



ISSN: 2230-9926

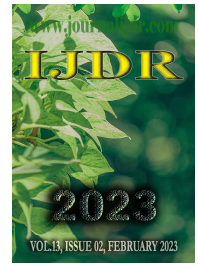
Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research

Vol. 13, Issue, 02, pp. 61503-61516, February, 2023

<https://doi.org/10.37118/ijdr.25138.02.2023>



RESEARCH ARTICLE

OPEN ACCESS

TRAINING ENTREPRENEURIAL LEADERSHIP FOR THE DEVELOPMENT OF SOCIAL AND FRUGAL INNOVATIONS A STUDY WITH INCUBATORS AND SOLIDARITY ECONOMIC ENTERPRISES IN THE NORTHERN REGION OF BRAZIL

¹Elizângela de Jesus Oliveira, ²Priscila Costa Rezende, ³Darly Andrade, ¹Rute Holanda Lopes, ⁴Suelânia Cristina Gonzaga de Figueiredo, ⁴Luciane Farias Ribas, ^{*5}David Barbosa de Alencar and ¹Ariane Batista

¹Academic Coordination of the Federal University of Amazonas-UFAM; ²Academic coordination of the Nove de Julho University – UNINOVE; ³Academic coordination of the Federal University of Uberlândia – UFU; ⁴Academic coordination of the Metropolitan University Center of Manaus – FAMETRO; ⁵Professor, of the Postgraduate Program in Engineering, Process Management, Systems and Environmental (PPEPMSE) - Institute of Technology and Education Galileo of the Amazon – ITEGAM

ARTICLE INFO

Article History:

Received 02nd January, 2023
Received in revised form
29th January, 2023
Accepted 01st February, 2023
Published online 25th February, 2023

KeyWords:

Social Entrepreneur; Leadership Training;
Solidarity Economic Enterprises;
Social and Frugal Innovations;

*Corresponding author:

David Barbosa de Alencar

ABSTRACT

Incubators and Solidarity Economic Enterprises are habitats for stimulating the formation of entrepreneurial social leaders and a fruitful condition for the development of social and frugal innovations, as they generate spaces and contexts that potentiate non-formal education. In this way, we seek an answer to the following research question: how can the formation of entrepreneurial leaders influence the development of social and frugal innovations in Incubators and Solidarity Economic Enterprises? Therefore, the research was carried out in stages, the first being of a qualitative nature, and the second, of a quantitative nature. In the first (qualitative) stage, the literature on non-formal education, learning spaces and contexts, entrepreneurial social motivations and leadership, and social and frugal innovations was analyzed. In the second (quantitative) stage, the incubation and post-incubation methodologies practiced by incubators in the northern region of Brazil were considered, specifically those with a distinctive innovative profile, in social and frugal terms. In this way, a survey was carried out with Solidarity Economic Enterprises (EES), linked to incubators in the north of Brazil, applying a structured questionnaire, in order to verify to what extent, the formation of entrepreneurial leaders influences the development of social innovations and frugal. A sample of 163 managers of incubators, EES and technology-based companies in northern Brazil was obtained and the results pointed to a strong trend of the DIY predictor with the six dimensions of innovation: Social, Marketing, Organizational, Incremental, Disruptive and Institutional, pointing to the ability of EEP managers in the northern region of Brazil to combine their resources in an economic and sustainable way in the search for innovative and creative solutions. It is hoped that the research results can encourage public policymakers to improve the national science, technology and innovation system, as well as institute pro-solidarity economy reforms.

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Citation: Elizângela de Jesus Oliveira, Priscila Costa Rezende, Darly Andrade, Rute Holanda Lopes, Suelânia Cristina Gonzaga de Figueiredo, Luciane Farias Ribas, David Barbosa de Alencar and Ariane Batista. 2023. "Training entrepreneurial leadership for the development of social and frugal innovations a study with incubators and solidarity economic enterprises in the northern region of Brazil", *International Journal of Development Research*, 13, (02), 61503-61516.

INTRODUCTION

The methodological efforts of technology incubators, when effective, can enhance the development of social and frugal innovations in countries that seek sustainable development and poverty eradication. A concrete way to accelerate this process is to encourage self-management and interdisciplinarity in the creation and maturation of Solidarity Economic Enterprises (EES) (Borges & Souza, 2020; Romero, Fonseca-silva, Dutra, & Freitas, 2020; Faria, 2017; Gutberlet, 2009; Miller, 2010; Nemirovsky, 2015).

Usually, EES are created by entrepreneurs who generate social transformations and, therefore, are named social entrepreneurs (Chiariello & Fonseca, 2021; Borges & Souza, 2020; Soares, Rebouças, & Lazaro, 2020; Alvord, Brown, & Letts, 2004; Austin, Stevenson, & Wei-Skillern, 2006; Gohn, 2006; Mair & Ignasi, 2006; Nemirovsky, 2015). Its social leadership, over the years, may demand a catalytic structure of interactions between academic knowledge, popular knowledge, professional experiences, partnerships and social networks, which are crucial to the development of the solidarity economy, from the generation of social and frugal innovations (Gutberlet, 2009; Hoogendoorn, Pennings, & Thurik, 2010; Tondolo, Tondolo, & Bitencourt, 2013; Koerich; Cancellier, 2020; Lopes et al.

2020; Certo & Miller, 2008; Sloan, Legrand, & Simons-Kaufmann, 2014). Thus, the formation of the social entrepreneur has a relevant role in terms of promoting and sustaining the EES, and also in the generation of social and frugal innovations in developing countries (Chiariello & Fonseca, 2021; Bandura, 2002; Fleury & Fischer, 2001; Friedlaender, 2004; Murphy; Liao, Welsch, 2006; Rossetto; Borini; Frankwick, 2018; Weyrauch & Herstatt, 2016), since the formation of these entrepreneurial leaders can determine the social values of this individual, their network of partners, as well as the self-management and interdisciplinarity of its social transformation projects (Soares, Rebouças, & Lazaro, 2020; Farfus & Rocha, 2007; Itelvino, 2015; Parente, Santos, Chaves, & Costa, 2011; Sousa, Bueno, Sousa, & Tech, 2013). Also noteworthy is the fact that the formation of entrepreneurial leaders is linked not only to the individual's social leadership trajectory, that is, to the full exercise of social entrepreneurship (Soares, Rebouças, & Lazaro, 2020; David, 2004; Oliveira, 2004; Nassif, Ghobril, Castilho, Silva, & Guardani, 2004; Yukl, Gordon, & Taber, 2002; Nemirovsky, 2015), but it can also be determined by the learning spaces and contexts to which the entrepreneur was submitted during a process of learning. incubation (Soares, Rebouças, & Lazaro, 2020; Faria, 2017; Miller, 2010; Chiariello & Fonseca, 2021). In addition, it can be driven by the individual's motivations to generate social transformations, in contexts of a solitary economy (Chiariello & Fonseca, 2021; Soares, Rebouças & Lazaro, 2020; Itelvino, Costa, Gohn, & Ramacciotti, 2015; Macêdo & Boava, 2008; Minuzzi, Belinazo, & Lezana, 2005; Navarro, Climent, & Palacio, 2011).

The northern region of Brazil is characterized as the natural cradle of the greatest biodiversity in the world, standing out as a bioindustrial asset and having a strong potential for innovation (Filho, Silva and Bigis, 2014; Zarelli *et al.*, 2020). In this sense, this research is justified from the point of view of the market and the academy, since it can contribute with relevant data to the understanding of the elements that influence the formation of entrepreneurial leaders in the northern region of Brazil. The results of this research can still be used as a way to encourage the promotion of more government policies interested in leveraging the scenario of entrepreneurship, innovation and technology. In view of these discussions, we seek an answer to the following research question: How can the formation of entrepreneurial leaders influence the development of social and frugal innovations in Incubators and Solidarity Economic Enterprises in the northern region of Brazil?

