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SUSTAINABLE PRACTICES IN THE COFFEE SUPPLY CHAIN IN THE CERRADO MINEIRO REGION, BRAZIL

ABSTRACT

The incorporation of sustainable practices in the supply chain management (SCM) has become recurrent in the business environment, resulting from a social reflection on the need to seek new development alternatives. In this context, the objective of this paper is to verify the existence of sustainable practices throughout the supply chain of coffee in the Cerrado Mineiro Region (CMR) and to understand the effects of this adoption regarding Green SCM. This paper focus on the relationship between producers and collective organizations, such as cooperatives and development foundations. To this end, a case study was carried out with the representatives of the supply chain members in CMR, which included coffee producers, cooperatives and a development foundation. It was verified the predominance of practices focused on environmental issues, followed by social and, finally, economic ones. It is also highlighted that the data identified allow us to understand that the development of sustainable strategies can bring positive effects to the agents studied. Considering that these aspects, evidently, improve the relationship of supply chain members, making it more collaborative. The results contribute to the systemic understanding of the way in which sustainability has been incorporated and operationalized in coffe supply chains in CMR.

KEYWORDS | Cerrado mineiro region, green supply chain management, sustainability, supply chain management, sustainable practices.

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INTRODUCTION

The depletion of patterns of development experienced since the twentieth century is evident. The understanding of this phenomenon, together with social reflection on the need to seek new alternatives for progress, has given rise to a new development model. The sustainable development model, which has been consolidating since 1972, the year in which the discussion of this issue, during the First Conference on Environment and Development held in Oslo, Norway.

In their investigations, Mathiyazhagan, Govindan, and Noorul Haq (2014) recognize that organizations in the most diverse economic sectors face pressures from public authorities, competitors and, above all, the consumer market to incorporate sustainable correct practices in their supply chains. This adoption occurs in order to minimize damage to the environment and society. This context, refers to the ideas of Elkington (1994), when the author deals with the Triple Bottom Line (TBL).

In addition, Food Supply Chains are not excluded from this process. Although in a timid way, it is noticed that the food sector has been following the changes in the consumption pattern of the society, in which a trend is evident on the part of the consumers as to the option for foods obtained from production systems that adopt environmentally correct and socially just practices in their productive processes. The focus on SCM is an important step in the adoption and development of sustainability, and the concept of Sustainable Supply Chain Management ((SSCM) directs efforts in this perspective. However, Mathiyazhagan et al. (2014) recognize that the incorporation of sustainable aspects into supply chains is a practice still uncommon in most organizations, especially in countries from emerging economies.

Jakhar (2015) highlights that research must aim to encompass all the sustainable development dimensions advocated by Elkington (1994), ie, economic, environmental and social, in order to have an holistic approach to supply chain sustainability and an understanding of the mechanisms involved in the sustainable product supply. The studies from Fabbe-Costes, Roussat, and Colin (2011), Bask, Halme, Kallio, and Kuula (2013), Brandenburg et al. (2014), Su et al. (2016), Kumar and Rahman (2016), and Alshubiri and Hussein (2016) encompassed all dimensions of Sustainable development in supply chain management. Nevertheless, these studies were developed in a small variety of supply chain, with emphasis on the automotive industry, retail trade and metallurgical industry.

We have identified few studies with a holistic approach to sustainability in food supply chains, mentioning the studies of Walker and Jones (2012) and Türkay and Saraçoglu (2015), which were applied in agrifood supply chain in the United Kingdom and of Turkey, respectively. In addition, it can be seen that a considerable amount of studies directs its analysis to the final links of the supply chain, that is, in the distribution/consumption interface. In this sense, the studies from Carvalho, Paiva, and Vieira (2016), Migliore, Schifani, and Cembalo (2015) and Krystallis, Chryssochoidis and Scholderer (2007) should be highlighted.

