of relationships between frequently occurring utterances [6]. In this research, each obtained answer from the interviewees was considered an Initial Context Unit (ICU). Each text set was composed of an ICU, allowing for a granular analysis of the data.

The axial coding phase (ii) utilized the Descending Hierarchical Classification (DHC) method, which involved classifying text segments based on their vocabularies, resulting in structuring lexical classes³ within the analyzed contexts [90].

During the analysis, CHD generated a dendrogram displaying the groupings, with word associations determined by the χ^2 statistics. Words with a χ^2 value less

than 3.80 ($p < 0.05$) were not considered as significant. Terms classified as nouns, adjectives, and verbs were included while other sets and terms present in the texts segments were excluded from the DHC process.

The lexical classes obtained in this phase served as constructor codes for the guide. Additionally, a similarity analysis was conducted to identify occurrences and connections between words, providing insights into their interconnectedness. This analysis facilitated the identification of the main codes that guided the entrepreneurs' perception of environmental sustainability in the Amazon Rainforest.

Selective encoding

The selective coding phase (iv) focused on the development of the code guide. The classes that emerged from the DHC were initially used for the development of the code clusters. Each class was individually analyzed by three researchers before considering all transcripts as a complete dataset. The interviews were coded and memorized by each member of the research team. Initially, the work encompassed five codes corresponding to the classes identified throughout DHC. However, as the researchers analyzed the first transcripts, they discovered an increasing number of new codes. These newly identified codes were interchangeably assigned to the transcripts and memos by each team member. Interactive manipulation was employed to enhance interaction and improve the quality and rigor of the analysis [3, 7]. Throughout each round of interactive discussion, researchers engaged in comprehensive conversations to reach a broad understanding and consensus regarding accepted codes, as well as those classified as emerging. Discrepant codes were eliminated using core category identification [15].

At the end of the meetings, the emerging codes guided the collection and analysis of new codes, along with subsequent memos. This interactive process continued until all previously defined ICUs and clusters were completed. The resulting guide at the end of the selective coding phase served to refine the obtained results in the analyses of the coding phase and formed the basis for the theory delimitation phase. Ultimately, the researchers consolidated these categories into unified themes, throughout an interactive consolidation process facilitated the reconciliation of themes with the 8 dimensions of sustainability, enhancing the overall analysis.

Theoretical delimitation

The theory delimitation phase (v) was conducted using the guide of codes and the association of answers with observed codes. This phase encompassed two studies that were coded using Atlas ti 8 software [59], although these studies have not yet been published.

³ Lexical classes can be defined as a grouping consisting of several ECUs with a homogeneous vocabulary [55].

To ensure agreement among the authors regarding the observed data, the Kappa coefficient was employed. The Kappa coefficient can be defined as a measure of association used to assess the level of agreement (reliability and precision) [41]. To classify the eligibility of the interpretations obtained, those with excellent agreement were considered, in accordance to the degrees of agreement described by Koch [39]. According to the author, values greater than 0.75 indicate excellent agreement, values below 0.40 represent low agreement, and values between 0.40 and 0.75 represent moderate (medium) agreement.

Ultimately, the obtained results focused on elucidating the perspective of the entrepreneurs who used brand equity to promote environmental sustainability in the Brazilian Rainforest, as well as identifying the perceived gaps in this regards.

Results and discussion

Open coding results

This section provides evidence from the perceptions of local Amazon entrepreneurs regarding their brands' connection with environmental sustainability, their role as entrepreneurs, and their management goals to achieve sustainability.

The textual corpus analyzed in this study consisted of respondents' answers to 12 inquiries, resulting in a total of 601 Text Segments (TS). Out of these, 481 TSs (80.55%) were used for analysis. A total of 20,994 occurrences (words, forms, or terms) were identified, including 2,926 distinct words and 1,536 words that appeared only once. Based on the groupings and Descending Hierarchical Classification (DHC) analysis, the content was categorized into five classes. These classes are the follow:

Class 1—"Involved agents and involved communities". This class comprised 101 TSs (20.73%);

Class 2—"Commercialization of products". This class encompassed with 106 TSs (22.20%);

Class 3—"Availability of resources and raw material used". This class included with 77 TTs (16.34%);

Class 4, "Brand Equity" related to forest". This class consisted of 115 TSs (23.9%); and Class 5—"Vision of sustainable forestry activities", with 81 TSs (16.83%).

Class 5: Vision of sustainable forestry activities": This class comprised 81 TSs (16.83%).

These classes reflect the different aspects and themes discussed by the entrepreneurs in relation to their brands' connection with environmental sustainability in the Amazon region.