Considering the problems presented, the theoretical foundations and propositions that will support the research are presented below, involving discussions on: non-formal education, spaces and learning contexts, motivations and entrepreneurial social leadership, and social and frugal innovations.

THEORETICAL FRAMEWORK

Learning Spaces and Contexts: Training Entrepreneurial Leaders:

According to Chiariello & Fonseca (2021); Macedo, Araújo & Araújo (2020) and Gohn (2006), non-formal education encompasses content and activities consistent with the need for learning and with the worldview (values and objectives) of each of the learners or the group/community to which it belongs. belongs, given that it takes place in social spaces of coexistence, not demarcated by the walls of the school, but significant, because they accompany the life trajectory of those involved. Based on the exchange and sharing of experiences, this education is marked by intentionality, that is, actions, interactions and even the performance of activities, which are optional or optional, denote the student's choice to be part of the learning process, which is usually offered by a group or social movement (Nascimento, Benini, & Petean, 2021; Macedo, Araújo & Araújo, 2020; Gohn, 2006; Sousa; Nakata; & Caladão Júnior, 2014). In this way, it is noted that, in non-formal education, objectives cannot be previously traced, determined, nor imposed, since they emerge gradually, continuously and collectively, throughout the educational process, thus generating social capital (Nascimento, Benini, & Petean, 2021; Turine; Macedo,

2017). According to Markell (2000), the terms “capital” (asset) and “social” (community) refer to an asset that comes from belonging to a community. With regard to non-formal education, then, it is a learning process, mediated by interaction, which, at the same time, results in and builds capital. In this sense, if the knowledge and skills of community members are used in an integrated way, learning will lead to changes and positive results (Macedo, Araújo & Araújo, 2020). According to Romeiro, Fonseca-silva, Dutra, & Freitas, (2020); Macedo, Araújo & Araújo (2020); Tondolo *et al.* (2013) and Turine, Macedo (2017) entrepreneurial actions also encompass social capital, as they rely on the interaction between social subjects, belonging to a certain community or group, which, therefore, constitutes a favorable environment for such actions, with the potential to promote local development, based on shared social innovations. Thus, social entrepreneurship, as a constructive form of social capital, can be seen as a practical example of non-formal education, as it helps in (a): formation of a collective identity; construction and reconstruction of the world view; feeling of belonging to a group/community; preparation of the individual for life and facing adversities; rescue of self-worth; and acquisition of knowledge, from practice. It is also noteworthy that social entrepreneurs are able to recombine and create their resources through bricolage behavior. Known as an approach used to describe the set of resources invoked by improvisation, bricolage allows companies to reduce their costs by using the improvisation of creative solutions from their existing resources (Davidsson, Baker & Senyard, 2017; Korsgaard, Anderson, & Gaddefors, 2016; Rönkkö *et al.*, 2013; Senyard, 2015).

After these theoretical reflections, the proposition is raised that (P1) the spaces and learning contexts inherent to the formation of entrepreneurial leaders and the bricolage behavior can affect the generation of social and frugal innovations. In addition to understanding what motivates the social entrepreneur, one must analyze the factors that affect the trajectory of their leadership, in the course of their life history. In this line of research, Chiariello & Fonseca (2021) and Friedlaender (2004) highlight the growing interest of behaviorists, who study the leadership of entrepreneurs in relation to the environment. Macedo, Araújo & Araújo (2020), Bandura (2002) and Murphy *et al.* (2006) corroborate this perspective, since, for them, the social entrepreneur's leadership is mediated by the interaction of behavioral, cognitive and environmental/situational variables. In another aspect – the sociological one –, the focus is given to the relationship between leadership behavior and the values of entrepreneurs. In this sense, Navarro *et al.* (2011) highlight the emotional attachment to work relationships, pointing out that social entrepreneurs tend to feel more satisfied with the performance of their activities, and also to develop a sense of belonging to the business and to the social group focused on their actions. , even though the remuneration received is lower than that of other types of entrepreneurs. This justifies the longer time of dedication and association of these individuals to these ventures, as they adjust to their lifestyle, thus representing much more than a career option.

In order to deliver social value to society, leadership business behavior usually relies on a financially independent, self-sufficient and sustainable entrepreneurial entity (Romeiro, Fonseca-silva, Dutra, & Freitas, 2020). And the leader of this social enterprise is, by nature, dissatisfied and outraged by injustice and inequality, as well as engaged, committed, loyal, ethical, transparent and passionate about what he does (Justen, 2020; Oliveira, 2004). Furthermore, Romeiro, Fonseca-silva, Dutra, & Freitas, 2020, Austin *et al.* (2006) and Justen (2020) add that these subjects rely on the principles of “knowing how to be” and “knowing how to do it”, and then “knowing how to act”, without losing sight of the environment and their own values. As for the collectivity, David (2004) and Bezerra-de-sousa & Teixeira (2019) reinforce that the objective of the social entrepreneur is actions related to the common good, so their leadership directly interferes in the group/organization, through proposals that effectively promote changes in social relations. To better understand social entrepreneur leadership, Yukl *et al.* (2002) and Zarelli *et al.* (2020) listed the most

common behavioral characteristics of this subject, given some of his tasks. The proposed structure follows the following steps: (1) short-term planning of activities, with the explanation of the objectives and expectations of each one of them, and subsequent monitoring of the operation; (2) support, encouragement, and recognition of the team's accomplishments and contributions; consultation for decision making; and empowerment, given to problem solving; and (3) keen observation of the external environment, proposing innovative strategies or new perspectives, and encouraging innovative thinking. Social entrepreneurial leadership plays a crucial role during the process of creating and developing social actions, as it outlines the culture of enterprises and social projects with the insertion of their values and worldview (Bertero, 1996; Zarelli *et al.*, 2020; Nascimento, Benini, & Petean, 2021).

The social entrepreneur, in this sense, shares with others his baggage of experiences, helping them to deal with requirements that go far beyond organizational barriers, as they arise from government decisions, economic variables and a range of community needs. Faced with so many specificities, the social enterprise needs trained leaders to adapt the business to the demands and opportunities of the environment (Bezerra-de-sousa & Teixeira, 2019; Justen, 2020; Minuzzi *et al.*, 2005; Zarelli *et al.*, 2020). After considering this set of theoretical reflections, the proposition that (P2) the entrepreneurial leadership trajectory can affect the generation of social and frugal innovations is raised.

Entrepreneurship and Social and Frugal Innovations: As entrepreneurship and local development are naturally correlated, and fierce business competition is formed, in general, in a productive and institutional environment, social entrepreneurship can be understood as a process that creates innovative solutions for immediate social problems, and transformations. sustainable social, from the mobilization of ideas, capabilities, resources and social arrangements (Alvord *et al.*, 2004; Justen, 2020; Sloan *et al.*, 2014; Zarelli *et al.*, 2020; Romeiro, Fonseca-silva, Dutra, & Freitas, 2020). Social entrepreneurial actions are guided, then, by a clear motivation – to create social value, through the application and mastery of entrepreneurial skills, while solving a problem faced by society (Justen, 2020; Sloan *et al.*, 2014; Zarelli *et al.*, 2020). If there is the generation of economic value, in this process, depending on the social value created, it can be seen as a subsidiary, that is, a guarantee for the financial viability of social actions (Bezerra-de-sousa & Teixeira, 2019; Mair & Teixeira, 2019; Mair & Ignasi, 2006). For this reason, it is prudent for the social entrepreneur to envisage and strive to achieve a balance between social and economic values, at the risk of not maintaining the sustainability of social enterprises, nor of promoting the innovative creation of social value.