The present study was developed at the production/processing interface, that is, at the initial links of the supply chain, comprising coffee producers, their cooperatives and development organizations. The focus is on Cerrado Mineiro Region, which is considered one of the main coffee producing territoriesin Brazil. It is the first region to produce coffee demarcated in the country, according to a decree of the Minas Gerais government, Brazil, since April 1995.

In this context, this paper aims to verify the existence of sustainable practices along the supply chain of coffees in Cerrado Mineiro Region and to understand the effects of this adoption with regard to the Green SCM focusing on the relationship between producers and collective organizations, such as cooperatives and foundations of development.

In order to attain this objective, it was conducted na applied research, with qualitative approach. A case study in Cerrado Mineiro Region was carried out in order to collect data through questionnaires and semi-structured interviews with the representatives of the coffee supply chain links. The research involved coffee producers, cooperatives and a development foundation. In a complementary manner, it was also conducted a documentary analysis based on reports provided by the aforementioned supply chain members.

This paper aims to broaden the discussion of the sustainability in coffe supply chains, by proposing an analysis of the existence of sustainable practices and a subsequent explanation of the effects of these in Cerrado Mineiro Region, Brazil. Besides that, this paper contributes for the academic literature by

identifying a research gap, considering that the recent researches have still not enough discussed on the dynamics of supply chains in the food sector, specifically in the case of coffee, from the perspective of the three sustainable development dimensions proposed by Elkington (1994). Regarding the managerial practice contributions, the analysis proposed in this study may favor the decision-making process by the agents that operate in the coffee supply chain, mainly in the case of producers, cooperatives and development foundations.

In addition to this introduction, the paper presents four other sections. In the first one, the theoretical basis under which the article is developed, which includes issues related to sustainability and the Green SCM, is presented. The second section presents and justifies the methodological procedures adopted in this research. In the third section, the results are presented and discussed later in the light of the theory. In the fourth and last section, the final considerations of the article are presented.

LITERATURE REVIEW

Supply chain: management and sustainability

One of the main definitions adopted in the literature for the term supply chain was disseminated by Mentzer et al. (2001). According these authors, this is a set of three or more companies directly involved in the upstream and downstream flow of goods, services, financial resources and information from the beginning of the chain to the end customer. In this context, Guarnieri and de Almeida (2016) recognize that for the existence of a supply chain, it is necessary to understand that customer satisfaction is the essential component. A supply chainstarts when the customer orders a product or service and ends when the payment is made.

Aligned with the understanding that a supply chain brings together a number of internal and external business processes of the business environment, it is essential to comprehend the fundamentals of SCM. One of the main definitions for the term was proposed by Mentzer et al. (2001), in which the authors state that SCM is a management model integrating the (systemic and strategic) traditional business functions within a particular company within supply chain, for the purpose of achieving long-term improvement.

The SCM concept has been recognized as a key factor in promoting organizational sustainability. In this sense, Stonebraker and Afifi (2004) emphasize that the success of a supply chain depends on management's ability to recognize changes in the corporate environment. In addition, Carter and Rogers (2008) define Green SCM as the strategic and transparent integration of social, environmental and economic aspects in the systemic coordination of organizational processes with a view to improving the long-term economic performance of the company and its supply chain. Carter and Liane Easton (2011) state that Green SCM is related to long-term improvement and has significant implications for the economic results of companies.

In other words, the Green SCM is defined as the management of material, information and capital flows, as well as cooperation between companies throughout the supply chain, while adopting sustainable development goals, i.e., the integration of the environmental, social and economic dimensions (Seuring & Müller, 2008). In order to meet the needs of stakeholders, according Ahi and Searcy (2013), the Green SCM consists of the creation of supply chain coordinated through the voluntary integration of economic, environmental and social policies with the interorganizational business systems designed to efficiently manage diverse processes of the company. This management constitutes a way to extend the profitability of the business, in addition to providing greater competitiveness and adaptability in the short, medium and long-term.