Axial coding and selective coding results

Class 1—"Involved agents and involved communities" accounts for 19.02% ($f=209$ TSs) of the total studied corpus. This class consists of words and stems in the interval between $\chi^2=2.11$ (aspect) and $\chi^2=38.33$ (thing). Within this class, entrepreneurs' express their perception regarding the participation and engagement of people in promoting environmental sustainability in the forest. There are also indications of the products' development related to brands that emphasize corporate responsibility in maintaining the forest in a circular manner, with a focus on sustainability-related content. Here are some examples of some text segments from this class:

"(...) Sometimes, as people in the communities are riverine, or indigenous, they may not be aware of the economic and cultural value of the products they have available" (Entrepreneur 01).

"(...) Natives are businesspeople, microentrepreneurs, but they need to be empowered, otherwise things do not work out. For example, society may see them as semi-illiterate, but they are involved agents of high innovation" (Entrepreneur 04).

"(...) We are deeply concerned with improving the quality of life in the community, particularly for the women involved in the community work, the environmental impact we have there, socioenvironmental but also with the products we use, as it also affects the environment" (Entrepreneur 03).

Class 2—"Commercialization of products and consumer market" represents 2.02% ($f=9$ TSs) of the total corpus. It encompasses words and stems in the range between $\chi^2=2.73$ (Brazil) and $\chi^2=37.48$ (price). This class includes text segments related to the entrepreneurs' perception of their products and the concept of fair pricing.

"(...) The fair price must benefit everyone: the customer, the community, my company and the environment" (Entrepreneur 02).

"(...) The collection and work involved on obtaining this material. So, from the very beginning, our intention was to pay a fair price for them" (Entrepreneur 03).

"(...) Even I am surprised, and I understand why the product is a more expensive compared to similar products that are not sustainable, but the outcome is remarkable. In my opinion, the quality of the product and environmental responsibility are crucial in justifying its price" (Entrepreneur 05).

It is worth noting that, for entrepreneurs who are actively researching and participating, the mitigation of risks associated with accepting fair prices is connected to their on going efforts to present themselves as sustainable to society. This includes using certifications and communicating with the community to emphasize the importance of positioning their brand through visible indications of environmentally sustainable practices [13].

Class 3—“*Availability of resources and raw materials*” accounts for 16.34% ($f=67$ TSs) of the total corpus. It encompasses words and roots ranging between $\chi^2=2.07$ (supplier) and $\chi^2=43.00$ (raw material). This class includes text segments related to the availability and procurement of raw materials used in products, as well as the brand’s responsibility to maintain relationships with extractive communities. This responsibility is demonstrated through knowledge exchange, raising awareness and supporting the communities through increased prices in the market or purchase of their manufactured products.

(...) They claim that it is not worth it because there is no demand and we are trying to show that there is demand, so if they offer the raw materials, during the harvest, then we can buy them on a larger scale” (Entrepreneur 03).

(...) They invited us to visit there and conducted a workshop to teach them how to make paint that has a longer lifespan, which they can use” (Entrepreneur 06).

Developing new businesses in forest-based sectors requires an understanding of how individuals perceives these concepts and how this information can have the least impact on the environment, often through traditional knowledge [56]. The importance of discussing and sharing traditional ecological knowledge for sustainability becomes apparent when one recognizes that such knowledge, passed down thorough generations, primarily focus on ensuring the continuous use of limited natural resources [37].

In essence, comprehending translational knowledge and transforming it into sustainable technologies provides novel approaches to preserve the value of ecosystem services and conserving the environment. Definitions of sustainability and sustainable development can also be rooted in multiple social perspectives, moral values, and beliefs, influencing how a particular society constructs reality at a given time [14]. However, it is crucial to remember that for traditional knowledge to remain accessible within local communities, effective and secure transmission by community members is necessary, which requires a certain level of

trust between the parties [4]. This trust can be fostered through the exchange of information and knowledge.

Class 4—“*Brand equity and signs related to the Amazon Rainforest*” accounts for 23.09% ($f=98$ TSs) of the total corpus. It encompasses words and word roots ranging between $\chi^2=2.07$ (Design) $\chi^2=52.86$ (to use). This class, with a larger volume of TS trademarks, comprises text segments that discuss the adoption of specific trademarks by entrepreneurs.

For instance:

(...) And then the designer realized this and used the colors. In addition, inside the letters of our brand, there are waves and a gradient reflecting the colors of the sunset in our region” (Entrepreneur 01).

(...) Our logo is a monkey from the region” (Entrepreneur 07).