Considering that social entrepreneurship aims to maximize social value, from innovative actions (Macedo, Araújo & Araújo 2020; Austin *et al.*, 2006; Certo & Miller, 2008; Ribeiro & Muylder, 2014), the School of Social Innovation seeks to analyze the profile of the entrepreneur, characterized as one who, in an innovative way, meets social needs (Borges & Souza, 2020; Bezerra-de-sousa & Teixeira, 2019; Hoogendoorn *et al.*, 2010; Phillips *et al.*, 2015). Therefore, it appears that the motivation of this individual is to attack the causes of social problems, in order to generate significant changes in the social environment. Social entrepreneurs are, therefore, social innovators and, at the same time, responsible agents for the changes that they themselves promote in society. Therefore, in addition to creating, they aim to sustain social value (Borges & Souza, 2020; Dees, Emerson, & Economy, 2001; Ribeiro & Muylder, 2014), being motivated by the development and/or combination of products or innovative services, which have the potential not only to implement changes in the initially targeted environment, but to enable their replication and/or expansion of their scope, with the aim of reaching other contexts and communities (Borges & Souza, 2020). Parente *et al.*, 2011; Ribeiro & Muylder, 2014). As innovative practices, in social enterprises, require collective participation, that is, they must be shared by all the actors involved in the cause in question, the social entrepreneur needs to have developed the relational skills of communication and application

of innovation processes (Chiariello & Fonseca, 2021; Bezerra-de-sousa & Teixeira, 2019; Ribeiro & Muylder, 2014; Sousa *et al.*, 2013). This will allow everyone to benefit from the value gained from social innovations and also during their development, which will give rise to new ways of thinking, interacting, structuring, standardizing and connecting in different dimensions. Innovation, therefore, is an instrument of social transformation, including for those who develop and apply it, evidencing some of its numerous beneficial contributions. In this area, it is worth mentioning that the innovative process is capable of reconstructing the systems of social relations, modifying the preexisting power structures, and of reconfiguring the processes and resources that reproduce them. When this occurs, it can be said that there was a social innovation, since, according to Chiariello & Fonseca (2021); Borges & Souza (2020) and Farfus and Rocha (2007), a new model of meeting social demands was offered, which respects diversity and human unity, and is also a tool for promoting equality in postmodern society. . Therefore, social innovation can be defined as a set of processes, products and methodologies capable of improving people's quality of life and reducing inequalities between them.

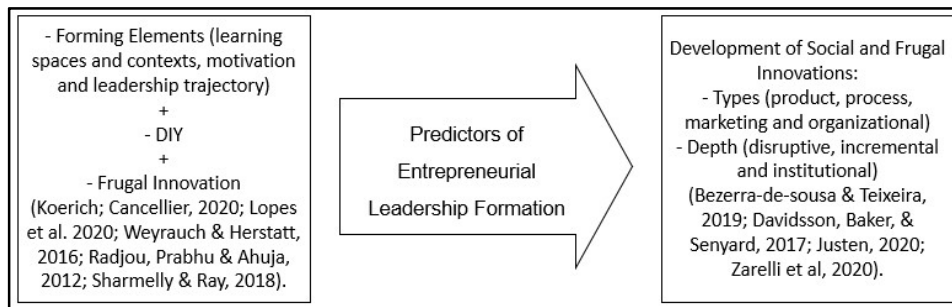
In developing countries, there is a trend towards an increasingly open innovation system, which should prioritize sustainable development, involving the cooperation of innovative ventures with incubators, universities and research institutes. Thus, there is a need to develop open innovation practices, focused on creating new products and services at affordable prices for mass markets. It is also noteworthy that according to the Oslo Manual (2020), social innovations can occur in terms of types (product, process, marketing and organizational), depth (disruptive, institutional and incremental) and coverage (local, regional, nationally and globally). Based on these theoretical reflections on the motivations for the development of social, open and frugal innovations, the following proposition arises: (P3) the motivation inherent in the formation of entrepreneurial leaders can affect the generation of social and frugal innovations. Finally, the central proposition is raised that Incubators and Solidarity Economic Enterprises are habitats for stimulating the formation of entrepreneurial social leaders, and a fruitful condition for the development of social and frugal innovations, as they generate spaces and contexts that enhance non-educational education. -formal, since they stimulate: (a) the participation of individuals as active subjects of the reality in which they live; (b) the generation and sharing of academic and popular knowledge for the transformation of individuals and enterprises; (c) intervention based on self-management and interdisciplinarity; as well as (d) the networking of individuals and institutions, for the promotion of public policies and sustainable territorial development pro-solidarity economy (Koerich; Cancellier, 2020; Kuo, 2017; Lopes *et al.* 2020; Prabhu, 2017; Radjou, Prabhu & Ahuja, 2012; Rossetto, Borini, & Frankwick 2018; Sharmelly & Ray, 2018; Tiwari, Fische, & Kalogerakis, 2016; Weyrauch & Herstatt, 2016). The next section discusses the methodology adopted in this research.

METHODOLOGY

This is a descriptive research since it sought to describe the characteristics related to certain populations and phenomena (Collis & Hussey, 2005). And the study was developed in two stages, one qualitative and quantitative. In the first (qualitative) stage, bibliographic research was carried out in national and international journals. In the second (quantitative) stage, an ideal survey was adopted when seeking to quantify data obtained through sampling (Kerlinger, 1980). Thus, a structured questionnaire was applied in order to verify to what extent the formation of entrepreneurial leaders influences the development of social and frugal innovations, taking into account that this relationship can be moderated by the motivations, spaces and learning contexts of the social entrepreneur. At first, this questionnaire was hosted on a platform and sent via email to the main incubators in the north of Brazil, who used the snowball technique to forward the link to the EES and technology-based companies in the North of Brazil. (research universe). Still in

data collection, the questionnaire was composed of a Likert-type scale and four variables, Frugal Innovation, Formative Elements, DIY and Type of Social Innovations, according to the following research model. It is observed that in Figure 1, in the proposed research model, it is assumed that Frugal Innovation, the Formative Elements (the spaces and learning contexts, the motivation and leadership trajectory) and the formation of entrepreneurial leadership can shape the formation of entrepreneurial leaders. DIY. In this case, these constructs constitute predictors for the formation of entrepreneurial leaders and the consequent development of social and frugal innovations in the Amazonian innovation ecosystem. Such constructs were chosen due to the innovation potential of the northern region of Brazil, aligned with the structural challenges so unique that they constitute a driving force for entrepreneurs to improvise efficient and effective solutions to meet social and environmental needs, meet the criteria of environmental sustainability and establish partnerships with public and private companies and/or bodies (Tiwari, Fischer, et al., 2016; Weyrauch & Herstatt, 2016).

resources to deal with new challenges. To evaluate the types of social innovation, the scale developed and validated by D'Amario and Comini (2020) will be used, which assess the types of social innovation in products, marketing and organizational; and the incremental, disruptive and institutional depths, as shown in table 3. After the application of the questionnaires, the data were stored in a database duly prepared for its treatment and, later, submitted to the use of the PASW 18 program (Analytics Software), in addition to Microsoft Excel. Univariate and multivariate statistical techniques were used. The univariate statistics aimed to determine the frequency distribution of the responses of the constituent parts of the data collection instrument, establishing the sample positioning measures (mean and median) and data dispersion (intervals P25 and P75 and standard deviation). The reliability examination of the questionnaire scales was approached through the evaluation of its internal consistency. Following the recommendation of several authors (CHURCHILL, 1979; SPECTOR, 1992; URDAN, 1995), in this work we chose to calculate the Cronbach's Alpha coefficient, which



Source: Authors (2021).