Regarding agri-food supply chains, which may include dairy products, grains, vegetables, meats, flowers and fruits, Routroy and Behera (2017) conceptualize that these are initiated from relationships with suppliers (i.e., materials and services of entry for farm-level operations) and are finalized through customer satisfaction through a specific distribution channel. Also in this context, Rais and Sheoran (2015) identified some factors that affect the performance of agri-food supply chains, such as cold storage unavailability, lack of government policies, inadequate connectivity, classification unavailability and classification technology, inadequate handling and packaging, unskilled labor, poor articulation in marketing, and other.

Clemens and Douglas (2006) state that some companies consider that adopting supply chain sustainability creates a commercial and competitive advantage.

Wang, Teng, and Lou (2014) understand Green SCM as a business strategy aimed at minimizing the environmental, economic and social risks of the organization to create corporate value.

Thus, Bask et al. (2013) point out that companies that adopt Green SCMrecognize that social and environmental impacts need to be managed in the same way as financial and commercial performance. They also suggest that in order to be competitive and survive in the market, especially in the coming decades, companies need to extend their sustainable practices throughout the supply chain. Therefore, companies need to foster their sustainability efforts beyond their own operations, including the practices of their suppliers and the satisfaction of their customers' sustainable expectations (Porter & Kramer, 2006).

In Koberg and Longoni's point of view (2018) sustainable supply chain management has been suggested to improve business sustainability results. Nevertheless, the authors acknowledge that this management model implies unique challenges as adopted in global supply chains, such as coffee. It is understood that such challenges advocated by Koberg and Longoni (2018) may be related to the configuration of the global supply chains, since the connections between the focal company and the various suppliers and customers, including the sub-layers, may be hampered by geographical issues and culture.

In relation to food supply chains, Wu and Huang (2018) reveal eight crucial characteristics for the success of adopting sustainability in supply chains: (1) the use of management software; (2) eco-innovation; (3) organizational culture; (4) storage capacity; (5) transportation options; (6) reduction of losses and waste; (7) availability of physical resources and; (8) regulatory frameworks. Among them, Wu and Huang (2018) highlight the two most important factors for the successful implementation of sustainability, being eco-innovation and reducing food loss and waste. These characteristics, which can also be understood as challenges for the management of supply chains, have reoriented business relationships within the agri-food sector (Cembalo, 2015, Wu & Huang, 2018).

METHODOLOGICAL PROCEDURES

Regarding to the methodological procedures used in this study, a case study was first developed with coffee producers, cooperatives and the Cerrado Mineiro Development Foundation (Fundaccer). The data collectiion was based on the following research instruments: (1) Questionnaire applied to coffee producers included in the Cerrado Mineiro Region, Brazil; (2) Semi-structured interview script, conducted with the managers of the cooperatives to which these producers were associated and of Fundaccer (development foundation); (3) Direct non-participant observation, as well as videos and photos, both in relation to the coffee production process, as well as the inherent aspects of the relationship between producers, cooperatives and Fundaccer e; (4) Documentary analysis (Development Plan, Sustainability and Promotion of Cerrado Mineiro Region, Brazil 2015/2020, among others).

The research with coffee producers was developed with the aid of a structured questionnaire, which was adapted froma validated scale proposed by Zhang, Tse, Doherty and Akhtar (2018). Considering the adaptation of the questionnaire, it was sent to the validation of content by judges (professionals of the coffee industry and researchers in the area). After this evaluation, it was verified that the adaptation was coherent and, then, it was done with the re-construction of this instrument. For the measurement of variables, a Likert-type scale was adopted. It is a non-comparative scale, of the itemized type, in which the participant points out a single item, according to their degree of agreement (Malhotra, 2006). Due to the context of this study, we chose to use the Likert scale with five levels (1-5), considerint the 1 the lowest level and the 5 the highest level of concordance.