(...) Our brand is the name of a porridge made from flour produced in the Amazon, consumed by indigenous people, with the purpose of providing nutritional substance. Apparently, it seems to be a very simple thing, water, and flour, but for you to get the flour, one must go through a whole process and care” (Entrepreneur 06).

For brands that operate a positioning focused on environmental sustainability, strategic management that presents their perspectives and concerns for the environment through the signs adopted in their speech is essentially important [58]. Since sustainable activities positively influence its performance and provide significant *insights*, the understanding of these activities is usually captured by the symbolism from the brand’s assets, since they are necessary to understand and communicate complex meanings about the value, status and morality of the company and the Consumers of the commodity make use of the perceived use of identifiable means applied by the company [104].

Class 5—“*Vision of sustainable forestry activities*” accounts for 16.83% ($f=64$ TSs) of the total corpus. It includes words and stems ranging from $\chi^2=2.47$ (region) $\chi^2=42.47$ (shape). In this class, entrepreneurs express their perception and understanding of environmental conservation and sustainability within their forest-related business activities.

(...) For example, I am very sad that here in Belém, because there are several canals that were called Venice and currently these canals, like the Dock in an upscale neighborhood, have become an open cesspoo” (Entrepreneur 07).

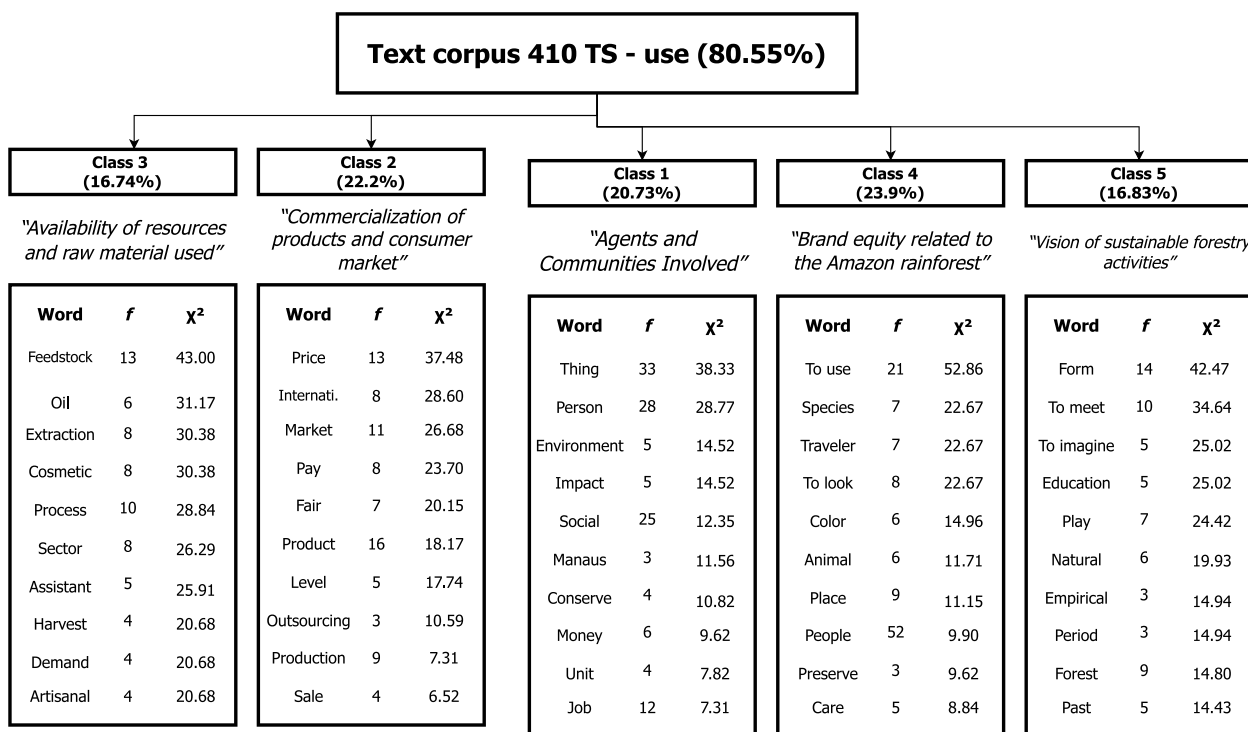


Fig. 1 Dendrogram of DHC classes

"(...) So today, for whom we are guarding the forest, I see that everything has already been deforested and in fact, we have a superfruit that reproduces naturally in this region and people continue to burn and kill them" (Entrepreneur 05).

