



**Supply Chain Sustainability Learning: the COVID-19 impact on emerging economy suppliers**

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## Supply Chain Sustainability Learning: the COVID-19 impact on emerging economy suppliers

### Abstract

**Purpose:** This paper investigates the impact of the COVID-19 pandemic on supply chain sustainability learning. In particular, it focuses on the learning associated with changes in the sustainability initiatives of emerging economy suppliers.

**Design/methodology/approach:** Through studying three scenarios (pre-outbreak, buyer-centred peak, and supplier-centred peak) over a nine month period, a multi-case study strategy was used to gain an understanding of the learning of export-oriented Brazilian coffee producers, using both exploitation and exploration capabilities. Content analysis was developed after each data collection phase to investigate how sustainability initiatives had changed.

**Findings:** Social sustainability was observed to be the main priority by suppliers facing this unprecedented outbreak, in ways that go beyond expected sustainability certification requirements. For instance, there was evidence of outstanding contributions to the local community. Suppliers initially developed their sustainability initiatives during the outbreak without any support from global buyers, certification bodies or government. Despite this, stronger relationships with buyers ultimately emerged facilitating greater supply chain sustainability. Consequently, by using both exploitation and exploration learning capabilities, multiple levels of learning were observed (i.e., individual, organisational and supply chain) as related to planning, new procedures and social awareness.

**Practical implications:** A greater awareness of supplier learning processes will aid buyers in developing recovery plans that are appropriate for their global supply chain partners.

**Originality/Value:** This paper provides an understanding of how emerging economy suppliers of global supply chains are coping with this unprecedented outbreak in regard to sustainability management. Moving the spotlight from buyers to suppliers, the research demonstrates that supplier learning is central to global supply chain sustainability.

**Keywords:** Supply chain sustainability; Supply chain learning; Sustainability initiatives; COVID-19; unprecedented outbreak; Emerging economy supplier.

**Article classification:** Research Paper

### 1. Introduction

The COVID-19 outbreak has challenged global economic activities worldwide (Ivanov, 2020), affecting global and regional supply chains (SCs) in terms of both demand and supply (Ivanov, 2020; Pantano et al., 2020). In contrast to other SC disruptions, such as Brexit related constitutional change (Hendry et al., 2019) or an extreme weather event (De Sá et al., 2019), the COVID-19 outbreak has unique characteristics (Craighead et al., 2020). For instance, it has been argued that the level of pressure and requirement to guarantee supply in an efficient and safe way is higher (The Economist, 2020). This poses new challenges for many different

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4 SC players worldwide in terms of their learning and the adaptation of their activities. In this  
5 context, this paper aims to understand the impact of the outbreak on emerging economy  
6 supplier learning as associated with sustainability initiatives.

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8 Despite the severity of the COVID-19 outbreak, different tiers of the supply chain have  
9 managed to respond well. For example, major food supplies (e.g. cereals) have been  
10 maintained, helped by good harvests and very high levels of stocks (The Economist, 2020).  
11 However, addressing only the market demand is not sufficient since there are also a set of  
12 urgent social issues (e.g. workers' health and safety protection, Larue, 2020) and the need for  
13 economic support on both the demand and supply sides (Bell and Blanchflower, 2020). Thus  
14 sustainability has emerged as a key issue for achieving SC resilience during the outbreak  
15 (Queiroz et al., 2020). This has led to the question of whether organisational sustainability  
16 priorities have been impacted by the outbreak (Barreiro-Gen et al., 2020; Hakovirta and  
17 Denuwara, 2020; Jabbour et al., 2020), in turn having a direct impact on SC learning. Since  
18 sustainability initiatives do not change overnight (Silvestre et al., 2020), it is important to  
19 study how they have evolved as the global effects of the outbreak have unfolded. It is  
20 particularly important to study how the initiatives of emerging economy suppliers have  
21 evolved as these suppliers tend to face additional barriers to sustainability (Busse et al., 2016),  
22 especially when an unprecedented event unfolds (Smith and Wenger, 2007). Given the  
23 cultural differences between emerging economy suppliers and their global buyers (Koberg  
24 and Longoni, 2019), it is likely that adopting a supplier perspective will lead to a fuller  
25 understanding of the impact of the pandemic on their learning. Thus, this perspective is  
26 adopted in this paper, strengthening its contribution as this is an under-explored viewpoint in  
27 the sustainability literature (Jia et al., 2018).

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29 SC sustainability research to date has included investigation into the complexity  
30 surrounding how sustainability initiatives evolve along trajectories (Silvestre, 2015; Roy et  
31 al., 2018). In this context, a trajectory represents a sequence of learning loops forming a path  
32 towards SC sustainability (Silvestre et al., 2020). However, there is a lack of research that  
33 explains how SC sustainability learning occurs (Gong et al., 2018; Yang et al., 2018). In  
34 particular, the extant literature has been barely interested in how SC sustainability learning  
35 differs for various SC players, and there is no research to date that considers how this learning  
36 occurs when facing an unprecedented outbreak such as the COVID-19 pandemic. Thus, there  
37 is a need to study how sustainability-oriented supplier learning occurs at multiple levels  
38 (individual, organisational and SC). This paper addresses this research gap claiming that  
39 learning refers to changes in knowledge, behaviours and values (Huber, 1991; Siebenhüner  
40 and Arnold, 2007). In this context, sustainability-oriented learning refers to changes in  
41 sustainability-related knowledge, behaviours and values resulting from the experiences of SC  
42 actors in implementing sustainability initiatives. Thus two research questions are posed, to  
43 first investigate how sustainability initiatives have evolved during the pandemic, with a  
44 specific focus on the initiatives of emerging economy suppliers, and second to explore the  
45 levels of learning that have been experienced by these suppliers. The research questions are as  
46 follows:

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48 *RQ1: How are sustainability initiatives being impacted by the COVID-19 pandemic in export-*  
49 *oriented emerging economy suppliers?*

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51 *RQ2: Which levels of supply chain sustainability learning are being experienced by emerging*  
52 *economy suppliers during this unprecedented outbreak?*

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60 A multi-case study approach is used to answer these research questions, by collecting  
data from Brazilian coffee suppliers both before the outbreak began and then comparing these

findings with their sustainability-related activities as the pandemic spread first to their buyer countries and then into Brazil. The selection of the Brazilian coffee SC can be justified for two reasons (i) the importance of this industry and (ii) the way it was impacted by the COVID-19 outbreak. The impact was significant as, given social distancing restrictions, the majority of coffee shops and restaurants were closed (Rizou et al., 2020). In terms of the size of the industry, Brazil is the largest coffee producer in the world, supplying around 32% of the total coffee consumed (Embrapa, 2018; International Coffee Organization, 2014; Conab, 2020). These coffee producers are key suppliers of many global SCs with the main buyer destinations in the USA, Italy and Germany (Brazilian Coffee Exporters Council, 2020), and customers that include important global brands such as Nespresso, Starbucks and Illy (Sakkis, 2018).

It is important to highlight that, at the time of this research, the pandemic is ongoing, therefore this is an initial analysis to explain how emerging economy suppliers in global SCs have operated and learned during this crisis. This paper therefore provides new empirical evidence on how the sustainability initiatives of these suppliers have evolved during the initial spread of COVID-19, thereby making three main theoretical contributions. Firstly, the evidence suggests that use of a 'light touch' buyer monitoring approach is more appropriate as a governance mechanism in this context, as it is more conducive to supplier learning. Secondly, it demonstrates that certifications are a key source of learning, but that learning is not limited to this source during an unprecedented outbreak. In particular, the evidence demonstrates that emerging economy supplier sustainability priorities have changed to become more focused on social sustainability issues, and that the crisis has accelerated their sustainability-oriented learning in this direction. Thirdly, it provides practical insights into the influence of an unprecedented outbreak on multiple levels of learning, including the individual level, given that SCs learn through individuals (Azadegan et al., 2008; Wieland et al., 2016). Thus the findings demonstrate the important role of learning at the individual, organisational and SC levels within emerging economy suppliers, for improving overall SC sustainability.

## 2. Theoretical Background

### 2.1. Sustainability in global supply chains: the need for a supplier perspective

Managing global SCs is complex as their operations take place within many parts of the world and hence the companies involved are characterised by differences in culture, language, size, resources, profitability and bargaining power (Awasthi et al., 2018; Koberg and Longoni, 2019). In this context, global SC sustainability studies have emphasised the importance of the effective management of suppliers in emerging/developing countries (Koberg and Longoni, 2019), mainly due to their high impact on global emissions and their economic and social instability (Jia et al., 2018; Liu et al., 2019). Thus it has been argued that sustainability within supplier country contexts needs to be better understood because their activities greatly influence the sustainability of the entire global SC, particularly given that the role of these suppliers tends to relate to extraction, production and manufacturing (Jia et al., 2018; Liu et al., 2019).