Figure 1. Research Model

Table 1. Frugal Innovation Construct Items/Forming Elements

FRUGAL INNOVATION/FORMING ELEMENTS AS A LEADING ENTREPRENEUR I seek/consider...
1. Attack the causes of social problems, in order to generate significant changes in the social environment.
2. The community or group to which I belong constitutes/constituted a favorable environment for learning, formation of a collective identity, changes and generation of social innovations.
3. My trajectory as an entrepreneurial leader is/was important for the development and/or combination of innovative products or services.
4. Solutions that offer good and cheap products/services
5. Significant cost reduction in the operational process
6. Saving organizational resources in the operational process
7. The rearrangement of organizational resources in the operational process
8. The core functionality of the product/service and not additional functionality
9. Product/service ease of use
10. The question of product/service durability
11. Efficient and effective solutions for customers' social/environmental needs
12. Environmental sustainability in the operational process
13. Partnerships with local companies in the operational process

Table 2. DIY Construct Items

DIY In the last three years, in the development of products/services in the company where I am LEADER ENTREPRENEUR...
1. I often find viable solutions to new challenges using our existing resources
2. I tend to take on a wider range of challenges than others would with our resources
3. Use all existing resources that seem useful to respond to a new problem or opportunity
4. I deal with new challenges by applying a combination of our existing ones with other resources economically available to us
5. When dealing with new problems or opportunities, I immediately take action on the assumption that we will find a viable solution.
6. By combining our existing resources, I take on a wide variety of new challenges
7. When we face new challenges, we gather viable solutions from our existing resources.
8. We combine resources to perform new challenges with resources we originally didn't intend to use
9. To deal with new challenges, we access resources at low or no cost and combine them with what we already have.

To measure the frugal innovation construct and formative elements, a questionnaire developed by Rossetto et al. (2018), submitted and approved by the Ethics Committee of an American university. This questionnaire was adapted for this research, and consists of 13 items, measured on a seven-point Likert scale, with items 1 to 3 referring to learning spaces and contexts, motivation and leadership trajectory (Forming Elements) and items 4 to 13 to the Frugal Innovation construct. The items referring to the measurement scale of the DIY construct were developed from Davidsson, Baker and Senyard (2017) and address questions about how the company maximizes its

determines how much the scale items are interrelated. Nunnally, cited by Spector (1992), stipulated a rule that a scale would be considered consistent if it had an alpha value greater than 0.70. The multiple regression analysis used in the research aimed to examine the dimensions of formative elements and bricolage that would influence the development of frugal and social innovations. Regarding the evaluation of the difference between the scores referring to the factors for the development of frugal and social innovations, Friedman's non-parametric test was used.

Table 3. Social Innovation Variables

Incremental social innovation variables	
1-	Our products/services already existed, but we have improved them and reduced costs so that people who are in a situation of social vulnerability can have access to them.
2-	We develop new products/services that are cheaper than those that already exist and that serve socially vulnerable populations.
3-	We improve existing products and/or services to reduce environmental impact and/or meet people in socially vulnerable situations.
Disruptive social innovation variables	
4-	Our new products/services enable the social and/or political participation of people in situations of social vulnerability.
5-	Our new products/services transform people's lives in situations of vulnerability.
6-	Our new products/services face a challenge that creates equality, social justice and empowerment.
7-	Our products/services are new alternatives offered to individuals and organizations as a way of achieving social change in their communities.
8-	Our new products/services have changed the market structure to serve people in socially vulnerable situations.
Institutional social innovation variables	
9-	Our new products/services promote changes in social relationships, increasing the level of participation of socially vulnerable groups.
10-	We make updates to products/services that lead to the inclusion of historically excluded groups.
11-	Our new products/services focus on the reconfiguration of existing social and economic structures, with new technologies more targeted to minorities who are in a situation of social vulnerability.
12-	Our new products/services rewrite and create new markets to serve people who are in a situation of social vulnerability.
Product social innovation variables	
13-	Our products/services have innovative functional characteristics that meet the demands and/or profile of consumers in a situation of social vulnerability.
14-	Our products/services present changes that do not change their function or intended use, but better meet the demands of consumers in situations of social vulnerability.
15-	Our products/services present changes in their characteristics that are perceived as valuable by consumers, especially those in situations of social vulnerability.
Marketing social innovation variables	
16-	We use marketing to generate a new conception of the product and/or service, in order to facilitate its use by people in socially vulnerable situations and/or cause less environmental impact.
17-	We use a new method of promoting or selling prices, in order to enable consumption by people in socially vulnerable situations and/or cause less environmental impact.
18-	Our products/services have a new design that fits the profile of consumers who are socially vulnerable and/or have minimal environmental impact.
19-	We intend to increase sales volume through changes in the positioning of our products/services, in order to make them accessible to consumers in situations of social vulnerability.
Organizational social innovation variables	
20-	Our organization achieves its social and/or environmental goals using new methods of partnering with other organizations to learn new ways of working.
21-	We seek to acquire knowledge and interact with other organizations to achieve our social and/or environmental objectives.
22-	Our organization employs new methods of interacting with other companies to share knowledge and achieve social and/or environmental goals.
23-	Our products/services are part of new initiatives and partnerships that aim to reduce social and environmental problems.

Source: D'Amario and Comini (2020, p.118)

Table 4. Demographic and occupational characterization of respondents

Variables		N	%
Sex	Feminine	65	39,9
	Male	98	60,1
Age Group	up to 30	8	4,9
	From 30 to 40	82	50,3
	Up to 40 to 50	37	22,7
	above 50	36	22,1
Marital status	Married	77	47,2
	divorced/divorced	20	12,3
	Separate	12	7,4
	Single	54	33,1
Level of education	Basic education	4	2,5
	education medium	20	12,3
	education higher	53	32,5
	Specialization/MBA	33	20,2
	Master's/PhD	53	32,5
Number of Employees of the Organization	up to 100	143	87,7
	above 200	20	12,3
Time of Work in the Position	up to 11 months	16	9,8
	From 1 to 4 years	61	37,4
	From 4.1 to 7 years	46	28,2
	over 7 years	40	24,5
Position held in the Company	Administrative	20	12,3
	Commercial	20	12,3
	Management	123	75,5
Organization's Sector	Industry	28	17,2
	services	135	82,8
Total		163	100,0

Source: Research data

This test, indicated when more than two situations in the same individual are compared, aimed to verify if any of the measured scores had a greater impact on the interviewees. In all statistical tests used, a significance level of 5% was considered. Thus, associations whose p-value was less than 0.05 are considered statistically significant. The next three sections of this study aim to present and analyze the results indicated by the research. In the first section, the demographic and occupational variables of the research participants are described; in the second, univariate analysis is performed; in the third, from the multivariate analysis, the variables of development of frugal and social innovations are associated with bricolage and elements that form learning.

ANALYSIS AND DISCUSSION OF RESULTS

The survey includes a sample of 163 respondents, of which 65 (39.9%) are female and 98 (60.1%) are male (Table 1). In terms of the age group of those surveyed, those aged between 30 and 40 years are 50.3%, and those aged between 40 and 50 years, with 22.7% of the sample. In relation to marital status, 47.2% of those surveyed are married, 33.1% are single and 7.4% are separated. With regard to the level of education of the respondents, 32.5% have a degree; 20.2% have an MBA/Specialization and 32.5% have a Master's/Doctorate. As for working time in the company, 37.4% have worked for 1 to 4 years in the position.

As for the job position, 75.5% work as managers and mainly in the service sector (82.8%). Regarding the size of the company in terms of employees, 87.7% of those surveyed say that the company has up to 100 collaborators. In this section, the variables related to the formative elements of learning, bricolage and the development of frugal and social innovations, through which the data for this study were collected, are analyzed and compared. The reliability examination of these dimensions was conceived through the coefficient of internal consistency known as Cronbach's Alpha.

Univariate analysis: As shown in TAB. 5, in general, in the questions related to formative elements, bricolage and the development of frugal and social innovations, their dimensionality and, therefore, their validity were confirmed, since the alpha was greater than 0.70 in

most Spector cases (1992). Only in the dimension related to motivation there was an unsatisfactory value of 0.367. Based on Table 5, based on an unsatisfactory internal consistency, the one whose alpha value was less than 0.5, we decided to exclude the Motivation dimension from further analyzes and from the theoretical model for the development of social and frugal innovations initially created in the present study. For the Space and Learning Context dimension, it was found that the question "The central functionality of the product/service and not additional functionalities", was excluded, Cronbach's alpha would be high (0.753). Exclusion was chosen to proceed with the next analyses, Table 5.