The data analysis reveals that environmental changes, such as river and stream disruptions, soil contamination, and increased deforestation, have raised concerns among entrepreneurs and had a negative impact on their businesses. Based on the five classes listed, from the perspective of grounded theory, it was possible to determine a significant number of convergent codes within each group. Figure 1 shows the dendrogram classes, derived from the Descending Hierarchical Classification (DHC).

This DHC resulted in the information of two subgroups. The first subgroup includes classes 2 and 3, which are focused on topics related to commercialization, products, and service development. The second subgroup comprises classes 1, 4, and 5, which are more closely associated with the perception of new entrepreneurs in the Amazon region, emphasizing the significance of aligning their brands with sustainable practices in forest exploitation. This subdivision will become more evident and explicit in the selective coding phase of the analysis.

Based on subgroups and codes outlined in the guide, it is possible to comprehend the factors that have

influenced entrepreneurs to engage in sustainable practices in the Amazon rainforest. Additionally, it allows us to determine the extent to which these factors can either benefit or adversely affect the long-term relationships between brands and the environmental sustainability of the Brazilian Amazon. Table 1 shows the main observed codes. To enhance comprehension during the selective coding phase, we consider the term "cluster" to refer to sets of codes associated with the initial classes that emerged in the axial phase.

Delimiting the theory within the dimensions of sustainable development

The phase delimitation enables a comprehensive understanding of the factors that contributed to the emergence of clusters during axial phase. This understanding is achieved by creating code clusters based on the classes obtained from axial coding, specifically focusing on social dimension.

Social dimension

Upon analyzing Codes 1A and 1B presented in Cluster 1, a clear set of ideas emerges, forming a vision associated with the social dimension of sustainability. In this context, the social dimension should be interpreted as the pursuit of maximum equality to subjects among the involved individuals in a society where the distribution

Table 1 Codes and reference guides

	Initials	Code	Description
Cluster 1	1A	Viewing the involved agents	The code “Involved agents” refers to the local agents involved in sustainable forestry activities, ranging from extractivism to the acquisition of products
	1B	Understanding how communities engage	The code aims to comprehend the involvement of traditional communities such as indigenous peoples, quilombo communities, and riverside dwellers, with the brand
	1C	Government action	The code seeks to understand the role of the government and NGOs in promoting environmental sustainability
	1D	Realizing the social impact	This code aims to comprehend the social impact of the brands in forests
Cluster 2	2A	Looking for a source of raw material supply	This code pertains to the sources of raw materials used by brands and the agents involved in the procurement process
	2B	Producing sustainable means of forest maintenance	This code focus on the strategies and initiatives undertaken by brands to ensure sustainable forest maintenance.
	2C	Recognizing the importance of traditional knowledge	This code aims to understand the recognition and integration of traditional knowledge within traditional communities and its impact on entrepreneurship
	2D	Commercial product/service negotiation	The code aims to understand which main products/services that are being developed sustainable in the Amazon rainforest of Brazil as studied in this research
Cluster 3	3A	Making the resources available	It aims to assess the extent to which brands make their resources available for the development of services/ products, both from themselves ad for other stakeholders in the local business ecosystem, including competitors
	3B	Understanding the processes	Focus on the production and extraction processes employed by producing agents, as well as the impacts are generated and the measures taken to minimize irT
	3C	Seeking strategic dimensioning	This section focuses on understanding the consumer market profile and the desired scale of achievement without causing any adverse impacts on the Amazon rainforest
	3D	Seeking fair trade	It aims to understand the fair price margin for trading its products, taking into account the challenges of sustainable performance and its obstacles to entering the market
Cluster 4	4A	Planning the brand	The code in this cluster refers to the branding strategies adopted by the company to strategically position themselves in contrast to the “environmental sustainability” brand
	4B	Outlining the distinctive signs	This section examines the signs and symbols that brands use to establish an association between their products and the forest or local community
	4C	Positioning yourself strategically	This section explores the target market that brands aim to reach, whether it is regional, national, or international in scope
Cluster 5	5A	Pursuing environmental sustainability	This section focuses on the primary objective of companies to achieve environmental sustainability in the rainforest, including the preservation of traditional knowledge, species, and indigenous communities
	5B	Observing the deleterious occurrences	This section highlights the main activities that brands observe, which lead to the degradation of the rainforest in their respective localities
	5C	Perceiving sustainability as a positive factor	The code in this cluster aims to understand the perception of the future of the rainforest and the sustainable attitudes observed which generate positive outcomes

of material and intellectual goods is more equitable. This pursuit seeks to significantly enhance rights and conditions for all individuals [66].