Data collection from cooperative managers and Fundaccer was carried out through interviews, conducted face-to-face and via Skype. In order to operationalize the method, a semi-structured script was used, which was also elaborated based on the scale proposed by Zhang, Tse, Doherty, and Akhtar, (2018), in order to triangulate the results of the questionnaires with the coffee producers and interviews conducted with managers. During the interviews with the managers, who had already been previously scheduled through e-mails and telephone calls, voice recorders were used, with the permission of the interviewees. The use of this instrument made it possible later that such interviews were transcribed and sent in a text file in order to be validated by them. So the participants of the interview could confirm or refute what they had said at the time of the interview. It should be noted that parts were complemented in this process.

The choice of the participants in the Fundaccer considered the criterion of representativeness, considering that managers interviewedhad information regarding the sustainable management of the supply chain. Two (2) collaborators of the organization were interviewed, who work in sectors directly linked to coffee producers. Regarding the choice of coffee producers, in the first moment, it was defined by convenience and accessibility. In a second moment we adopted the methodological technique of Snowball.

Sampling

Baldin and Munhoz (2011) point out that the Snowball technique is widely used in the social sciences mainly in qualitative research. In this techniquethe initial participants of the study indicate new participants who, in turn, indicate others and so, successively. It is indicated for identify study participants who are often geographically dispersed.

Regarding the representatives of the cooperatives, only managers who participated actively in the activities related to coffee, thecriterion adopted was also representativeness. Thus, the participants were selected considering the position they have within the cooperatives. It was decided to hide the names of cooperatives, considering that one of these organizations requested that its name not be mentioned. Thus, for purposes of standardization and guarantee of secrecy of information, cooperatives are identified by (1) Cooperativa Alfa; (2) Cooperative Beta and; (3) Cooperativa Gama.

For the analysis and treatment of data, it was used the Content Analysis method, proposed by Bardin (1977). The content analysis was operationalized through the data collected in the interviews, both with producers and managers of the cooperatives, besides those from the systematic reviews. The logic of applying this method of analysis consists on the importance of establishing categories of analysis for the data collected, which are essentially qualitative in nature. Post-categorization was adopted, according to Bardin (1977). The categories were defined a priori based on the article by Zhang, Tse, Doherty and Akhtar (2018) and also adapted a posteriori, based on the cores of meaning of the interviewees' speeches. This procedure was established by Bardin (1977), considering the technique of thematic categorical analysis.

RESULTS

In terms of structure, although this study has analyzed only three members of supply chain (coffee producers, cooperatives and development foundation) it was evidenced that this chain is composed of other links, classified as 2nd level suppliers (tangible and intangible products), 1st level customers, among which also cooperatives, along with accredited exporters, coffee shops and final customers (direct sales), as well as logistics operators. However, it is observed that the 2nd level suppliers feed the chain with supplies used for the production of inputs such as fertilizers, fertilizers, machinery, equipment, and other. They also work in the provision of financial services, insurance, consulting and soil analysis. Table 1 presents the systematization of sustainable practices and behaviors identified in the relationship between producers and cooperatives of Cerrado Mineiro Region.

Table 1. Systematization of sustainable practices and behaviors identified in supply chain

Variables and items analyzed according to Zhang et al. (2018)	Dimension of sustainability	Evidenced Practices and Behaviors	Supply Chain Members		
			producers	cooperatives	foundation
Environmental sustainability in the coffee production process	Environmental	▪ Use of Electrostatic Spraying	x	-	-
		▪ Construction of rainwater harvesting systems	x	-	-
		▪ Use of wastewater cleaning and fertigation system	x	-	-
		▪ Partial adoption of biological control of pests and diseases	x	-	-
		▪ Use of precision agriculture	x	-	-
Environmental sustainability in supplier relationships		▪ Environmental auditing for supplier selection	x	x	x
Environmental sustainability in collaboration with customers		▪ Development of biodegradable packaging	x	x	x
		▪ Gradual replacement of the use of jute packs by big bags	x	x	-
Internal Green Management		▪ Operation of the Empty Packing Processing Center	-	x	-
		▪ Trainings of employees on sustainable coffee production	x	x	-
		▪ Development of compliance and environmental audit programs	x	x	x
		▪ Implementation of environmental management systems	x	x	x
Investment Recovery	Economic	▪ Holding of open auctions for the sale of scrap of machines and equipment	x	x	-
Diversity Management	Social	▪ Hiring employees without prioritization of a particular gender	x	x	x
Development and social involvement		▪ Day of Cooperate	-	x	x
		▪ Support to regional philanthropic entities	x	x	-
		▪ Food and toy collection campaigns	x	x	-
Security Management		▪ Sizing ergonomically correct workstations	x	x	x
		▪ Use of Personal Protective Equipment (PPE)	x	x	x
		▪ Training on health and safety at work	x	x	x