The way in which these global suppliers, located in emerging/developing countries, undertake sustainability-related learning has not yet been sufficiently discussed in the literature (Jia et al., 2018; Koberg and Longoni, 2019). In particular, more research is needed to consider the supplier perspective, as focal companies do not comprehend well why some suppliers adopt sustainable initiatives successfully while others do not (Liu et al., 2019). This may be due to the operational context of these emerging/developing country suppliers, which

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contrasts with that of their buyers' in developed countries (Akbar and Ahsan, 2019; Köksal et al., 2018; Koster et al., 2019). The emerging/developing country context includes: a lack of strict national laws; a lack of infrastructure; high social inequalities and informality; and high levels of corruption (Fritz and Silva, 2018; Koberg and Longoni, 2019; Tanco et al., 2018). In addition, companies in these countries face barriers related to weak organisational culture, and lack of top-level management commitment to sustainability (Hajjar et al., 2019; Silvestre, 2015).

Despite these barriers, emerging/developing countries' suppliers need to act sustainably to comply with their mandatory buyers' requirements and, thus, many of them have gained certifications aiming to improve their management practices (Hajjar et al., 2019; Köksal et al., 2018). Some previous studies on global SCs evidenced both positive (Hajjar et al., 2019) and negative (Mancini, 2013) environmental, economic and social outcomes attached to these certifications. Although previous studies have shown that subsequent sustainability initiatives improve corporate performance, there is insufficient data about this in emerging/developing countries' context in comparison to developed economies (Jia et al., 2018). Thus the relationship between sustainability in SCs and countries' development is an important subject to consider in research (Awasthi et al., 2018; Jia et al., 2018) and a better understanding of the emerging/developing countries' suppliers' role is crucial for better global SC sustainability management. This will enable buyers to both better assess these suppliers and to develop their relationship with them enabling successful strategic collaboration (Koberg and Longoni, 2019). It can therefore be argued that one important aspect of the supplier operations requiring greater understanding concerns how they learn about sustainability initiatives, thereby increasing the implementation of these initiatives within the SC.

## 2.2. *Supply chain sustainability learning during unprecedented outbreaks*

The sustainability literature is starting to challenge existing meanings and definitions regarding the implementation of sustainability within companies and SCs (Elkington, 2018). For example, Fritz and Silva (2018) have suggested that the UN sustainable development goals should be used to analyse SC sustainability, as these provide greater breadth and depth than is typically achieved using the triple bottom line (TBL). In this paper, sustainability refers to the inter-generational sharing of needs and responsibility, which is represented by various initiatives. In this sense, sustainability initiatives comprise companies' long-term actions (e.g. projects and programmes, Walker and Jones, 2012) developed by companies and disseminated among SC members. These initiatives emerge to improve the SC practice and performance and arise according to specific sustainability trajectories that guide SC members' behaviour (Silvestre et al., 2020). According to Silvestre (2015), the SC sustainability trajectory consists of a series of learning loops along a non-linear and multi-directional journey. He thereby argues that building a trajectory depends on how efficient the SC is at learning.

The learning associated with sustainability initiatives as part of this trajectory is essential for successful SC sustainability implementation (Oelze et al., 2016; Silvestre et al., 2020). Therefore, learning is an ongoing process that companies experience as they develop their sustainability initiatives; however, it is not limited to conscious and intentional changes since "an entity learns if, through its processing of information, the range of its potential behaviour is changed" (Huber, 1991, p. 89). Here, an entity refers to learners (e.g. individuals, groups, organisations, industries, etc.) and the processing of information refers to the acquiring, distributing and interpreting of this information (Huber, 1991). This learning occurs at multiple levels (Antonacopoulou, 2006; Knoppen et al., 2010), and interactions between these levels occur as part of the SC sustainability trajectory. Thus, since SC learning

is not simply a sum of individual/organisational learning (Knoppen et al., 2010), the following definitions are proposed:

- SC sustainability learning at the *individual level* as the personal process experienced by employees and managers to increase sustainability information and awareness. This includes different learning representations, such as: new behaviours, knowledge and values incorporated, for example, through a leadership process (Gosling et al., 2017; Knoppen et al., 2010; Ojha et al., 2018; Yang et al., 2018).
- SC sustainability learning at the *organisational level* involves the function-related sustainability knowledge that may occur within specific parts of an organisation. It refers to both continuous improvement and fundamental changes towards sustainability goals across the whole organisation, including: strategies, culture and practices (Azadegan et al., 2008; Bessant et al., 2003; Siebenhüner and Arnold, 2007).
- SC sustainability learning at the *supply chain level* occurs when there is sustainability knowledge that crosses firm level boundaries, such that information is thereby transferred, acquired, assimilated and exploited to increase sustainability in the SC (Bessant et al., 2003; Gong et al., 2018; Huo et al., 2019; Yang et al., 2018).

Sustainability-oriented learning at all three levels is informed by multiple sources and is defined as a process where entities deal with changes in both knowledge and values (Siebenhüner and Arnold, 2007). Thus, this type of learning is a powerful means to analyse and apply sustainability initiatives (Gavronski et al., 2012; Silva et al., 2020; Yang et al., 2018). These sustainability initiatives may be limited to implementation within a focal firm, however they rely on learning at both individual and organisational levels as well as the SC level (Gong et al., 2018; Silvestre et al., 2020). For instance, Silvestre (2015) claims that SC learning loops are related to introducing innovations within a SC sustainability learning trajectory in a non-linear and self-supportive manner. Focusing on learning means that processes are analysed within loops of sharing to achieve a specific target. It can hence be argued that supplier sustainability learning is relevant to the entire SC learning, as buyers can learn through supplier innovations (Azadegan et al., 2008; Flint et al., 2008; Zhang and Lv, 2015). Thus, it is important to understand how learning associated with sustainability initiatives has occurred at multiple levels. More specifically, there is a research gap to study changes in the knowledge, values and behaviours of emerging economy suppliers as essential participants in these SC learning loops, where these changes may include their level of awareness of sustainable operations (Geldermann et al., 2007; Faisal, 2010), and especially their agility to adapt their sustainability initiatives within a turbulent environment (Bag et al., 2020).

SC sustainability learning therefore shapes how diverse SC stakeholders deal with sustainability initiatives. In this context, Silvestre (2015) point out that SC learning involves integrating activities and creating joint collaboration among stakeholder members. Oelze et al. (2016) corroborate showing learning as a driver for SC sustainability strengthened by collaboration with intra-industry and inter-industry partners. In turn, Chandès and Pachè (2010) point out that in humanitarian SCs monitoring may be used to improve SC coordination by learning from past disasters. It is important to highlight, that some companies will assume a leadership position to initiate and disseminate sustainability throughout their SCs (Gosling et al., 2017); however, this depends on its learning orientation. Thus, sustainability-oriented learning can be used, for instance, to disseminate sustainability initiatives to suppliers, since the learning complexity reduces once they acquire sufficient

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4 knowledge (Gong et al., 2018). However, less is known about how suppliers react to this  
5 dissemination in terms of their own learning.

6 Whether the source of the learning is inter or intra-organisational, SC members need  
7 learning capabilities to be able to assimilate and consolidate new knowledge (Yang et al.,  
8 2018). Two key types of learning capabilities have been studied in the supply chain learning  
9 context – ‘exploration capabilities’ and ‘exploitation capabilities’, see for example Ojha et al.  
10 (2018) and Silvestre et al. (2020). These constructs have their origins in the broader  
11 organisational learning literature, where, according to March (1991), exploration refers to  
12 capabilities related to discovery and flexibility, for example, whereas exploitation relates to  
13 issues such as refinement. March (1991) argues that both are essential for organisations, but  
14 they compete for scarce resources. Ojha et al. (2018) suggest that exploitation is the primary  
15 capability for short term change, whereas exploration is more significant for a long term  
16 perspective. In addition, Silvestre et al. (2020) conclude that exploitation capabilities are more  
17 frequently used than exploration. It can therefore be inferred that SC learning typically takes a  
18 short-term perspective, which could be argued to be inappropriate in the context of  
19 sustainability. Gaining a complementary balance between the two capabilities has been  
20 argued to be important in the context of supplier selection - see for example, Azadegan et al.  
21 (2008). However, this balance is made difficult when there are multiple levels of learning and  
22 particularly in a changing environment (March, 1991). Further research is needed to  
23 determine the relative importance of exploration and exploitation capabilities as relevant to  
24 sustainability-related learning for emerging economy suppliers, particularly during an  
25 unprecedented outbreak.

26 Prior research has identified drivers and barriers that prevent SCs from developing the  
27 required learning capabilities when they operate in a turbulent environment (Bessant et al.,  
28 2003; Silvestre, 2015; Yang et al., 2018). The literature argues that turbulence mainly occurs  
29 in emerging and developing countries, and leads to barriers such as: lack of manager  
30 knowledge (which includes low qualifications) (Hajjar et al., 2019; Jia et al., 2018; Köksal et  
31 al., 2018; Tanco et al., 2018); non-monetary costs of training and monitoring change  
32 (including the difficulty of changing group mind-sets) (Hajjar et al., 2019; Tencati et al.,  
33 2008); and local corruption (Akbar and Ahsan, 2019; Köksal et al., 2018). However, this  
34 research was undertaken under “normal” conditions. Even where SC disruptions have been  
35 studied (e.g., De Sá et al., 2019; Hendry et al., 2019), albeit in a variety of country contexts,  
36 companies were not experiencing the same level of disruption as is occurring currently in the  
37 context of the COVID-19 pandemic. Thus, this paper is centred on studying sustainability  
38 initiatives and learning during the COVID-19 pandemic, as the barriers and drivers may be  
39 different in this context.