(...) Yes. Whenever we need to express something on the packaging, we end up borrowing from them, from the communities, of course, with consent. We even ask them for suggestions for some graphics, some kind of art they use for us to incorporate into

our brand” (Entrepreneur 2).

Based on the understanding that all stakeholders involved in sustainable activities play crucial roles in constructing a strategic sustainability plan, their connections demonstrate the brand’s commitment to local environmental preservation. These stakeholders also contribute to fulfilling the political and social dimensions of sustainability [71]. Political sustainability requires the

involvement not only of the local community but also of society as a whole, including the government, institutions, and the business community. This comprehensive approach is often referred to as institutional sustainability within this dimension. The heterogeneity and complexity of social practices intertwined with landscapes must be acknowledged in order to integrate various measures of forest sustainability [23]. In this context, the proximity of local entrepreneurs to the people in traditional communities is crucial for the dynamic consumption of the natural resources available in the forest. However, due to the prevailing economic dynamics in the region largely overlook the local population, environmental and social damage occurs, such as deforestation and resource degradation. As a result, the livelihoods of countless forest-dependent individuals are at risk [25, 63].

National and international political dimensions

When questioned about the actions of government agents involved in the national political dimension (1C) and their importance in supporting sustainable entrepreneurship, the majority of participants mentioned that they did not receive assistance. They expressed that the combination of welfare policies and negligence from public agencies made their local activities more challenging and discouraged potential future partnerships.

"(...) How can I explain it to you? I got tired of the welfare policy; you know! Welfare tired me, I wanted to see beyond that." (Entrepreneur 1).

"(...) In terms of action, we are very far from that. Thus, it is very distant, and the perception of local people in relation to this is still not very good, showing an image that is just assistance" (Entrepreneur 04).

"Here in the region, there are few actions. I know an NGO that is now working on education with a local group, and there is also a public company that is working on mangrove recovery. However, they are on the other side of the region. I prefer not to talk about public services because they really don't help us here" (Entrepreneur 05).

Given the entrepreneurs' perception of low government performance, there is a concern about how regional sustainability initiatives implemented by public agencies can impact their businesses.

"(...) Here in Tapajós we noticed a reduction in tourism during the Carnival holiday due to national news about the Tapajós river's cloudy waters caused by illegal mining and other activi-

ties." (Entrepreneur 03).

"(...) It is just that we feel somewhat helpless when it comes to finding solutions for the issue of waste left in the Tapajós National Forest. (...) As communities still struggle with a significant amount of garbage, there is no selective garbage collection,. People resort to burning it. When we visit those areas, we realize the need of selective collection. The government should implement some form of waste management. We try to raise awareness in our own way." (Entrepreneur 01).

The Tapajós River was traditionally been known for its crystalline, clear waters with low concentration of suspended sediments [12]. However, recent research by Silva Montes et al., [86] has shown elevated levels of mercury (Hg) in the river and its tributaries. These high mercury levels are attributed to mining activities in the Tapajós River region, as well as the leaching of eroded soil resulting from deforestation and the burning of forest cover high [46].

psychological dimension

Upon analyzing code 1C, a connection can be observed between this code and codes 2D and 3A. This connection highlights the affinity for the forest and its resources, in addition to economic considerations. Furthermore, there is a noticeable hereditary connection among the interviewees, indicating how deeply the forest is intertwined with their identities and how this impacts their commitment to forest preservation.

"(...) I am the son of a quilombola mother and from a very early age I learned to embrace traditional knowledge. Combining this knowledge with the expertise I gained through my education, I realized that I could add value in my products while simultaneously representing and preserving the culture and identity of the people who live in the Amazon" (Entrepreneur 02).

The psychological dimension is closely linked to mental well-being. In this context, mental well-being is defined as an increase in personal sense of belonging, satisfaction, and happiness. It encompasses subjective interpretations that vary from person to person, as individuals become aware of the reality that surrounds them, through different experiences, expectations and motivations, and their relationship with others and the community [52].

"(...) In reality, it wasn't my father who initiated it. He inherited the knowledge from my grandparents,

and over time, he established a preserved area. Now, I am carrying forward his legacy” (Entrepreneur 05).

“(…) When I moved here, I enjoyed taking people to explore the natural beauty of this region where I grew up in. (…), That’s when I came up with the idea of offering unconventional tourism, combining sun, beach, and my passion for cycling. It all came together positively” (Entrepreneur 07).