Regarding the data presented in Table 1, it was verified that coffee producers, in fact, agree and recognize the importance of adopting environmentally correct practices in coffee production. The agreement level was practically 100% in all analyzed variables. It was found that, in the case of coffee producers, there is a search to improve the coffee production process in order to reduce the consumption of materials and energy, as well as to increase the recycling rate of these materials.

Another identified practice is the reduction of the consumption of water withdrawn from the riverbeds and dams by reuse of rainwater from the coffee plantations. It was verified that this practice is being adopted in nine of the twelve properties analyzed.

In the opinion of cooperative managers, even if environmental criteria are directly or indirectly considered in the choice of suppliers, it is something that needs to be more absorbed by decision-makers within cooperative organizations. According to the Cooperative Manager Range:

As much as we know the need to consider this environmental issue, we still run into the issue of price or even ease of delivery of the product we need. As we work with harvest, we can not waste planting time waiting for some supplier that has this certification, which is not easy to get (Manager 3 - Cooperativa Gama).

Considering the statemente above, it is evident that for both coffee producers and cooperatives, maintaining and controlling internal sustainability is something that is already internalized. However, when this responsibility transcends the internal barrier of ownership and migrates to the external environment, it becomes something more complex to control.

It was verified that the vision of producers, cooperative managers and Fundaccer are aligned and are moving towards cooperation between customers in the search for a more sustainable Cerrado Mineiro Region - CMR coffee crop. According to the manager of the Gama cooperative, customers need to realize that coffee production in the CMR is tied to environmental care, ranging from how to irrigate coffee plantations (with something that can reduce water consumption) to even biodegradable packaging that is used in some coffee brands.

Also regarding to cooperatives, which are generally responsible for the storage process, an interesting practice was identified regarding the physical distribution of coffee, making logistics and handling of coffee beans more efficient within the warehouses. It is the gradual replacement of the traditional jute sack (vegetable textile fiber) by big bags.

Concerning issues related to training, it has been noted that it is sometimes intermediated by cooperatives and Fundaccer with the use of their own human resources or through partnerships with other institutions, such as Sebrae and Epamig. This aspect is indicative, as Jabbour, Azevedo, and Arantes (2013) state, that there is a cross-functional cooperation involved in coffee supply chain in Cerrado Mineiro Region. We could observe the frequent involvement of the agents of this chain in order to achieve better results in terms of coffee quality and the sustainability of coffee production.

Although it was verified the existence of environmentally correct practices within the properties, it is seen that some of these (3) still do not have an Environmental Management System formally developed. This group of producers also states that there is no regular practice of audits, whether internal or external, in order to verify the compliance of environmental actions in the realm of property. It is known, however, that the Environmental Management System is voluntary, due to there is no legislation that obliges producers or organizations to implement this system in their activities.

Regarding internal green management, it was verified that all cooperatives studied developed internal practices aimed at preserving the environment. The cooperative Beta, for example, in 2003, in partnership with the National Institute of Empty Packaging Processing (inpEV) - responsible for reverse logistics of pesticides and agri-chemicals - operates the Empty Packaging Processing Center in its headquarters municipality. The plant receives packaging of pesticides and similar products already used to contribute to reverse logistics, so as not to compromise the environment. This practice is also developed in a similar way in the Alfa cooperative and in the Gama cooperative, even though it is a legal imposition, due to specific legislation regarding the handling and transportation of pesticides and also as established in the Brazilian Policy of Solid Waste – Law12,305/2010 (Barbosa, Guarnieri, & Junqueira, 2017).