It is concluded, then, that the scales for the development of social and frugal innovations used have eight main factors - as we exclude the motivation dimension - and we include, in addition to these, the leadership trajectory dimension, as it presents only one question related to the theme, which was not carried out. The analysis of internal consistency was performed, with the same nomenclature suggested by the theoretical basis, configuring, therefore, the presence of the eight dimensions of the construct, in addition to the dimension of leadership trajectory. However, only one question was removed from the questionnaire (q8 of the 1st part of the questionnaire) aiming at a more representative analysis of the reality of the group of interviewees and also aiming at the validity of the scale, since each factor must be measuring exactly what is being measured. proposed. It can be said that the scale applied in the study is reliable, that is, it has the capacity to produce consistent results through its constant use. Next, the variables related to the factors that form elements of learning, bricolage and the development of frugal and social innovations are analyzed and compared, corresponding to the part of the questionnaire, through which the indicator data for the total sample for this study were collected.

As for the variables belonging to the factors of forming elements of learning and DIY and their respective meanings in part 1 of the questionnaire, the following stand out:

- Learning Space and Contexts – resulting from the calculation of the average of questions 1.2, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12 and 1.13 of the questionnaire for each individual respondent;

Table 5. Initial Dimensions of the Research A

Name	Questions	Alpha	Cronbach's Alpha if Item Deleted
Learning Space and Context	The community or group to which I belong constitutes/constituted a favorable environment for learning, formation of a collective identity, changes and generation of social innovations.	,685	,667
	Significant cost reduction in the operational process.		,647
	Saving organizational resources in the operational process		,648
	The rearrangement of organizational resources in the operational process		,657
	The core functionality of the product/service and not additional functionality		,753**
	Ease of use product/service		,656
	The question of product/service durability		,647
	Environmental sustainability in the operational process		,629
	Partnerships with local companies in the operational process		,617
Motivation	Attacking the causes of social problems, in order to generate significant changes in the social environment.	,367**	-,125
	Solutions that offer good and cheap products/services.		,115
	Efficient and effective solutions for customers' social/environmental needs		,618
DIY	I often find viable solutions to new challenges using our existing resources	,848	,850
	I tend to take on a wider range of challenges than others would with our resources		,809
	I use any existing resources that seem useful to respond to a new problem or opportunity		,826
	I deal with new challenges by applying a combination of our existing ones with other resources economically available to us		,815
	When dealing with new problems or opportunities, I immediately take action on the assumption that we will find a viable solution.		,819
	By combining our existing resources, I take on a wide variety of new challenges.		,843
	When we face new challenges, we assemble viable solutions from our existing resources.		,838
	We combine resources to tackle new challenges with resources we originally didn't intend to use		,846
	To address new challenges, we access resources at low or no cost and combine them with what we already have.		,837

Note :** It was chosen to remove the item or dimension. Source: Research data.

Table 5. Initial Dimensions of the Research B

Name	Questions	Alpha	Cronbach's Alpha if Item Deleted
Incremental Social	1-Our products/services already existed, but we have improved them and reduced costs so that people who are in a situation of social vulnerability can have access to them.	,848	,869
	2-We develop new products/services that are cheaper than those that already exist and that serve socially vulnerable populations.		,675
	3-We improve existing products and/or services to reduce environmental impact and/or meet people in socially vulnerable situations.		,822
Disruptive Social	4-Our new products/services enable the social and/or political participation of people in situations of social vulnerability.	,929	,910
	5-Our new products/services transform people's lives in situations of vulnerability.		,896
	6-Our new products/services face a challenge that creates equality, social justice and empowerment.		,912
	7-Our products/services are new alternatives offered to individuals and organizations as a way to achieve social change in their communities.		,930
	8-Our new products/services have changed the market structure to serve people in socially vulnerable situations.		,915
Institutional Social Innovation	9-Our new products/services promote changes in social relationships, increasing the level of participation of socially vulnerable groups.	,934	,922
	10-We make updates to products/services that lead to the inclusion of historically excluded groups.		,921
	11-Our new products/services focus on the reconfiguration of existing social and economic structures, with new technologies more targeted to minorities who are in a situation of social vulnerability.		,901
	12-Our new products/services rewrite and create new markets to serve people who are in a situation of social vulnerability.		,913

Note :** It was chosen to remove the item or dimension.

Source: Research data.

Table 5. Initial Dimensions of the Research C

Name	Questions	Alpha	Cronbach's Alpha if Item Deleted
Product Social Innovation	13-Our products/services have innovative functional characteristics that meet the demands and/or profile of consumers in a situation of social vulnerability.	,872	,739
	14-Our products/services present changes that do not change their function or intended use, but better meet the demands of consumers in situations of social vulnerability.		,880
	15- Our products/services show changes in their characteristics, which are perceived as valuable by consumers, especially those in situations of social vulnerability.		,828
Social Marketing Innovation	16-We use marketing to generate a new conception of the product and/or service, in order to facilitate its use by people in socially vulnerable situations and/or cause less environmental impact.	,923	,906
	17-We use a new method of promoting or selling prices, in order to enable consumption by people in situations of social vulnerability and/or cause less environmental impact.		,899
	18-Our products/services have a new design that fits the profile of consumers who are socially vulnerable and/or have minimal environmental impact.		,892
	19-We intend to increase sales volume through changes in the positioning of our products/services, in order to make them accessible to consumers in situations of social vulnerability.		,901
Organizational Social Innovation	20-Our organization achieves its social and/or environmental goals using new methods of partnering with other organizations to learn new ways of working.	,882	,830
	21-We seek to acquire knowledge and interact with other organizations to achieve our social and/or environmental objectives.		,830
	22-Our organization employs new methods of interacting with other companies to share knowledge and achieve social and/or environmental goals.		,853
	23-Our products/services are part of new initiatives and partnerships that aim to reduce social and environmental problems		,881

Note :** It was chosen to remove the item or dimension.

Source: Research data.

- Motivation - resulting from the calculation of the average of questions 1.1, 1.4 and 1.11 of the questionnaire for each respondent individually;
- Leadership Trajectory - resulting from question 1.3 of the questionnaire for each individual respondent;
- Bricolage – resulting from the calculation of the average of questions 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22 of the questionnaire for each individual respondent;
- Incremental - resulting from the calculation of the average of questions 2.1, 2.2 and 2.3 of the questionnaire for each respondent individually;
- Institutional - resulting from the calculation of the average of questions 2.9, 2.10, 2.11, and 2.12 of the questionnaire for each respondent individually;
- Product – resulting from the calculation of the average of questions 2.13, 2.14 and 2.15 of the questionnaire for each respondent individually;
- Marketing - resulting from the calculation of the average of questions 2.16, 2.17, 2.18 and 2.19 of the questionnaire for each respondent individually;
- Organizational - resulting from the calculation of the average of questions 2.20, 2.21, 2.22, and 2.23 of the questionnaire for each respondent individually;

As for the variables pertaining to the development of frugal and social innovations and their respective meanings, the following are highlighted in part 2 of the questionnaire:

- Disruptive – resulting from the calculation of the average of questions 2.4, 2.5, 2.6, 2.7 and 2.8 of the questionnaire for each respondent individually;

For part I of the questionnaire, space and contexts of learning and bricolage, data corresponding to feelings related to elements that form learning will be analyzed. Questionnaire responses to these questions were of the five-point LIKERT type, with a mean or median score ranging from 3.0 to 3.99. Thus, since the degree of agreement on this scale ranges from totally disagree to totally agree, it means that variables that present scores above 3.99 indicate a situation of agreement, below 3.0 a situation of disagreement, and equal to this value, an intermediate situation between agreement and disagreement. To synthesize the information for each question, the mean and median were used as a measure of central tendency and for the measure of dispersion, the standard deviation and the interquartile range (P₂₅ and P₇₅) were used. Table 6 shows the results of respondents' feelings about learning elements.