According to Wang [99] well-being, as a component of the psychological dimension of sustainability, can be achieved by eliminating or transforming individual desires through the construction of a unity between individuals, nature, and society. This concept is unconsciously expressed by the interviewed entrepreneurs, as they evoke a nostalgic sentiment when discussing their family connections to the Amazon region and the local communities. It demonstrates a positive relationship between the forest, the communities, and the life stories of the entrepreneurs.

“(…) Therefore, we not only assist them in improving their extraction process, but also contributed to the development of bioproducts, from the by-products obtained with the extraction” (Entrepreneur 03).

“(…) We have collaborated with other communities that work with raw materials suitable for our products, ensuring their sustainable utilization. This has been truly beneficial for all of us” (Entrepreneur 06).

cultural dimension

The codes presented in Cluster 2 of the study contributed for the perception of the environmental dimension and its connections to access to raw materials sources used in product development, extraction points and the cultural dimension associated with the significance of traditional knowledge for the establishment of a circular economy. This perception emphasizes the importance of making information available to indigenous communities, as their traditional knowledge and customs are highly relevant for the native peoples of the Amazon [93]. Codes from Cluster 1 (1B and 1C) align with this business concept. In addition to the findings of Shafqat et al. [82], the inclusion of local traditional knowledge is a significant finding that informs the importance of sharing knowledge with the community and entrepreneurs. The arguments presented by the entrepreneurs in this research highlight the value of sharing with indigenous peoples, as their ancestral

knowledge and sustainable solutions are fundamental for creating the indices in Cluster 2.

“It is, indeed, something that we need to go there and learn from them, and this is crucial for us to grasp. They know how to manage forests amazingly. So sometimes it makes you want to cry with emotion” (Entrepreneur 01).

“(…) That’s exactly it, people fail to understand that this is important, but it is a sensitivity towards life, not merely a financial transaction. They do not seek money or material possessions. They desire an exchange of knowledge and a display of respect” (Entrepreneur 02).

This connection with the forest and its communities is vital, as entrepreneurs recognize the link between their brand and the region in which they live. It demonstrates that the activity they undertaken there are not solely focused on economic gains but also encompass socio-environmental considerations.

Environmental dimension

The environmental sustainability of the Amazon Rainforest depends not only on the application of traditional policies but also on environmental responsibility and the exchange of knowledge with traditional peoples [64]. The orientation and awareness of native people about environmental sustainability is also perceived by entrepreneurs as an effective tool in the pursuit of sustainability.

“One aspect that concerns us greatly is when we visit. It’s just that we feel somewhat limited in finding solutions for the issue of waste left in the Tapajós National Forest. Unfortunately, the communities still lack knowledge on how to properly dispose of non-biodegradable waste. The way they handle garbage impacts the beauty of the place, which, in turn, influences tourists’ perception. Regrettably, they still perceive all waste as biodegradable. However, for us, who were raised with a different form of education, we know that the garbage will persist for hundreds of years. Hence, we try to assist them by providing guidance on selective waste collection methods” (Entrepreneur 01).

The dimension of environmental sustainability can be planned through the execution and monitoring of restoration activities through educational strategies that effectively use natural resources in a sustainable way, allocated through natural education programs in the countryside [69]. In some studies, indigenous peoples

were responsible for environmental monitoring, building relationships with plants and lands, and even ecological restoration [94, 100]. Consequently, there are numerous valuable insights and approaches where indigenous knowledge and ethnobiology intersect, providing valuable contributions to the future of humanity and the preservation of life on Earth [97].

Economic dimension

Cluster 4 codes primarily resolve around the economic dimension, highlighting the entrepreneurs' comprehension of their negotiation capabilities and the expansion of sales in the international market through brand positioning strategies. In a competitive landscape with geographic barriers, the adoption of innovative branding approaches, *particularly* those related to biodiversity and environmental protection, facilitates market diversification and enhances brand value [28].

Additionally, within the economic dimension, codes 3C and 3D indicate the entrepreneurs' pursuit of fair trade practices involving all stakeholders. They acknowledge the challenges of engaging in sustainable business ventures, which aligns with the findings from the axial phase. Fairtrade initiatives represent notable examples of new or private governance mechanisms that, when effectively implemented and managed, contribute not only to sustainable development but also to the promotion of environmentally friendly economic practices [70].

"(...) I even pursued the fair-trade certification seal" (Entrepreneur 03).

"(...) Yes, but it is necessary to work on our image because in numerous international fairs that we attended, we discovered that Brazil no longer enjoys the same level of credibility as before. It's sad, it's very sad" (Entrepreneur 02).

"(...) We have been questioning ourselves since many people make or sell products claiming they are products from Amazon, but only the raw material comes from Amazon, extracted without any regards and at a cheap price. The value is added abroad, claiming it is from the Amazon" (Entrepreneur 05).