40 Given that this unprecedented outbreak is causing a set of different impacts worldwide,  
41 it is necessary to assume that not all countries are experiencing the same impact, mainly  
42 because not all of them have a stable business environment, i.e. the turbulent environment is  
43 ongoing (Majumdar et al., 2020). According to these authors, while some countries are  
44 concerned about measures of social distancing, others are more severely experiencing the  
45 social and economic consequences. This impacts sustainability priorities and concerns. For  
46 instance, Barreiro-Gen et al. (2020), point out that social sustainability is now a higher  
47 priority for many companies in comparison to the other TBL dimensions. On the other hand,  
48 Trautrim et al. (2020) highlight the possibility for further worker exploitation leading to  
49 more modern slavery during this pandemic. Given this debate, further research is needed to  
50 understand the main priorities of companies and SCs sustainability operations during this  
51 unprecedented outbreak. This paper addresses this research gap by providing insights from an  
52 emerging economy supplier country (i.e. Brazil) and their sustainability-oriented learning to  
53 provide an original contribution to theory and practice.

### 3. Research Method

Given the unique nature of the COVID-19 pandemic, an exploratory research approach has been adopted using qualitative multiple case studies (Ketokivi and Choi, 2014; Yin, 2017). This method was selected because it has the potential to enable deep and rich data collection (Eisenhardt and Graebner, 2007). In-depth data collection is needed for this research in order to fully understand the global coffee supplier's perspective in terms of their SC sustainability initiatives and learning, which are the main focus of the two research questions as previously presented.

#### 3.1 Case selection criteria and research protocol

The research protocol was initially focused on SC sustainability learning, and later, questions were added to the interview schedule to study the COVID-19 pandemic influence in the region. Therefore, although initially, the study focused on the "normal" context, this unprecedented outbreak provided an excellent opportunity to compare findings from data collected before and during the pandemic. The Brazilian coffee farmers selected were located in the Cerrado Mineiro Region, in the Minas Gerais state, because it is an important region for the worldwide sourcing of coffee with suppliers concerned about sustainability within global SCs. There are around 4500 producers operating in 55 municipalities in the region (Região do Cerrado Mineiro, 2020), and the coffee is sold to multinational companies such as Nespresso, Starbucks and Illy (Sakkis, 2018).

To select the specific cases to study, the following criteria were established:

- (i) size, to the study focused on medium/large coffee producers, as they are more engaged with sustainability initiatives (Antonioli et al., 2013); and
- (ii) export-oriented, to ensure they operate in global SCs.

The size classification is based on the total hectares of crop planted. This is the criterion adopted by the Federation of Cerrado Coffee Farmers, based on the classification of rural properties and the legislation regarding the Tax on Rural Territorial Property (ITR). Four modules, according to the ITR, is the minimum size for a rural property to be classified as medium-sized. Thus, all the producers that participated in the research had at least four modules, which is equivalent to 160 hectares of coffee plantation area in the Cerrado Mineiro Region.

#### 3.2 Data collection

To gather data to understand the sustainability journey during the COVID-19 pandemic, three rounds of semi-structured interviews were used with different research protocols (before and during the outbreak). In order to define the research sample, the "snowball" technique was used to access the participants (Teddlie and Yu, 2007). Hence, initial contacts were made by calling coffee producers known by the main researcher, and after their acceptance, suggestions were made for further producers to add to the sample. Thus, twelve coffee farmers participated in this study. The criterion used for ceasing data collection was the saturation level, i.e., the data collection process stopped when no more significantly new data was being added (Eisenhardt, 1989). The first set of interviews (referred to below as scenario 1) were conducted either face-to-face or by phone, according to the availability of the participant. The remaining interviews (scenarios 2 and 3 which took place after the pandemic had begun as further described below) were all carried out by phone given the social distancing restrictions surrounding the pandemic. Table 1 shows the main company and



participant information as well as the interview lengths during the three different scenarios of analysis.

Table 1

As can be seen in the table, all participants were available throughout the research process, except P12 who was not available during scenario 3. Primary data gathering started in November 2019 with the aim to better understand the sustainability initiatives adopted by coffee farmers in Brazil. Once the COVID-19 pandemic began, the focus was moved to investigate changes and learning during this period, thereby creating three scenarios for research. This shift aligns with the time frame analysis recommended by Dasaklis et al. (2012) to understand the influence of an unprecedented outbreak on operations. In doing so, both the pre-event setting and the impact of this unprecedented outbreak during the event were studied. The first scenario was the pre-outbreak context with data already collected, thus providing a unique opportunity to compare this data with information gathered during the outbreak. The second scenario represents the context where the main buyers' countries were experiencing the initial contamination peak in April 2020. At this point, Brazil was just reporting its first cases. This scenario was selected as lockdown restrictions had led to the closure of the main places of coffee consumption (e.g. coffee shops and restaurants). Finally, the third scenario focused on the displacement of the contamination peak from European buyers to Brazil. Thus, the final interviews were carried out between the end of June and the beginning of July 2020, when the main buyers' countries were past the initial peak and reopening non-essential shops/services, including coffee shops and restaurants, and Brazil was experiencing its first contamination peak.

Each data collection phase had specific questions in the interview guide, and a sample of these questions is provided in the Appendix. For example, the last scenario considered the learning that participants had undertaken since the second interview. Specific sustainability initiatives were thus investigated, which had emerged during the second interview, in order to perceive whether these new initiatives were becoming embedded within daily operations. All interviews were conducted in Portuguese, recorded and transcribed verbatim, thereby generating a total of 208 pages of interview data. Selected quotations were translated to English to ensure that the correct meaning was presented in each quotation. In addition, secondary data was collected during this period to triangulate the interview information with other sources, including: the organisations websites; news about the pandemic in the buyers' countries and in Brazil; and certification rules.

### 3.3 Data analysis and rigour

Content analysis was used to understand the information collected, as has been argued to be an appropriate technique to analyse case studies (Mayring, 2004; Seuring, 2008). Thus this strategy was used to understand each scenario based on its own context and characteristics. To develop the analysis, the focus was centred around the SC sustainability initiatives, which were the unit of analysis. First, an in-case analysis of the experiences of each of the twelve cases was completed. Secondly, a cross-case analysis was carried out to compare the sustainability initiatives and associated learning. In doing so, the sustainability initiatives emerged from the empirical findings, and were selected only when mentioned at least three times among the cases. This inductive analysis allowed a local understanding of the meaning of sustainability to emerge during each of the three scenarios of analysis. In the final stage of the analysis, the three levels of SC sustainability learning for the content analysis were defined *a priori* whilst the subcategories linked with each level emerged inductively

(Kovács and Spens, 2005; Saunders et al., 2019) from the data. In the findings below, only the cross-case analysis from the second and final scenarios is presented as this provides an overview of SC sustainability learning in the region during the outbreak.

Each initiative studied was highlighted by the respondents as central to supply chain sustainability. Having first identified an initial set of initiatives during the first scenario, this set was then used as a reference point during the research to (i) identify priorities and changes in the initiatives and (ii) to investigate the main SC learning by considering the COVID-19 outbreak influence. At each stage, the research analysis was based on management perceptions of the main changes and learning during this turbulent environment. To ensure research rigour reliability and validity criteria were applied (Yin, 2017). Reliability was ensured through the use of the research protocol and triangulation (between interviews and secondary data) (Seuring, 2008; Yin, 2017). To ensure internal validity a double-check strategy was used, i.e. two researchers were involved in the data analysis. In addition, for external validity, the findings were compared with those of the newer research regarding the COVID-19 outbreak (e.g. Barreiro-Gen et al., 2020; Chowdhury et al., 2020; Majumdar et al., 2020).

#### 4. Findings

This section begins by presenting the findings on how sustainability initiatives evolved due to the outbreak by considering each of the three different scenarios in turn in sections 4.1 to 4.3 respectively (pre-outbreak, buyer-centred peak, and supplier-centred peak). Then, in section 4.4, the main learning analysed using a multi-level perspective is presented.

##### *4.1. Scenario 1 (pre-outbreak): understanding suppliers' SC Sustainability initiatives*

Table 2 lists the sustainability initiatives as identified by managers in the first set of interviews. This table shows a high level of environmental concern as a direct result of the influence of buyers' certification requirements. This confirms previous research which indicates that for coffee production in particular, many different certifications have been adopted (e.g., UTZ, Rainforest, Nespresso) in order to gain access to international markets (Hajjar et al., 2019). Thus the findings indicate that managers recognised certifications as guides to transform their practical actions/behaviours, and during the interviews they were emphatic that there are a set of learning processes influenced by these certifications. For instance, health and safety issues and eco-innovations are initiatives resulting directly from certifications, which were not previously implemented by managers. In addition, other initiatives emerged indirectly to support the learning process such as raising the environmental awareness of employees and community and improving environmental protection.