Table 6. Descriptive Statistics of the Space Scales and Learning Contexts questions

Learning Space and Contexts	descriptive measures				
	Average	D.P	P25	median	P75
The community or group to which I belong constitutes/constituted a favorable environment for learning, formation of a collective identity, changes and generation of social innovations.	4,26	0,63	4,00	4,00	5,00
Significant cost reduction in the operational process.	4,35	0,53	4,00	4,00	5,00
Saving organizational resources in the operational process	4,27	0,61	4,00	4,00	5,00
The rearrangement of organizational resources in the operational process	4,29	0,65	4,00	4,00	5,00
Ease of use product/service	4,34	0,53	4,00	4,00	5,00
The question of product/service durability	4,17	0,83	4,00	4,00	5,00
Environmental sustainability in the operational process	4,34	0,65	4,00	4,00	5,00
Partnerships with local companies in the operational process	4,44	0,50	4,00	4,00	5,00

Source: Research data.

Table 7. Descriptive statistics of the questions on the Motivation scales

Motivation	Descriptive measures				
	Average	D.P	P25	Median	P75
Attacking the causes of social problems, in order to generate significant changes in the social environment.	4,32	0,67	4,00	4,00	5,00
Solutions that offer good and cheap products/services.	4,17	0,62	4,00	4,00	5,00
Efficient and effective solutions for customers' social/environmental needs	4,39	0,58	4,00	4,00	5,00

Source: Research data.

Table 8. Descriptive Statistics of the Leader Trajectory scales questions

Leader Trajectory	Descriptive measures				
	Average	D.P	P25	Median	P75
My trajectory as an entrepreneurial leader is/was important for the development and/or combination of innovative products or services.	4,51	0,50	4,00	5,00	5,00

Source: Research data.

Table 9. Descriptive Statistics of Bricolage scale questions

DIY	Descriptive measures				
	Average	D.P	P25	Median	P75
I often find viable solutions to new challenges using our existing resources	4,24	0,73	4,00	4,00	5,00
I tend to take on a wider range of challenges than others would with our resources	4,29	0,64	4,00	4,00	5,00
I use any existing resources that seem useful to respond to a new problem or opportunity	4,34	0,61	4,00	4,00	5,00
I deal with new challenges by applying a combination of our existing ones with other resources economically available to us	4,36	0,58	4,00	4,00	5,00
When dealing with new problems or opportunities, I immediately take action on the assumption that we will find a viable solution.	4,24	0,62	4,00	4,00	5,00
By combining our existing resources, I take on a wide variety of new challenges.	4,17	0,54	4,00	4,00	4,00
When we face new challenges, we assemble viable solutions from our existing resources.	4,31	0,47	4,00	4,00	5,00
We combine resources to tackle new challenges with resources we originally didn't intend to use	4,02	0,72	4,00	4,00	4,00
To address new challenges, we access resources at low or no cost and combine them with what we already have.	4,12	0,71	4,00	4,00	5,00

Source: Research data.

Regarding the space factor and learning contexts for the total sample, it was found that the interviewees showed high agreement with the learning indicators, since all the scores obtained had a median equal to 4.00, (Table 6). This result is in line with Romeiro, Fonseca-silva, Dutra, & Freitas, (2020); Macedo, Araújo & Araújo (2020); Tondolo *et al.* (2013) and Turine, Macedo (2017) who claim that entrepreneurial actions encompass social capital, as they rely on the interaction between social subjects, belonging to a particular community or group, which, therefore, constitutes a favorable environment for such actions, with the potential to promote local development, based on shared social innovations. As for the

motivation factor, even though it is not included in the model of associations with innovations, it was found that the interviewees showed high agreement with the motivation indicators, since all scores obtained had a median equal to 4.00, (Table 7). This result corroborates the findings of Chiariello & Fonseca ,2021; Soares, Rebouças & Lazaro, 2020; Itelvino, Costa, Gohn, & Ramacciotti, 2015; Macêdo & Boava, 2008; Minuzzi, Belinazo, & Lezana, 2005; Navarro, Climent, & Palacio, 2011 by stating that one of the individual's motivations in the context of a solitary economy is focused on generating social transformations. The indicator related to the leader's trajectory had a median equal to 5.00, evidencing a situation of high agreement of the informants in this aspect, Table 8. From this perspective Macedo, Araújo & Araújo (2020), Bandura (2002) and Murphy *et al.* (2006) state that the social entrepreneur's

leadership trajectory is mediated by the interaction of behavioral, cognitive and environmental/situational variables. Thus, social entrepreneurial leadership plays a crucial role during the process of creation and development of social actions, as it outlines the culture of enterprises and social projects with the insertion of their values and vision of the world (Bertero, 1996; Zarelli, *et al.*, 2020; Nascimento, Benini, & Petean, 2021). Table 9 presents indicators related to DIY. In a global assessment, as shown in the table, it was found that all the questions related to DIY by the respondents showed high agreement, as the median scores obtained was 4.00. In this sense, observing the results of TAB. 9 the authors Davidsson, Baker & Senyard, 2017;

Korsgaard, Anderson & Gaddefors, 2016; Rönkkö *et al.*, 2013 & Senyard, 2015 state that social entrepreneurs are able to recombine and create their resources through bricolage behavior, which allows companies to reduce their costs by using the improvisation of creative solutions from your existing resources. For part II of the questionnaire, development of frugal and social innovations, data corresponding to sentiment related to innovation will be analyzed. Questionnaire responses to these questions were of the five-point LIKERT type, with a mean or median score ranging from 3.0 to 3.99. Thus, since the degree of agreement on this scale ranges from totally disagree to totally agree, it means that variables that present scores above 3.99 indicate a situation of agreement, below 3.0 a situation of disagreement, and equal to this value, an intermediate situation between agreement and disagreement.

expressive (Table 11). This result is in line with the commitment of social entrepreneurs in the northern region of the country to delivering social value to society through a financially independent, self-sufficient and sustainable entrepreneurial entity (Romeiro, Fonseca-silva, Dutra, & Freitas, 2020). Table 12 presents the indicators related to incremental social innovation. In a global assessment, as shown in the table, it was found that all the questions related to the respondents' incremental social innovation showed high agreement, as the median scores obtained was 4.00. This result points to the importance of social entrepreneurship as a process that creates innovative solutions (Alvord *et al.*, 2004; Justen, 2020; Sloan *et al.*, 2014). Regarding the disruptive social innovation factor for the total sample, it was found that the respondents showed high agreement with the disruptive social innovation indicators, since all scores

Table 10. Characterization of the total sample according to the type of development of frugal social innovations

Type	Descriptive Measures					P-value	Conclusion
	Average	D.P	P25	Median	P75		
Incremental Social Innovation	4,14	0,77	4,00	4,00	5,00	0,000**	Incr > Disrup = Instit
Disruptive Social Innovation	4,03	0,81	4,00	4,00	4,80		
Institutional Social Innovation	3,95	0,84	4,00	4,00	4,50		

Note: – The probabilities of significance (p-value) refer to the Friedman test

– P-value values in bold indicate significant differences.

– Significant results were identified with asterisks, according to the level of significance, namely: p-value < 0.01** (99.0% confidence level) and p-value < 0.05 * (95% confidence level .0%).

Source: Research data.

Table 11. Characterization of the total sample according to the depth of development of frugal and social innovations

Depth	Descriptive Measures					P-value	Conclusion
	Average	D.P	P25	Median	P75		
Social Innovation Product	4,00	0,78	4,00	4,00	4,67	0,00**	Org > Prod = Mark
Social Innovation Marketing	4,02	0,73	3,94	4,00	4,50		
Organizational Social Innovation	4,35	0,44	4,00	4,25	4,75		

Note: – The probabilities of significance (p-value) refer to the Friedman test

– P-value values in bold indicate significant differences.