Fair Trade plays a significant role in creating alternative networks and promoting ethical norms and practices in the commercial arena, as highlighted by Reynolds et al. [68]. It provides better exchange conditions, fosters partnerships, and ensures rights for both producers and consumers, contributing to sustainable development.

The concept of fair price incorporates a minimum price that is deemed acceptable to the producers, influenced by consumers' expectations and demands prior to

making a purchase. Therefore, companies' perception of a fair price is closely tied to consumers' perception of the brand, including their recognition of the product's origin and relevant certifications. This connection between companies' understanding of fairness and consumers' perception of fairness emphasizes the importance of transparency, certification, and consumer awareness in promoting fair trade practices.

Indeed, for brands that prioritize environmental sustainability, the concept of fair price has a direct impact on *Brand Equity*. When properly communicated and implemented, it can foster consumer affinity by conveying that the product is not only accepted but also fair in terms of its value for the price paid [98]. Previous research has shown that strategic crafted consumption-related images can enhance consumer's desire to purchase and their satisfaction with the brand [80], leading to positive perception of the product and its value [8]. This alignment necessitates companies to establish a well-defined positioning in their niche, enabling them to establish credibility through sustainable practices and potentially command a premium price for their products, thereby increasing profit margins [42].

For the brand management positioning, entrepreneurs claim to use different strategies, such as (i) Visual language: the use of signs and symbols that refer to the forest in their logo design, websites, and packaging; (ii) product nomenclature and distinctive names using regional idioms or words from local dialects; (iii) copywriting strategies using the expression of the relationship with the native peoples of the Amazon; and (iv) Sustainability and cause driven differentiation: brand strategy focused on sustainability values and the cause/purpose of the forest conversation. As an example, we can mention the *product strategy naming* used by one of the studied brands to name a line of its products.

"(...) All of our labels are based on the visual language of the native peoples, with their consent. We add color and other elements, but the art itself belongs to them" (Entrepreneur 02).

"We aim to showcase our partnerships through our products and packaging. For instance, we have the Amazon expedition kit, which represents a journey through the forest, presenting the flavors of the forest and traditional communities through chocolate bars. The kit includes chocolate bars from Vale do Jarí, produced by river side people of Mocujiba; the Sakaguchi bars made from cocoa sourced from agroforestry in Tomé – Açú, and the Xiba bar produced with cocoa harvested in Barbacena, by the riverside community Xiba along the banks of the Acará-PA

river" (Entrepreneur 02).

"In our itineraries, we like to relate the traditional places; for example, we have the De Bubua itinerary. Staying "De Bubua" is the Amazonian way of saying that you want to relax, be calm, have a day off, do what you like, enjoying nature. We also have the Per-reché Tour, which is done on foot (...). This expression relates to walking barefoot (Entrepreneur 01).

"Yes, in addition to symbols, we use regional songs and animal names as well. It is all thinking about things in the region that refer to that. For example, we have a handkerchief called Coá-Piranga, a bag called Curumim, and Cunhantã t-shirts. Several other products" (Entrepreneur 06).

Ecological dimension

In Cluster 3, the focus is on ecological restoration activities and the entrepreneurs' commitment to both maintaining reserved regions and developing sustainable extractive regions. The codes mentioned (3A, 3B, and 3C) highlight the importance of ecological preservation in the Amazon region through the restoration of sites that were previously used for extractive activities, while ensuring minimal interference with the forest.

"My father was very observant. He noticed everything about the forest's diversity. He observed how the natural pollinators did their job and then he began to see that the standing forest would be worth more, so he started to reforest with cocoa, cupuaçu, everything you can imagine from fruit trees? It was an empirical approach to sustainable management, isn't it?" (Entrepreneur 05).

The concern with the ecological dimension is also evident in Cluster 5. When observing code 5A, which addresses renewable energy, most respondents do not have renewable energy sources but express their intention to implement them strategically. Reasons for the delay range from limited space and high implementation costs to the availability of affordable local energy supply.

"(...) No, not yet, but it is on our agenda. In fact, today I received a visit from a person who is preparing a budget for installing and implementing a photovoltaic system... It will be installed both at the factory and at my home" (Entrepreneur 02).

"(...) No, not yet, because we don't have a physical space yet" (Entrepreneur 01).

"(...) No, because we use very little electricity" (Entre-

preneur 04).

"(...) We are trying to switch to solar energy, you know? However, at the moment, it is not financially feasible for us," (Entrepreneur 05).