*Table 2*

As can be seen in the table, SC sustainability initiatives were presented in all cases albeit with different numbers of companies engaged. Each case highlighted the most relevant initiatives for their context, which varied between raising the environmental awareness of employees with low levels of education (P2, P3, P8, P9 and P12) through to traceability which was mentioned only by three cases (P3, P5 and P7). Therefore, SC sustainability learning can be seen to be different even in the same region and sector, with priorities concerning sustainability initiatives being defined differently by each producer even when they are following the same guide. For example, cooperation with local cooperatives was

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4 mentioned in only six cases, who were more interested in having support for their economic  
5 sustainability. Nonetheless, as already discussed, the role of the certification in supporting  
6 learning is clear in the evidence:  
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9 Certifications are essential to ensure the proliferation of a culture of sustainability in  
10 the company. [...] Given that the certification details what is expected of each  
11 action, what the company can or cannot do, these certification tools serve exactly to  
12 guide you as to what to do. So, certification has a very important role in the  
13 implementation of sustainable management. It materializes and facilitates. It  
14 systematizes (P10).

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16 The findings indicate that the production in the Cerrado Mineiro region is highly  
17 mechanised which may explain why social sustainability initiatives had a lower priority at this  
18 point in comparison to other sustainability initiatives. In addition, some producers mentioned  
19 collaborations with universities/research centres (which supported eco-innovations) and local  
20 institutions (mostly focused on supporting economic sustainability), which were sources of  
21 knowledge to support producers in better achieving certification requirements. Surprisingly,  
22 traceability was not recognised as a central initiative by the majority, despite it being aligned  
23 with certification requirements and the designation of origin label (e.g., production process,  
24 quality, producer history). In summary, the analysis of the first scenario showed that SC  
25 sustainability learning is evident for managers and guided primarily by buyer certification  
26 requirements. Thus it can be argued that the main source of learning at this stage was external  
27 to the emerging economy suppliers, and transferred to them via their supply chain partners.  
28 The suppliers then used exploitation capabilities to apply the knowledge obtained from these  
29 external learning sources to their context.  
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#### 32 33 *4.2 Scenario 2 (buyer-centred outbreak peak): initial influences of COVID-19 on suppliers'* 34 *SC sustainability initiatives* 35

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37 While most of the buyer countries were implementing COVID-19 outbreak measures,  
38 the suppliers in Brazil had only just started to consider the influence of the pandemic in their  
39 region. Thus, the findings suggest that at this initial stage, the concerns of most of the  
40 participants were related to their response to early lockdown restrictions. At this point, they  
41 started to think about the future since the harvest period was imminent. According to the  
42 analysis, although the environmental sustainability initiatives were maintained, the priority  
43 shifted to social and economic initiatives, and it was these initiatives that received additional  
44 attention by managers. It is important to also note that the institutional environment was very  
45 uncertain, since local political turmoil was influencing the economy as much as the outbreak  
46 itself. In this context, 'health and safety' initiatives were intensified by all suppliers including  
47 P1 who explained that: "*We made some adaptations including the use of alcoholic gel and*  
48 *face masks [...] people in the risk group were put on vacation [...] Then we hired a*  
49 *psychologist also to provide support for the staff*".  
50

51  
52 At the beginning, certification requirements of care and cleanliness were essential to  
53 guide them in learning how to deal with the lockdown. As P12 argued "*to have a certification,*  
54 *you already must be prepared for this type of thing [e.g., sanitary safety]*". In addition, P6  
55 stated that "*Everything is certified here and everything is very clean. But I think that the*  
56 *pandemic serves to show that we always have to be more attentive to anything that we don't*  
57 *even see, but that can come through and bring us down*". Therefore, interviewees started to  
58 show more concern for their employees, even though the harvest is highly mechanised, thus  
59 reinforcing initiative 5 as identified in Table 2. On the other hand, they also focused on  
60 economic sustainability and changes were developed in the region, including in the

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4 negotiation process (e.g., postponement of payments) and additional SC interactions. For  
5 instance, P10 developed a project called 'Beanstalk' with the promise that for "*everyone who*  
6 *buys a kilo of roasted coffee on our roaster/coffee network in the world, [then] we will plant a*  
7 *tree. So, it's: one kilo, one tree!*" This project stimulates economic sustainability throughout  
8 the SC and is therefore categorised as being part of initiative 2 in Table 2, and at the same  
9 time it addresses environmental issues.

10  
11 As well as reinforcing some of the eight sustainability initiatives identified in Table 2,  
12 two new initiatives were introduced as a result of managers learning during this stage of the  
13 outbreak. Thus exploration capabilities began to be evidenced in the data at this stage, in  
14 addition to the ongoing use of exploitation capabilities as the existing initiatives also  
15 continued to be maintained and refined. As shown in Table 3, these new initiatives have been  
16 labelled as 'Community support during COVID-19' – evidenced by three interviewees  
17 (initiative 9) and 'Re-shape social interaction processes' – as evidenced by all participants  
18 (initiative 10). Both initiatives were crucial to address the lockdown requirements, as they  
19 involved changes to operations to avoid infections (e.g., having more buses for transportation)  
20 and started to provide more local community assistance to address the lack of infrastructure  
21 and equipment in local hospitals. Initiative 9 further illustrates the greater priority concerning  
22 social sustainability, as given the chaos caused by the delayed government support, the coffee  
23 producers decided to shift resources to provide medical care within the local community, an  
24 important stakeholder in their context. Table 3 summarises the impact on each initiative of  
25 this phase of the outbreak and indicates that four initiatives were not mentioned by the  
26 interviewees at this point.

27  
28 This focus on social sustainability as a priority arose since the harvest period was  
29 imminent and 10 of the producers did not receive any relevant information from buyers, local  
30 government and certification bodies. Although information was eventually available on some  
31 government websites - national and local - it was vague and delayed considering when the  
32 outbreak began, and this ratifies the managers' perception of lack of government support.  
33 Only two participants received advice from buyers/certifiers to improve health and safety  
34 issues. P11 stated that they received "*a booklet about the measures that should be taken, not*  
35 *as far as agricultural management is concerned, but, rather, concerned with society, with the*  
36 *social aspects on the farm. [...] We had a direct meeting with them.*" The remaining suppliers  
37 studied showed adaptation and resilience considering they were not supported by buyers at  
38 this stage. This showed that their main sustainability initiatives shifted from buyers and  
39 certifiers requirements to attending to local needs and specifications, indicating a shift in their  
40 primary source of learning. Therefore, the main influence of the buyer and certification guides  
41 on learning as identified in scenario 1 seemed to reduce during scenario 2. Instead, the  
42 suppliers now also demonstrated a pro-active orientation to learn using exploration  
43 capabilities, as well as continuing to use exploitation capabilities in maintaining/ refining their  
44 existing initiatives.

### Table 3

#### 4.3 Scenario 3 (supplier-centred outbreak peak): additional influences of COVID-19 on suppliers' SC sustainability initiatives

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56 The findings during the third contact with suppliers showed continued development of  
57 SC sustainability-related initiatives, since they faced the initial infection peak in Brazil and  
58 any contamination on their farms could hamper the harvest leading to significant financial  
59 losses. At this point, there was no significant change in the environmental sustainability  
60 initiatives and so the main areas of evolution continued to be on the social side. Thus, the

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4 focus on training was on social awareness, i.e., during interviews, managers did not mention  
5 issues about recycling or environmental protection any more, but instead they emphasised the  
6 need to improve the knowledge of employees and the community about infection prevention.  
7 A new initiative (initiative 11 - 'Social awareness of employees and community') was thereby  
8 identified, as included in Table 3. Also, the two initiatives that began in the scenario 2 –  
9 'Community support during COVID-19' and 'Re-shape social interactions processes' –  
10 continued to be developed.  
11

12 The interview evidence showed that for the majority of participants, the certification  
13 was a main driver to guide their activities during scenario 3, as also observed in scenario 1,  
14 since this had been the source of learning about prevention and other procedures. This  
15 demonstrates that for SC sustainability learning, even during an unprecedented outbreak, the  
16 use of exploitation capabilities to apply certification rules can be really effective. However,  
17 managers did not limit themselves to ideas generated from this source, and instead expanded  
18 on some of their own initiatives. For example, in the context of the 'health and safety'  
19 initiative, actions were intensified by all managers, as exemplified by P2: "*We hired a nursing  
20 technician to give specific training on measures to combat and mitigate the coronavirus in  
21 order to raise awareness, not in the sense of making too much fanfare, but really raising  
22 awareness*". According to P1, the measures increased since "*We also bought thermometers to  
23 measure the workers' temperature when they get on the bus and when they leave. [...] We  
24 also had to hire more buses to provide services because we are at harvest time and we have  
25 many people working on the farm.*" In addition, he claimed: "*We took out a life insurance  
26 policy for each employee so that they would be more relaxed to work at that time, considering  
27 the difficulty of this pandemic period. The psychologist also intensified assistance to the staff  
28 to provide greater support.*" This demonstrates that exploration capabilities were being used,  
29 leading to deep levels of learning about social awareness as an important sustainability  
30 initiative. Table 3 shows additional information about SC sustainability learning in scenario 3.  
31