– Significant results were identified with asterisks, according to the level of significance, namely: p-value < 0.01** (99.0% confidence level) and p-value < 0.05 * (95% confidence level .0%).

Source: Research data.

Table 12. Descriptive Statistics of Incremental Social Innovation Scale Questions

Incremental social innovation variables	Descriptive measures				
	Average	D.P	P25	Median	P75
1-Our products/services already existed, but we have improved them and reduced costs so that people who are in a situation of social vulnerability can have access to them.	4,06	1,03	4,00	4,00	5,00
2-We develop new products/services that are cheaper than those that already exist and that serve socially vulnerable populations.	4,09	0,82	4,00	4,00	5,00
3-We improve existing products and/or services to reduce environmental impact and/or meet people in socially vulnerable situations.	4,26	0,77	4,00	4,00	5,00

Source: Research data.

Table 13. Descriptive Statistics of Disruptive Social Innovation Scale Questions

Disruptive social innovation variables	descriptive measures				
	Average	D.P	P25	median	P75
4-Our new products/services enable the social and/or political participation of people in situations of social vulnerability.	4,02	1,00	4,00	4,00	5,00
5-Our new products/services transform people's lives in situations of vulnerability.	4,03	0,95	4,00	4,00	5,00
6-Our new products/services face a challenge that creates equality, social justice and empowerment.	4,04	0,95	4,00	4,00	5,00
7-Our products/services are new alternatives offered to individuals and organizations as a way to achieve social change in their communities.	4,22	0,72	4,00	4,00	5,00
8-Our new products/services have changed the market structure to serve people in socially vulnerable situations.	3,82	0,94	3,00	4,00	4,00

Source: Research data.

With regard to the variables depth of development of frugal and social innovations, a situation of high agreement was found in the three dimensions of types of innovations, as the score obtained from these dimensions presented a median close to 4.0 (Table 11). Among the interviewees, in a comparative analysis of the factors of development of frugal and social innovations, it was verified the existence of significant differences regarding these factors of the depth of development of innovations, since the test presented a p-value of 0.000**, the Organizational Social Innovation variable was the most

obtained had a median equal to 4.00, (Table 13). In line with this result Macedo, Araújo & Araújo 2020; Austin *et al.*, 2006; Certo & Miller, 2008; Ribeiro & Muylder, 2014 point to one of the most important roles of the social entrepreneur, which is to maximize social value, from innovative actions in order to meet social needs. In a global assessment, as shown in TAB. 14, it was found that all questions related to institutional social innovation of those surveyed tend to have an assessment of high agreement with the institutional theme, as all indicators presented a median of 4.00.

Table 14. Descriptive Statistics of the Questions of the Institutional Social Innovation scales

Institutional social innovation variables	Descriptive measures				
	Average	D.P	P25	Median	P75
9- Our new products/services promote changes in social relationships, increasing the level of participation of socially vulnerable groups.	4,03	0,83	4,00	4,00	5,00
10- We make updates to products/services that lead to the inclusion of historically excluded groups.	3,86	0,96	4,00	4,00	4,00
11- Our new products/services focus on the reconfiguration of existing social and economic structures, with new technologies more targeted to minorities who are in a situation of social vulnerability.	3,96	0,88	4,00	4,00	5,00
12- Our new products/services rewrite and create new markets to serve people who are in a situation of social vulnerability.	3,95	1,00	4,00	4,00	5,00

Source: Research data.

Table 15. Descriptive Statistics of Product Innovation Scales Questions

Product social innovation variables	Descriptive measures				
	Average	D.P	P25	Median	P75
13-Our products/services have innovative functional characteristics that meet the demands and/or profile of consumers in a situation of social vulnerability.	4,01	0,93	4,00	4,00	5,00
14-Our products/services present changes that do not change their function or intended use, but better meet the demands of consumers in situations of social vulnerability.	3,92	0,90	4,00	4,00	5,00
15-Our products/services present changes in their characteristics that are perceived as valuable by consumers, especially those in situations of social vulnerability.	4,09	0,79	4,00	4,00	5,00

Source: Research data.

Table 16. Descriptive Statistics of Marketing Scales Questions

Marketing social innovation variables	Descriptive measures				
	Average	D.P	P25	median	P75
16-We use marketing to generate a new conception of the product and/or service, in order to facilitate its use by people in socially vulnerable situations and/or cause less environmental impact.	4,07	0,78	4,00	4,00	5,00
17-We use a new method of promoting or selling prices, in order to enable consumption by people in socially vulnerable situations and/or cause less environmental impact.	4,01	0,81	4,00	4,00	5,00
18-Our products/services have a new design that fits the profile of consumers who are socially vulnerable and/or have minimal environmental impact.	3,96	0,81	4,00	4,00	4,00
19-We intend to increase sales volume through changes in the positioning of our products/services, in order to make them accessible to consumers in situations of social vulnerability.	4,04	0,83	4,00	4,00	5,00

Source: Research data.

Table 17. Descriptive Statistics of the Questions of the Organizational Social Innovation scales

Organizational social innovation variables	Descriptive measures				
	Average	D.P	P25	Median	P75
20-Our organization achieves its social and/or environmental goals using new methods of partnering with other organizations to learn new ways of working.	4,41	0,54	4,00	4,00	5,00
21-We seek to acquire knowledge and interact with other organizations to achieve our social and/or environmental objectives.	4,39	0,49	4,00	4,00	5,00
22-Our organization employs new methods of interacting with other companies to share knowledge and achieve social and/or environmental goals.	4,31	0,47	4,00	4,00	5,00
23-Our products/services are part of new initiatives and partnerships that aim to reduce social and environmental problems	4,29	0,55	4,00	4,00	5,00

Source: Research data.

The results in Table 14 seem to indicate in accordance with Borges & Souza, 2020; Dees, Emerson, & Economy, 2001; Ribeiro & Muylder, 2014 that the motivation of the social entrepreneur is to attack the causes of social problems, to generate, with this, significant transformations in the social environment. As for the social product innovation factor, it was found that the interviewees showed high agreement with the product indicators, since all scores obtained had a median equal to 4.00 (Table 15). In this sense, social entrepreneurs are, therefore, social innovators and, at the same time, responsible agents for the changes that they themselves promote in society. Therefore, in addition to creating, they aim to sustain social value (Borges & Souza, 2020; Dees, Emerson, & Economy, 2001; Ribeiro & Muylder, 2014). Regarding the social innovation factor of marketing, it was found that the interviewees showed high agreement with the marketing indicators, since all scores obtained had a median equal to 4.00 (Table 16). The result of TAB.16 corroborates Parente *et al.*, (2011); Ribeiro & Muylder, (2014) when stating that social entrepreneurs use a combination of innovative products or services, which have the potential not only to implement changes in the initially targeted environment, but also to enable their replication and/or expansion of scope, with the aim of reaching other contexts and communities.

With regard to the organizational social innovation factor, it was found that the interviewees showed high agreement with the organizational indicators, since all scores obtained had a median equal to 4.00 (Table 17). Analyzing the Table 17, the results seem to indicate that the innovative process is capable of reconstructing the systems of social relations, modifying the preexisting power structures, and of reconfiguring the processes and resources that reproduce them. Therefore, social innovation can then be defined as a set of processes, products and methodologies capable of improving people's quality of life and reducing inequalities between them (Chiariello & Fonseca, 2021; Borges & Souza, 2020).

Multiple regression analysis.

The multiple regression analysis used in the research aimed to examine the variables of Forming Elements and Bricolage that would influence the Development of Social and Frugal Innovations. Before starting the discussion of the results, it is necessary to clarify some procedures applied in the regression analysis. Initially, we sought to examine the research's ordinal scale independent variables to decide which of them would be selected to be part of the regression analysis. Table 18 contains the independent variables used in the regression.