Regarding the reduction of pollutants, businesses that utilize transportation mentioned that they prefer *peer-to-peer transportation* whenever is possible. These services allow individuals to use transportation on an as-needed basis [76, 83]. It is important to note that shared mobility can reduce road congestion, demand for transport infrastructure, CO₂ emissions, and financing costs compared to individually owned vehicles [30].

Territorial dimension

The territorial dimension encompasses the organization of space and is influenced by criteria of territorial occupation creating a dynamic and interconnected system that operates on various scales, from micro to macro [18, 71]. Entrepreneurs recognize the importance of incorporating sustainable landscapes and productive areas into their activities, preserving native forests and utilizing sustainable production [22]. This strategic approach not only helps in preserving the environment but also contributes to the brand positioning by creating a positive perception of the company's environmental efforts among consumers.

The insights gained in this research provide the entrepreneurs with valuable ideas and discussion on the dimensions of sustainability, offering opportunities to generate new ideas and replicate successful factors in similar businesses.

Conclusion

The qualitative-quantitative study highlights the perceptions of new entrepreneurs in the Amazon Rainforest regarding the significance of connecting their brand with sustainable development indicators.

Entrepreneurs recognize that environmental sustainability relies on collaborative partnerships among the company, the environment, and the local traditional communities. They believe that branding efforts should focus on fostering a participatory and cooperative image of these entities.

The preservation of the forest's natural capital is seen as a valuable asset for promoting and sustaining sustainable development. There is a consensus among the interviewed entrepreneurs regarding the importance of the environmental sustainability in the Amazon Rainforest, which serves as favorable foundation for implementing strategic brand positioning that emphasizes sustainable practices as a differentiating factor.

The social indicators identified in the study highlight the importance of active participation and knowledge sharing by native peoples who possess traditional ecological knowledge. Collaboration with government agencies in legal reserves and the sustainable utilization of biological assets is emphasized. Additionally, there is a need to foster a greater appreciation for forest resources among the local population, and a call for increased involvement of public authorities in supporting local businesses.

In the economic dimension, entrepreneurs express challenges in marketing their brands products. This necessitates their adaptation to international consumer markets that prioritize environmental concerns and forest preservation. Local entrepreneurs believe that it is possible to enhance sustainable production capacity and profitability without introducing additional resource dependencies. They emphasize the value of social resources associated with existing environmental resources. Furthermore, entrepreneurs assert that the use of signs and certifications can enhance the perceived credibility of brands' sustainable performance in the Amazon Rainforest.

Local entrepreneurs in the Amazon Rainforest believe that they can increase sustainable production capacity and profitability without relying on new resource dependencies. Instead, they emphasize the importance of valuing social resources associated with existing environmental resources. This approach allows for the promotion of environmental sustainability while maintaining economic viability. Entrepreneurs also emphasize the significance of using signs and certifications to enhance the perception of brands' sustainable performance in the Amazon Rainforest. These symbols provide more reliable indicators of a brand's commitment to sustainability and can positively influence consumer perceptions.

It is recognized that all stakeholders involved in the region's development should collaborate on initiatives that promote environmental sustainability. This includes the creation of socially and ecologically complex systems, sustainable ecological spaces and more effective rural education programs. By integrating these efforts, long-term market-focused companies can be established, ensuring the preservation of the forest, respecting the rights and knowledge of native peoples, and promoting effective sustainable practices.

Although the studied population represents a small portion of the active brands in the Amazon Rainforest, their perception of effective sustainable action in the region aligns with the importance of forest conservation, preservation of biodiversity, and respect for native peoples and their traditional knowledge. These factors are closely intertwined with the successful implementation of sustainable practices in the region.

Effective brand knowledge, when properly directed and organized, can significantly enhance the competitiveness of small companies that may not have extensive resources for Research and Development. By leveraging brand strategies, these companies can improve competitive capacity and stand out in the market.

Abbreviations

CVC	Content Validity Coefficient
DHC	Descending Hierarchical Classification
ICUs	Initial Context Unit
TSs	Textual Segments

Authors' contributions

Pedro Vinícius Bertulino de Menezes conducted experiment and provided data and prepared draft manuscript. Francisco Holanda, Luiz Santos, Catuxe Varjão de Santana Oliveira and Ana Paula Schervinski Villwock provided the conceptualization, supervision and corrected the manuscript. Alceu Pedrotti helped revise English language. All authors read and approved the final manuscript.

Availability of data and materials

Data sharing is not applicable. All data analyzed in this study is included in the cited materials.

Declarations

Competing interests

The authors declare that they have no competing interests.

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