32 In addition, at this point, the findings identified a closer interaction with other SC  
33 members, mainly the buyers. In this scenario, most of the managers said that buyers'  
34 companies sent new guidelines to follow in the context of the pandemic, but only one  
35 participant mentioned changes in certifiers' advice, albeit not embedded in its rules. For  
36 example, P6 and P2 described buyers' actions: "*Buyer A, via the cooperative, forwarded some  
37 procedures to customers and suppliers. They also did some live training with us. Buyer B also  
38 sent some guidelines by email*" (P6). "*Buyer A and Buyer C are running an educational  
39 campaign on local radio stations with guidance*" (P2). This change seems to indicate that at  
40 first buyers were more focused on their own activities and maybe they were learning about  
41 how to act during this unprecedented outbreak, with suppliers being a second priority.  
42 However, by this stage, they were engaging more in supporting suppliers.  
43

44 It is important to mention that increased mechanisation of the harvest process has led to  
45 lower levels of employment in some cases. However, some companies still faced problems  
46 with worker recruitment, partly due to a reduced number of migrant workers and partly as an  
47 unexpected consequence from government financial support during the pandemic. This  
48 support was available for the unemployed and led to some potential workers preferring not to  
49 work and use government support instead, even though it was set at 60% of the Brazilian  
50 minimum wage (P7, P9, P10). In some cases, companies then had to pay higher salaries to  
51 recruit migrant workers (P7, P10). For instance, P10 claimed that they "*had to increase wages  
52 to compensate for the amount they would be receiving from the government*". In addition, in  
53 relation to the forthcoming negotiation process of coffee prices from the current harvest P10  
54 states:  
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We offered a different price proposal this year with some reduction, understanding that it is a difficult time for everyone [...] so, we carried out a study on what we

could offer. We listened to buyers about what they need. Some need to extend the payment time. We are being much more customized to serve each client.

Based on this statement and the other data analysis during this phase, it seems that the suppliers have learned how to maintain/refine (via exploitation capabilities) and develop (via exploration capabilities) their SC sustainability initiatives. Their concern is not only related to their own survival, but also that of other coffee SC members in different countries. It can also be concluded that the number of changes to the initiatives was high and participants managed them effectively. The main modification was in relation to sustainability-related priorities with the emphasis moving from environmental sustainability to social sustainability for all managers interviewed. It was also observed that even though buyer/certifier requirements are considered a guide to sustainability, supplier sustainability initiatives are not centred only on those requirements. Thus, suppliers demonstrated an important pro-active role in SC sustainability, suggesting that their needs and learning processes should be considered by buyers given that these suppliers can be important contributors to the sustainability of the entire SC.

#### 4.4 SC sustainability learning during COVID-19 outbreak

Table 4 summarises and provides further evidence of the SC sustainability learning during the COVID-19 outbreak. During scenario 2, seven managers claimed that they had not learnt anything new, whilst the other five indicated many changes. However, by scenario 3, all participants described some learning. Therefore, it can be argued that it was possible to observe learning loops guiding the SC sustainability trajectory of all of the participants during this changing environment. At each of the three different levels of learning related to the sustainability initiatives i.e. the individual, organisational and supply chain levels, the following sub-categories were identified: planning; new procedures; and social awareness, as indicated in Table 4 and discussed in turn below.

Table 4

*Planning:* Since the first contact with managers pre-outbreak, it was evident from their answers that certifications provide an important guide for their sustainability initiatives. However, the pandemic intensified that learning, at the individual and organisational level, about the importance of being prepared for unprecedented outbreak by being flexible and having the necessary knowledge. Although it is an on-going issue to advance SC sustainability, in some cases the suppliers had not sufficiently planned specific aspects such as a secure and balanced cash flow. In facing the outbreak, they identified the need to have better planning concerning the coming harvest and negotiation period. At the SC level, the learning was more related to placing a greater emphasis on planning for sustainability to facilitate better outcomes in further crises.

*New procedures:* Two main elements influenced the development of new procedures, i.e. hygiene issues and intensification in the use of technology. For both issues changes were necessary and learning emerged at the three levels. For instance, food security was highlighted as a main reason for new hygiene procedures. In addition, new technological solutions became more widespread to support process continuation with the required social distancing. The use of technology also improved their connection with other SC members and possible new buyers, since the suppliers developed new ways for the market to see their product and production process.

*Social awareness:* The main learning at the individual and organizational levels in this category related to recognising the importance of people and health. Since the environmental

issues were always the most required by certifications, social sustainability was a lower priority before the outbreak, as previously explained. At the SC level, learning related to the pertinence of relationships with other producers and throughout the SC, which were strengthened to ensure ongoing global SC activities. As presented in Table 4, it seems that they started to see more the human side of the SC, which helps to achieve sustainability. It is important to highlight that this learning happened during the second and third scenario rather than the first one.

It is therefore concluded that SC sustainability learning is an ongoing process that companies and SC members need to follow during their daily operations. In comparison to other sectors (e.g., clothing in South Asia; Majumdar et al., 2020), Brazilian coffee production did not experience huge disruptions since the harvest period did not occur at the beginning of the outbreak. However, the findings show that during the outbreak, Brazilian coffee suppliers learned about themselves (individually, organisationally and at the SC level), in a manner that went beyond the buyer/certifier requirements.

## 5. Discussion

To study supplier SC sustainability learning during the COVID-19 outbreak, this paper compared sustainability initiatives during three scenarios (pre-outbreak, buyer-centred initial peak, and supplier-centred initial peak), showing how suppliers are dealing with the changes in the institutional environment as well as how their sustainability initiatives have evolved. Figure 1 summarises and conceptualises the findings, illustrating how the learning capabilities evolved within three learning loops, each of which represents one of the data collection scenarios. Initially, the primary source of learning was external to the emerging economy suppliers and the learning capabilities were exploitation based. However, as the pandemic began to unfold, new exploration learning capabilities emerged, with evidence of this capability in all of the cases in the third scenario. In terms of the subsequent specific learning outcomes, the prior literature related to the outbreak has suggested that to maintain their competitiveness, companies in all sectors have to improve their operational resilience, value chain digitization and adopt more remote work, reinventing their sustainable operations (e.g. Jabbour et al., 2020; Verma and Gustafsson, 2020). In contrast, this study demonstrates that Brazilian coffee producers did not need to make all of these improvements, but instead were concerned about other crucial issues i.e. planning, the introduction of new procedures and social awareness. These findings corroborate the extant literature understanding of the need for new learning to emerge following an unprecedented event (Smith and Wenger, 2007). In addition, Figure 1 illustrates the evolving nature of the buyer-supplier relationship and which of the multiple levels of learning were impacted by the changes in the emerging economy supplier initiatives during each scenario.

This paper then makes three main contributions to the literature by revealing: (a) insights into buyer-supplier relationship governance during an unprecedented event; (b) changes in SC sustainability priorities, sources of learning and learning capabilities, and (c) the key role that emerging economy supplier learning plays, at multiple levels of learning, in improving overall SC sustainability. Each of these three main areas of contribution is discussed in turn below, along with the development of associated propositions.

### *Figure 1*

Firstly, the learning observed in this paper contrasts with Gosling et al.'s (2017) discussion, since they consider the primary impact of leadership (from a buyer's perspective) in SC learning. However, the findings described above show that in the context of the

COVID-19 outbreak, supplier sustainability-oriented learning emerged pro-actively since no information was shared by buyers in the first months of the crisis, and supplier assessment was postponed. Later the relationship between buyers and suppliers was strengthened, with buyer influence re-emerging through a different type of monitoring process. According to Gimenez and Tachizawa (2012), to extend sustainability to suppliers, assessment and collaboration are the main governance mechanisms. However, given the findings in this research, it is argued that an alternative form of governance emerged during the crisis, with a more natural SC relationship involving mutual respect. Thus, a more 'light touch' monitoring approach was used as a governance mechanism since assessment had not been possible during the outbreak and collaboration did not exist initially with global buyers. This is a new finding in the context of sustainability research, but confirms a similar finding from the context of humanitarian logistics (see Chandes and Paché, 2010). This has led to a stronger coffee SC emerging given that levels of communication and trust had increased by the time of the last scenario of analysis. Thus, a pair of propositions follow that are linked to the buyer-supplier relationship:

*P1a: SC sustainability learning will accelerate during unprecedented events (e.g. the COVID-19 pandemic), when suppliers operate pro-actively in a sustainability-oriented manner in the absence of buyer governance.*