DISCUSSIONS

Regarding the sustainable practices developed within the supply chain, specifically the environmental

sustainability of the coffee production process, a favorable behavior was observed with regard to the supply chain links analyzed (coffee producers, cooperatives and Fundaccer). Practices adopted to reduce the consumption of materials and energy were identified, such as (1) use of electrostatic spraying; (2) construction of systems for collecting rainwater; (3) use of wastewater cleaning and fertigation system; (4) partial adoption of biological control of pests and diseases; and (5) use of precision coffee cultivation, among others.

These actions developed by the coffee producers in supply chain, besides expanding the possibilities of commercialization of the coffee grain and also to deal with the legal issues, can improve the efficiency of the business, since the reduction of the consumption of materials and energy directly reflects in the cost of coffee production. This fact can also be seen as a competitive differential in several aspects.

Regarding the existence of environmental practices in the relationship with suppliers, it was identified that this is an action still lacking in use in supply chain. Although some of the members of the supply chain analyzed promote an environmental audit for supplier selection, this practice is not a rule, but an exception. Thus, it is understood that it is necessary to establish supplier development programs in the perspective of environmental sustainability in the relationship with suppliers. What, according to the literature, needs to be an initiative of the focal company, in this case the Fundaccer.

At the other end of supply chain, referring to the environmental collaboration with customers, it was noticed that the established practices in this sense are also moderate, as well as in the relationship with suppliers. Although most of the links recognize this importance, only two practices associated with environmental collaboration with customers were identified, with (1) the gradual replacement of the use of jute packs by big bags; (2) the development of biodegradable packaging and; (3) practice of reverse logistics. Nevertheless, the evidence suggests that supply chain members are concerned that customers value when coffee production is linked to environmental practices, otherwise they are also aware that customers can boycott coffee brands that not meet environmental or social aspects.

Regarding to the internal green management variables, it was possible to perceive that both coffee producers, cooperatives and Fundaccer carry out some type of action internally, generally related to organizational and collaborator aspects. Some properties have Environmental Management Systems, as well the cooperatives. Consequently, some properties aim to establish compliance and environmental audit programs internally, and often subject their collaborators to training on sustainable coffee production.

With regard to the economic dimension of sustainability, an interesting practice was verified in the direction of the recovery of the investment in the assets destined to the sustainable coffee production. Two of the analyzed cooperatives sell unsecured materials (scrap, for example) through open auctions, which is a practice of reverse logistics. It is a practice that aims at least to recover part of the amount invested in the acquisition of these physical assets. Indirectly, practices in this sense were also observed in the daily life of coffee farms, besides of economic and environment protection results they comply with the environmental legislation related to reverse logistics.

In the social dimension, when it comes to diversity management, no evidence has been found that there is a prioritization for hiring employees based on sex, for example. Regarding the remuneration, what was perceived is that it occurs according to the activity performed. It should be noted that diversity in the supply chain workforce can be a two-way street. One is directed to an ethical and social commitment of the company and another related to the competitiveness in terms of market. However, this research did not focus in this an issue, which can be deepened in future researches, since some studies emphasize that the feminine labor suffers salary differences.

In terms of development and social involvement, a socially responsible, if still developing, behavior of coffee producers, cooperatives and Fundaccer was confirmed with the environment in which they are inserted. Various evidences were found in this sense, such as participation in community events in the form of sponsors, days of fields open to the population, campaigns for collection of goods to be later distributed, and other.

Finally, with regard to safety management, some actions were identified in order to promote safety in the production of coffees. In addition to ergonomically designed workstations, part of the links of supply chain aims to conduct courses and promote training on aspects such as health and safety in work related to coffee.