Table 18. Research model independent variables

Variable
Learning spaces and contexts
The motivation
DIY
The leadership trajectory

Source: Research data

Table 19. Regression model for predictors of formative elements and bricolage and factors of social innovations

Predictors	Social Innovation and Product	Social Marketing Innovation	Organizational Social Innovation	Incremental Social Innovation	Disruptive Social Innovation	Institutional Social Innovation	VIF
DIY	.692**	.639**	.296**	.763**	.701**	.776**	1.747
Learning Space and Context	.286**	.252*	.048	.243**	.192	.095	3.020
Trajectory as an entrepreneurial leader	-.595**	-.353**	-.343**	-.380**	-.473**	-.301**	2.486
R2	.464	.424	.364	.570	.427	.498	
adjusted R2	.454	.413	.352	.562	.416	.489	
F	45.66**	38.72**	29.94**	69.87**	39.48**	52.28**	

Source: Research data

Note: The values placed in the table correspond to the Beta coefficients calculated at significance levels $p < .05^*$ and $p < .01^{**}$.

The variables that designate space and context, motivation, bricolage and leadership trajectory were represented in the questionnaire by ordinal qualitative scales, but transformed into numerical ones through a combination of questions based on the calculation of the arithmetic mean, so that the analysis technique of multiple regression could be applied. Once the process of transforming the variables to be used in the regression analysis was concluded, Table 8 showed us that the internal consistency of the motivation scale presented parameters below the literature and that is why we decided not to include it in the regression model. The dependent variables are represented by the six factors - calculated taking into account the combination of questions based on the calculation of the arithmetic mean - of Development of Social and Frugal Innovations. The general results of the regression analysis are presented below. Initially, each of the factors corresponding to social innovations and the respective predictors was regressed separately. Table 19 shows the regression results for the predictors of forming elements and DIY. THE acronym VIF refers to the multicollinearity indicator between the variables independent, where high values above 1 indicate the presence of this situation (Hair, 1998). The value of F indicates the intensity and significance of the association between the variables involved in the regression. As seen in Table 19, the Learning Space and Context predictor showed a high rate of multicollinearity among the predictors and therefore we concluded that it should not be included in the model with the six factors: Social, Marketing, Organizational, Incremental, Disruptive and Institutional. In these associations, the explanatory power of the regression equation was moderate, as can be seen from the values of the adjusted regression coefficients (R2) that were close to fifty percent. When closely examining Table 18, it appears that the Bricolage predictor - maintained a positive, significant relationship with the six dimensions: Social, Marketing, Organizational, Incremental, Disruptive and Institutional. That is, a greater agreement in Bricolage impacts on a greater agreement in these six dimensions. This result corroborates the strong innovative potential of the northern region of Brazil, characterized as the natural cradle of the greatest biodiversity in the world and standing out as a bioindustrial asset, which drives social entrepreneurs increasingly to improvise creative solutions from their existing resources (Davidsson, Baker & Senyard, 2017; Korsgaard, Anderson & Gaddefors, 2016; Rönkkö *et al.*, 2013; Senyard, 2015). In addition, the leader trajectory predictor showed a significant, inverted association with the six dependent variables. That is, greater agreement in the Trajectory as a Leader impacts on disagreement in these six dimensions. These relationships showed, respectively, significant regression coefficients, with p-values lower than 5%.

FINAL CONSIDERATIONS

The objectives proposed by the study were achieved through descriptive, qualitative and quantitative research carried out with a

sample of 163 managers from incubators, EES and technology-based companies in northern Brazil. Regarding the size of companies in terms of employees, 87.7% of those surveyed say that the company has up to 100 employees. The reliability examination of the dimensions of the study was conceived through the coefficient of internal consistency known as Cronbach's Alpha. Thus, in general, in questions related to formative elements, bricolage and the development of frugal and social innovations, their dimensionality and, therefore, their validity were confirmed, since the alpha was greater than 0.70 in most cases. Only in the dimension related to motivation there was an unsatisfactory value of 0.367 and, based on an unsatisfactory internal consistency, the one whose alpha value was less than 0.5, it was decided to exclude the Motivation dimension from the analyzes and from the theoretical model of development of social and frugal innovations initially created in the present study. For the Space and Learning Context dimension, it was found that the question "The central functionality of the product/service and not additional functionalities" was excluded, Cronbach's alpha would be high (0.753). Exclusion was chosen to proceed with the analyses.

The scales for the development of social and frugal innovations used presented eight main factors - as the motivation dimension was excluded - and, in addition to these, the leadership trajectory dimension is included, as it presents only one question related to the theme, no analysis was carried out. internal consistency analysis, with the same nomenclature suggested by the theoretical basis, thus configuring the presence of the eight dimensions of the construct, in addition to the leadership trajectory dimension. However, only one question was removed from the questionnaire (q8 of the 1st part of the questionnaire) aiming at a more representative analysis of the reality of the group of interviewees and also aiming at the validity of the scale, since each factor must be measuring exactly what is being measured. proposed. Thus, it can be concluded that the scale applied in the study is reliable, that is, it has the capacity to produce consistent results through its constant use. Regarding the space factor and learning contexts for the total sample, it was found that the interviewees showed a high agreement with the learning indicators, demonstrating that social entrepreneurs in the northern region of Brazil seek efficient and effective solutions for social needs/ of its customers (average of 4.39). Regarding the motivation factor, it was found that the interviewees showed high agreement when stating that the trajectory as an entrepreneurial leader is/was important for the development and/or combination of innovative products or services (average of 4.51). Regarding the DIY variable, the interviewees strongly agreed with the ability to deal with new challenges by applying a combination of existing resources with other resources available economically for the social enterprise (average of 4.36). Regarding the types of innovations, organizational social innovation pointed to high agreement (average of 4.35) and the interviewees pointed to a strong tendency to improve products and/or services that already existed to reduce the environmental impact and/or meeting

people in situations of social vulnerability (average of 4.26), making products/services new alternatives offered to individuals and organizations as a way of achieving social changes in their communities (average of 4.22) and making new products/services agents of change in social relations, increasing the level of participation of socially vulnerable groups (average of 4.03). Respondents also strongly pointed to the tendency to make their products/services present changes in their characteristics that are perceived as valuable by consumers, especially those in situations of social vulnerability (average of 4.09); Using marketing to generate a new product and/or service concept, in order to facilitate its use by people in socially vulnerable situations and/or cause less environmental impact (average of 4.07) and finally, they pointed out that their organizations achieve their social and/or environmental goals using new methods of partnering with other organizations to learn new ways of working (average 4.41). Finally, it was evidenced in the proposed model of this study that the DIY predictor stood out with a positive, significant relationship with the six dimensions: Social, Marketing, Organizational, Incremental, Disruptive and Institutional, which denotes the capacity of EEP managers of the northern region of Brazil to combine its resources in an economical and sustainable way in the search for innovative and creative solutions. In order to point out the continuity and developments of the study, we suggest the use of larger samples per state in the northern region of the country, which was not achieved by this study due to the limitations imposed by the health crisis that greatly worsened the EES of the northern region of Brazil. Once this study was carried out by state, the results could be better compared and stratified by size, by origin of capital, by most adopted innovations, aspects not tested in this study.

Acknowledgment

- To Academic Coordination of the Federal University of Amazonas-UFAM
- To Academic coordination of the Nove de Julho University – UNINOVE
- To Academic coordination of the Federal University of Uberlândia – UFU
- To Academic coordination of the Metropolitan University Center of Manaus – FAMETRO
- To the Postgraduate Program in Engineering, Process Management, Systems and Environmental (PPEPMSE) - Institute of Technology and Education Galileo of the Amazon – ITEGAM

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