*P1b: During unprecedented events, light-touch monitoring of suppliers is more conducive to SC sustainability learning than traditional assessment mechanisms.*

Secondly, in terms of SC sustainability initiative priorities, the findings suggest that social sustainability received more attention from suppliers during the outbreak, which reinforces the findings of Barreiro-Gen et al. (2020) who drew the same conclusion in the context of medium and large-sized organisations. However, these findings contrast with those related to the clothing SC (Majumdar et al., 2020) and the agricultural SC (Chowdhury et al., 2020) in South Asia as the coffee producers studied further introduced a set of quality of life activities and benefits, as described in the interviews. This paper therefore provides evidence of workforce development during the COVID-19 pandemic (Queiroz et al., 2020) by illustrating that social awareness was one of the main points of SC sustainability learning (see also Geldermann et al., 2007). This demonstrates also the need to do more than just meet sustainability standards and certifications (Hakovirta and Denuwara, 2020). It also reinforces the need to develop both exploration and exploitation learning capabilities, particularly within a changing environment (March, 1991); with a balance between both types of capabilities providing greater potential for sustainability that takes a long term perspective. In particular, in terms of the social side, it is necessary to assume a set of social inequalities, vulnerabilities and problems that goes beyond what is currently studied in the literature (Majumdar et al., 2020; Trautrimis et al., 2020). For example, one of the suppliers studied had concerns relating to government support which was hampering companies in recruiting migrant workers and hence required alternative actions (e.g., increasing worker pay). This leads to a further pair of propositions illustrating changes in the supplier's sustainability-related priorities, sources of learning and learning capabilities:

*P2a: Emerging economy supplier learning is informed by certification requirements, which is applied using exploitation learning capabilities. However, during an unprecedented outbreak, this learning is not limited to this source of knowledge as other pro-active sources of learning emerge via the development of exploration capabilities.*



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4 *P2b: SC sustainability learning will have a greater focus on social sustainability related*  
5 *initiatives during an unprecedented outbreak.*  
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8 Thirdly, the outbreak revealed new nuances on how sustainability should be developed  
9 and required throughout the SC. However, it can be argued that the findings are not limited to  
10 unprecedented outbreaks, but can be more broadly linked to the SC sustainability learning  
11 process. For example, Barreiro-Gen et al. (2020) concluded that this pandemic has influenced  
12 priorities, which in turn will impact SC sustainability learning in the long run. In particular,  
13 this study demonstrates that SC sustainability learning should be analysed using a multiple  
14 level approach, thereby addressing a current research gap. This multi-level learning is aligned  
15 with the paths followed by companies and SCs in developing capabilities over time (Silvestre,  
16 2015; Silvestre et al., 2020). The findings therefore reinforce the literature regarding SC  
17 learning (e.g. Knoppen et al., 2010; Ojha et al., 2018; Yang et al., 2018); and also extend this  
18 literature by adding further clarity and definitions previously not empirically verified within  
19 the context of SC sustainability. For instance, this study highlights the important impact of  
20 individual, organisational and SC level supplier learning on overall SC sustainability learning  
21 (Azadegan et al., 2008; Haq et al., 2020; Wieland et al., 2016). It thereby adds to the  
22 conclusions of Gong et al. (2018), who discuss the focal company's influence on learning, by  
23 showing that suppliers can also have an impact on the overall SC learning. These findings  
24 therefore lead to a third proposition, as follows:  
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28 *P3: Emerging economy supplier sustainability-oriented learning occurs at multiple levels –*  
29 *the individual, organisational and SC levels – and plays a key role in improving overall SC*  
30 *sustainability.*  
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33 Therefore as a consequence of the outbreak societies are learning how to become more  
34 sustainable (Sarkis et al., 2020), with new priorities being adopted in both companies and SC  
35 contexts. Therefore, the COVID-19 outbreak has affected the way of doing business,  
36 providing new insights for studying sustainability learning and initiatives.  
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## 39 **6. Conclusions and further studies**

40  
41 This paper has investigated how emerging economy global suppliers' sustainability  
42 initiatives have been affected by the COVID-19 pandemic with a focus on their learning.  
43 Understanding that these initiatives arise according to specific sustainability learning  
44 trajectories that guide SC members to new behaviour and develop their sustainability learning  
45 orientation, it can be concluded that this unprecedented outbreak has positively affected  
46 Brazilian coffee producers' social sustainability initiatives. Thus, this paper contributes to the  
47 literature regarding the COVID-19 pandemic and more broadly, since the findings reveal a set  
48 of insights that are not limited to the outbreak but also provide evidence of suppliers'  
49 sustainability learning in itself, as new initiatives were introduced and developed. This paper  
50 therefore highlights the need to advance studies of emerging economy supplier learning in  
51 global SCs.  
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54 *Theoretical implications* emerged during this research. Firstly, a better understanding  
55 emerged of how the COVID-19 pandemic has impacted global SCs' governance mechanisms.  
56 Thus, under specific unprecedented outbreak conditions, buyers move from supplier  
57 assessment to a more 'light touch' monitoring approach as part of their global supplier  
58 management process. This constitutes a new source of sustainability related governance in  
59 global SCs, which better appreciates how suppliers learn as well as entailing a higher level of  
60 buyer-supplier communication and trust. Secondly, understanding has been advanced in terms

of how emerging economy suppliers learn sustainability, especially when facing an unprecedented outbreak. This was shown to have accelerated during the pandemic, with a change of sustainability focus towards social issues. In particular, the findings show that whilst certification is a rich source of knowledge and learning for emerging economy suppliers, this learning is not limited to guidance provided by this source during an unprecedented outbreak. Thus a balance between exploitation and exploration learning capabilities has been shown to be needed for a long term sustainability perspective. Thirdly, through defining multiple levels of SC sustainability learning, and then providing empirical evidence for each of these levels, this paper reinforces that SC learning is more than the sum of individual and organisational learning. This generates *teaching implications* as it suggests that the study of SC sustainability should follow a more holistic approach by showing that both exploitation and exploration capabilities can shape SC sustainability initiatives and learning through multiple levels within turbulent environments.

*Managerial implications* are centred on supplier behaviour within the relationship. The findings suggest a renewed social awareness that requires not only a rethink of the role of workers during the outbreak, but also the process of interaction with multiple stakeholder involved in the SC. Thus, managers may leverage learning strategies to incorporate a coherent recovery plan for future disruption, but also to develop a plan on how to consider social sustainability in their normal activities, i.e. without the influence of the outbreak. Also, the findings indicate that buyers need to consider more the needs and expectations of suppliers as well as their learning process outcomes, which in turn will support them to develop better SC strategies. Hence, following the outbreak, buyers need to consider what suppliers have learned and use this information in their own recovery plans. In addition, the use of more 'light touch' monitoring strategies may strengthen the SC relationship since this level of governance sits somewhere between the two extremes previously discussed (i.e. assessment or collaboration). SC managers may reflect on what type of governance mechanism has been used to date and consider developing a better or different relationship with their suppliers as appropriate.

The research also has both *policy and social implications*. In terms of *policy implications* government support is potentially an important source of guidance for companies during an unprecedented outbreak, but in this case it was neither effective nor timely in supporting supplier needs. Thus, public managers need to better recognise their influence on SCs and develop policies that can support companies in the development of recovery plans. In particular, governments need to provide explorative learning opportunities by engaging global suppliers in the development of SC sustainability policies and initiatives. In doing so, for example, social sustainability capabilities may then be developed not only in response to unprecedented outbreaks, but also as part of more routine organisational operations. In terms of *social implications*, the results demonstrate additional supplier engagement with social sustainability initiatives. This highlights the importance of emerging economy supplier social awareness and actions given the turbulent environment in which they operate with social inequalities and vulnerabilities. Thus, the findings of this study provide motivation for companies in these countries to strengthen their social sustainability initiatives, thereby having a positive impact on local development. Therefore, a SC sustainability-orientation helps SC members to understand that their role can extend beyond transactional decisions, allowing them to share strategies and experiences to generate engagement that is more widespread than their immediate SC.

The research has three main limitations: (i) the case study method cannot provide a generalisation to the whole population of coffee suppliers in Brazil; however it is a rich source of theory elaboration on SC sustainability learning which justifies its use; (ii) given the chosen context, export-oriented members of global supply chains were studied and thus import-oriented organisations were excluded; and (iii) the perspective of emerging economy

supplier managers was studied, thus data was not gathered from other SC stakeholders (e.g., employees, buyers) who could aid in further understanding the SC sustainability learning process. As this study focused on scenarios pre and during the outbreak, it would be interesting to conduct a further study after the outbreak or to extend the research as the process of the outbreak unfolds into the second peak. This would enable firms and SCs to reflect on this unprecedented outbreak and its total impact in their learning related to sustainability. Further research should consider different SC stakeholders, including import-oriented members of global SCs, as well as the impact of the pandemic on local SCs. A longitudinal research method could be used to analyse the influence of the COVID-19 pandemic over a longer period of time in different SC operations (e.g., in various countries and sectors). Concerning SC sustainability learning further studies should be conducted in order to uncover nuances of the multiple level learning perspective worldwide, which is still underexplored.