As emphasized in the theoretical basis of this study, organizations that aim to implement sustainable practices in their productive and organizational processes within the scope of supply chain, do so as a business strategy aimed at minimizing environmental, economic and social risks and thus create and extend the corporate value (Wang, Teng, & Lou, 2014).

In the Cerrado Mineiro Region supply chain, it is clear that there is some prioritization of the customers aimed to the coffees produced with social and environmental responsibility parallel to the economic issues. Therefore, the coffee production is driven to the market and the sustainable practices have received significant attention by the members of the supply chain of coffee in the Cerrado Mineiro Region. These practices are associated with TBL concept, proposed by Elkington (1994), aiming the balance amont environmental, social and economic dimensions.

Throughout the interviews withcoffee producers, cooperative managers and Fundaccer, it was observed that there is a predisposition to implement sustainable practices in the various productive and organizational processes of coffee supply chain. The practices previously discussed and summarized in Table 1 confirm this observation and also allow to verify that many of these are developed externally, that is, there are partnerships among supply chain members to implement and operationalize such actions. It is also important to emphasize that in the supply chain of Cerrado Mineiro Region of coffee, to obtain certification of origin, producers were impelled to integrate between cooperatives and developmentfoundation (in this case, Fundaccer), which has guaranteed the quality of the product, facilitated the dissemination of sustainable practices and also made possible their export in order to access previously unexploited markets. The foundation can be recognized as focal company, governing the supply chain, while cooperatives play two roles: the supplier of inputs and also the buyer of the product.

Similarly, it has been noted that many of the drivers of the ustainable practices are also external, and it is not something that is solely a concern of supply chain members, but rather of the consumer market. These results are presented as interesting findings, since the Green SCM literature assumes that the implementation of sustainable practices in supply chain is a result of external influences, especially of pressures, incentives and demands of the clients and the government.

Finally, it should be emphasized that the discussion of public policies to promote sustainable practices in food supply chains, such as coffee, can enable the implementation of sustainable practices, as well as their improvement. This fact is also important when considering that the coffee market is based largely on international buyers, who require a sustainable positioning in agri-food production, as a requirement in the negotiations. Considering the relevant participation of agribusiness in the Brazilian, the implementation of public policies for this purpose can have favorable effects and may be the object of future research.

FINAL CONSIDERATIONS AND RESEARCH AGENDA

In this study, we aimed to identify sustainable practices adopted in coffee production in the Cerrado Mineiro Region. A number of practices were identified, which encompassed all three dimensions of sustainability, although a greater number of practices focused on environmental issues were adopted, followed by social ones and, finally, economic ones.

The contributions observed from this study are related to the systemic understanding of the way in which sustainability has been incorporated and operationalized in the coffee Cerrado Mineiro Region supply chain. Therefore, it helps managers of the organizations researched and involved in the supply chain in the decision making process, since the adoption of sustainable practices may require financial investments. On the other hand, it is also worth noting that the data presented here are evidence that the development of sustainable strategies can have positive effects for the companies studied, since these aspects have proven to improve the relationship of supply chain members, teto the most collaborative ones.

Despite the efforts and contributions of the research, it is necessary to highlight the limitations. It was decided to analyze in this paper only three links ofsupply chain covering 12 coffeeproducers, 3 cooperatives and 1 development foundation (Fundaccer). By expanding this range ofsupply chain members, including such as associations and coffee shops, other views on sustainability could emerge and motivate further discussion.

Considering the aforementioned limitations, it is recommended to further studies: (1) To explore the in-

fluences that strategic management of sustainability in agri-food supply chains can exert on the internal orientation of organizations; (2) Analyze the internal and external drivers towards the adoption of sustainable practices in the coffee Cerrado Mineiro Region supply chain; (3) Analyze the barriers faced by supply chain members towards the adoption of sustainable practices in their productive and organizational processes; (4) Analyse the social related issues, as such as, female labour force and other issues.

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