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#### 14 **Appendix - Interviews Script sample**

##### 15 **Questions: Scenario 1**

- 16 1. What do you understand by sustainability?
- 17 2. Do you consider your company to be sustainable? If yes, could you cite some examples. If not, why  
18 not?
- 19 3. What are the main supply chain sustainability initiatives developed by your company?
- 20 4. What are the motivations to have these initiatives?
- 21 5. Is there any influence from buyer companies in your current initiatives?
- 22 6. How long have you been working on these initiatives?
- 23 7. How do you manage sustainability internally and with supply chain members?
- 24 8. How did you learn to manage these initiatives?

##### 25 **Questions: Scenario 2**

- 26 1. What are the main supply chain sustainability initiatives developed by your company?
- 27 2. Is there any change regarding sustainability following the COVID-19 outbreak?
- 28 3. Are there changes regarding sustainability requirements from your buyers? Please, provide  
29 examples.
- 30 4. Did you change your operations during the outbreak? Please provide examples.
- 31 5. Is there any learning related to supply chain sustainability initiatives?

##### 32 **Questions: Scenario 3**

- 33 1. Have there been any changes regarding sustainability requirements from your buyers since April?  
34 Please provide examples.
- 35 2. Did you identify changes concerning sustainability initiatives during the outbreak?
- 36 3. What has changed in your operations since April? Please provide examples.
- 37 4. As an organization, have you learned during this pandemic? If so, what have you learned? Could  
38 you give examples?
- 39 5. Did your learning relate to supply chain sustainability initiatives during the outbreak since April?  
40 Please provide examples.  
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**Table 1 – Company, participant and interview information**

Code	Gender	Time as company manager	Production Size (hectares)	Number of employees	Certifications	Interview 1 November 2019	Interview 2 April 2020	Interview 3 June 2020	Interview length per participant
P1	Male	07 years	Medium	8 permanent, 40 temporary contracts/year	Rainforest, UTZ, Cerrado Mineiro Region (DO)	30 min	26 min	22 min	78 min
P2	Male	08 years	Medium	10 permanent, 24 temporary contracts/year	Rainforest, UTZ, 4C, Cerrado Mineiro Region (DO)	22 min	15 min	18 min	55 min
P3	Male	30 years	Medium	12 permanent, 53 temporary contracts/year	UTZ, Cerrado Mineiro Region (DO)	28 min	18 min	16 min	62 min
P4	Male	17 years	Medium	4 permanent, 44 temporary contracts/year	UTZ, Cerrado Mineiro Region (DO)	38 min	18 min	29 min	85 min
P5	Male	33 years	Large	52 permanent, 20 temporary contracts/year	Rainforest, UTZ, Cerrado Mineiro Region (DO)	25 min	15 min	17 min	57 min
P6	Male	09 years	Medium	6 permanent, 8 temporary contracts/year	Rainforest, Cerrado Mineiro Region (DO)	33 min	16 min	19 min	68 min
P7	Female	02 years	Large	9 permanent, 4 temporary contracts/year	Rainforest, Cerrado Mineiro Region (DO)	23 min	18 min	27 min	68 min
P8	Male	17 years	Medium	9 permanent, 4 temporary contracts/year	UTZ, Cerrado Mineiro Region (DO)	39 min	22 min	18 min	79 min
P9	Female	05 years	Medium	28 permanent, 5 temporary contracts/year	Rainforest, UTZ, Cerrado Mineiro Region (DO)	43 min	17 min	15 min	75 min
P10	Female	16 years	Large	370 permanent, 120 temporary contracts/year	ISO 14001, Rainforest, UTZ,	33 min	23 min	24 min	80 min
P11	Male	02 years	Medium	9 permanent, 3 temporary contracts/year	UTZ, Cerrado Mineiro Region (DO)	27 min	21 min	19 min	67 min
P12	Female	05 years	Medium	30 permanent, 100 temporary contracts/year	Rainforest, UTZ, Cerrado Mineiro Region (DO)	29 min	19 min	-	48 min
Total	-	-	-			370 min	228 min	224 min	822 min

DO: Designation of Origin certification; Medium: between 4 and 15 modules; Large: more than 15 modules. Each module, in the Cerrado Mineiro Region, is equivalent to 40 hectares

Table 2 - Sustainability Initiatives evidenced by suppliers in scenario 1 (pre-outbreak)

Initiative	Trigger	Description	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
<b>(1) Sustainable agriculture certification</b>	Owing to market demand, managers were required to have certifications. This perspective helps them in the market to provide food security.	Certifications are standards in terms of environmental, social and economic management of production, and are audited and validated by certifiers' organizations frequently.	X	X	X	X	X	X	X	X	X	X	X	X
<b>(2) Cooperation to improve economic sustainability</b>	To improve their knowledge as well as have support on the economic side, managers have partnerships.	Cooperation between suppliers locally, and cooperatives and other institutions creates a strong network.	X	-	X	X	-	-	X	-	X	X	-	-
<b>(3) Environmental awareness of employees and community</b>	To implement certification, changes are necessary in the employees and community's mentality and understanding on sustainability.	Programs of training or social projects to motivate workers and the community to improve their awareness and care in regard to the environment.	-	X	X	-	X	-	-	X	X	X	X	X
<b>(4) Environmental protection beyond the law and certification requirements</b>	Beyond what is required by law, companies changed their strategic orientation towards sustainability.	Focused on their environmental contribution, large areas of nature reserves and reforestation were created.	-	X	X	-	X	-	X	X	X	X	-	X
<b>(5) Health and Safety</b>	To follow local and certification rules, actions are necessary to avoid employees' accidents and diseases.	Program of protection, including vaccinations and blood tests; provision and use of PPE; psychological care.	X	X	X	X	X	X	X	X	-	X	X	X
<b>(6) Working condition improvement</b>	Beyond following local and certification rules, they decided to improve workers well-being.	Involves changes and improvement to the refectory, new equipment or machines to offer more comfort to workers, etc.	X	X	-	X	-	X	X	X	-	X	-	X
<b>(7) Traceability</b>	Needed to ensure sustainability and to maintain the designation of origin label.	The provision of information on the production process and the history of the producer and farm. Certifies the origin.	-	-	X	-	X	-	X	-	-	-	-	-
<b>(8) Eco-innovations (e.g., R&amp;D)</b>	To reduce environmental impacts and improve productivity as well as achieve some certification criteria.	Partnership with universities/ research centres were developed in order to better use their resources.	-	-	-	X	X	-	-	-	-	X	-	-

Table 3. Sustainability initiatives evidenced by suppliers in scenario 2 and scenario 3

Initiatives	Sample Quotes for scenario 2: initial influences of COVID-19 on suppliers' SC sustainability initiatives	Evidence	Sample Quotes for scenario 3: additional influences of COVID-19 on suppliers' SC sustainability initiatives	Evidence
<b>(1) Sustainable agriculture certification</b>	We have had a certification project on the property for several years. So, it intensified more because, of course, of the pandemic, but, a good part of the actions we were already doing. (P1) [...] According to certification rules, the workplace is always clean, with everything in the right place. (P8)	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12	Because we have had this certification for a long time, my father was always careful with cleaning the farm, with hygiene, so we were very careful with that. [...] it is good to have no problems during the pandemic. (P9)	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11
<b>(2) Cooperation to improve economic sustainability</b>	We participate in the cooperative and it has several initiatives in schools and with the members' families. (P8) We have launched a project called Beanstalk, by João, through which we are encouraging people to buy. For everyone who buys a kilo of roasted coffee on our roaster/ café network in the world, we will plant a tree. So, it's: one kilo, one tree. It is a way for us to encourage the purchase of coffee, mainly from these small roasters, which need to get through the crisis. (P10)	P2, P3, P4, P5, P6, P7, P9, P10	The cooperative is very important for us, it is our base here. Together we made instruction booklets and mailed them out for other farmers. (P2)	P2, P3, P7, P9, P10
<b>(3) Environmental awareness of employees and community</b>	We are giving the same guidelines to employees and everything about hygiene. (P2) We always talk and reinforce the issue of hygiene in the workplace. Everything is certified here. Everything is very clean. But I think it shows the employees, those more hard-headed, that they always have to be aware of any little thing that we are not even seeing, that can come and bring us down. (P8)	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12	No mention	-
<b>(4) Environmental protection beyond law and certifications</b>	No mention	-	No mention	-
<b>(5) Health and Safety</b>	What was possible to do from home we did, but there are things that need to be done in the field [...] We started to sanitize buses with bleach to disinfect aluminium, something that is in common use. When the truck comes out, we go and spray the tyres, the truck, with bleach. (P1) Hygiene is a recurring procedure. We are cleaning transportation with only half the capacity of the bus in use, and the employees	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12	The issue of PPE, we became much more rigid with the use of a mask, with the non-sharing of PPE, you know, each one with his own. [...] during meals, we try to stay as far away from each other as possible. We have two tables well separated from each other. So, they split up there and are more distant from each other. (P7) The use of masks became mandatory. We made masks for everyone. And we continue to do what has to be done, which is to	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11

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4		wearing a face mask. If they have any symptoms of fever or		use alcohol gel, cleaning the bus. On receiving people on the farm,	
5		something, that person will be isolated. (P5)		we only receive visits that are essential. We are not receiving	
6		We started using face masks, alcohol gel, these things, but we didn't		visitors to see the harvest. (P9)	
7		stop at the farm. (P6)			
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9	<b>(6) Working condition improvements</b>	No mention	-	No mention	-
10					
11	<b>(7) Traceability</b>	No mention	-	No mention	-
12					
13	<b>(8) Eco-innovations (e.g., R&amp;D)</b>	No mention	-	No mention	-
14					
15	<b>(9) Community support during COVID-19*</b>	The cooperatives that we also participate in have a PCR, which is a	P1, P5, P8	We are helping even more at the local hospital with the purchase of	P1, P5, P10
16		molecular separation piece of equipment. This equipment alone is		respirators and expansion of the building to serve possible patients	
17		expensive; so it was borrowed from the laboratories at Coopacer by		with COVID-19. (P1)	
18		the local university laboratory in Rio Paranaíba city [...] to carry out			
19		the [COVID-19] tests. (P1)			
20		We are in partnership with the Ministry of Agriculture. We are			
21		making a booklet with all the procedures for us to harvest in a			
22		peaceful way here in the Cerrado Mineiro Region. (P5)			
23		Each cooperative has taken an initiative. [...] In our case here, we			
24		are doing a coffee campaign, and this collected coffee will be			
25		transformed into a basic food basket and we will donate to the			
26		entities that have registered vulnerable people. Now, the others,			
27		some have raised money to buy a respirator for the hospital, others			
28		are making masks for the hospital. Each is doing an action			
29		according to the local need. (P5)			
30					
31	<b>(10) Re-shape social interactions processes (e.g. logistic, meeting, negotiation)*</b>	According to local decree, we cannot use the full bus, only 50% of	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12	We try, as much as possible, to avoid visits here on the farm. This	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11
32		its capacity can be used to enable a little more distance between		is suspended. It's all over the phone, email or WhatsApp [...] the	
33		people. (P1)		protocol is people call to book. (P2)	
34		It changed in terms of the relationship with the suppliers of inputs,		We decided to join the fully mechanized harvest to avoid crowding	
35		to visit the property it has to be booked, scheduled beforehand. The		because there would be 40 more people here on the farm. This,	
36		staff have avoided attending. Even technical assistance in this		unfortunately, affects coffee production a little for next year, but it	
37		period of the pandemic is more restricted. (P3)		is a precautionary measure against the pandemic. (P11)	
38		I usually receive negotiators at the headquarters and we serve a			
39		coffee. Today, for example, some people came and I received			
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wearing a mask. No coffee. (P4)

We decided to try to send [to buyers] as much as we could. [...] We have shipped more coffee [to ensure the supply] (P10).

We slowly closed the doors of the farm to receive people. We are very restricted with receiving visits, both from suppliers, customers and people who go there to visit, to try to do some negotiation (P11)

Non existent.

**(11) Social awareness of employees and community\*\***

We set up a booklet with instructions for employees on hygiene and cleaning procedures for us to try to prevent the virus from proliferating. So, this was done in an informative way for use at several points in the farm, including the entrance for administrators, meal stations, the cafeteria, all the points with taps, washbasins, as well as, drinking points. (P4)

P1, P2, P3,  
P4, P5, P6,  
P7, P8, P9,  
P10, P11

We created a safe harvest plan. Our cooperative, together with various agencies, created a booklet to guide the members, workers, customers and we made this material available digitally to all entities in the region. (P5)

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Legend: \* new initiatives from scenario 2. \*\* new initiatives from scenario 3.

Table 4. SC sustainability learning

	Level	Sample of key quotations	Evidence	Analysis
<b>Planning</b>	<b>Individual level</b>	I learned that I need to see the future without fear. If I think about the future by imagining what can happen from science, from research, from concrete facts, I cannot plan the things to come soon. (P10)	P1, P3, P4, P7, P8, P10, P12	Managers learned the importance of intensifying planning, mainly in relation to considering this unprecedented outbreak during their working life.
		I was worried about drought, hailstorms and now there is one more thing that we didn't expect. So, I need to worry and plan for that too. (P12)		
	<b>Organisational level</b>	As we improved on the certification aspects, we also became more prepared for this moment that we are living in. (P1) We saw the importance of having balanced cash flow and diversified assets, not staying in a monoculture. So, we could see also the importance of creating a financial reserve. (P1) We learned that something can always come that we do not even know now, not always linked to farming, but that you need to be prepared for, mainly, financially. (P8) We are learning that we cannot make one decision that will last a long time. We might make one decision today and it may be that in 20 days we will have to change [...] we need to plan, plan and plan, building possible scenarios. (P10)	P1, P2, P4, P6, P7, P8, P9, P10, P11	Even though certifications had already guided them to implement initiatives, and by providing the necessary knowledge to face this unprecedented outbreak, organisations still realised the importance of planning flexibly because of the outbreak. Given the world scenario has changed so fast during recent months, they need to be prepared, mainly financially.
	<b>Supply Chain level</b>	I think that the pandemic highlighted the sustainability issue more strongly. I believe that the entire chain is seeing and, more than that, the supply chain has realized that it has to guarantee itself and that its supplier has to be sustainable and correct. So, in that sense, it only reinforces the need to be really sustainable. (P10)	P1, P5, P10, P11, P12	During this period a greater awareness about SC sustainability emerged. This may be supported by certification and planning of different initiatives.
<b>New procedures</b>	<b>Individual level</b>	I see that more hygiene is a very important point of learning. (P6)	P1, P2, P3, P4, P5, P6, P7, P8, P12	More hygiene, health care and improvement in relational aspects were emphasized.
		I think a lot has changed. Regarding hygiene, wash your hands more, use alcohol gel. [...] I think this is here to stay. After it passes, I think we will continue doing this. (P7) We learn to have more patience, to respect more, we learn to take more precautions, more care for ourselves, with our physical body. (P12)		
	<b>Organisational level</b>	We learned more about the importance of food security, of traceability, of producing even with quality and safety. After all, our final product is food. (P5)  We are using more technology, social networks to chat with our buyers. They always ask for photos, videos of coffee drying, harvesting. As they cannot come here to visit, so we share everything online. In this I see an opportunity to open more markets. So,	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12  P6, P7, P8, P10, P11, P12	More attention is now being to food security, due to learning about hygiene.  Improvement in use of technology to better advertise their product and production as a possible way to access

		there may be a potential customer I do not know, who never came here, so I can send to him too. (P11)		new buyers.
	<b>Supply Chain level</b>	We changed the coffee tasting process and visits. The tasting will involve more restrictions and hygiene. It was very common to receive buyers from other countries, especially at harvest time, because many have never seen a coffee harvest. Now we have to take more precautions and restrict visits. (P2)	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12	The interaction with SC members changed given new hygiene restrictions related to receiving buyers.
		We are using technology to our advantage. Many things that we needed to do in person, nowadays technology delivers [...] I am using technology to advantage today, video calls, video meetings. (P11)	P4, P7, P8, P10, P11, P12	Technology solutions and uses were intensified. Thus, new procedures for SC meetings and negotiation emerged.
<b>Social awareness</b>	<b>Individual level</b>	We saw the even greater importance of valuing people, teams. We saw that the human being does not work alone, one needs the other and also that each one has to take care of himself because if a team member gets contaminated, he can contaminate many people. (P1)	P1, P4, P6, P7, P8, P10, P11	Through interviews it was clear that the majority learnt the importance of working in groups and for the people. They recognised the importance of care of each person (community) and the environment to health.
		Much more awareness regarding science, the planet, much more. [...] that we also need to meet social needs so that people do not die. (P10)		
	<b>Organisational level</b>	This crisis showed that I need to keep our employees' jobs, try to help the situation a little to maintain social balance. (P5)	P1, P5, P6, P7, P8, P10, P11	The importance of people increased in the company, mainly because the previous focus was on environmental measures. However, now managers understand the importance of maintaining workers jobs for broader social reasons. The outbreak also helped organisations to become creative to innovate during an unprecedented outbreak.
		I saw that nobody can do anything alone. We need a team for everything. So, I have my employees there, every year, every day, as having machinery to harvest is not enough. We still need people working with us, even with this much technology. We have a dryer, washer, harvester, yet we still need people. It is not enough to mechanize 100% and not have people. Still, labour is very necessary. That was what I felt most this year, a difference from other years for this one. (P7)		
		The first learning is that in a moment of despair you [as managers] think outside the box and you are willing to face the issues to continue producing. (P10)		

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**Supply Chain level**

That connection between people. The coffee has a very connected supply chain. I think everyone wants to help each other. I think it is super cool. [...] I talked to several producers from different regions and we are always talking, exchanging experiences about the difficulties that each one is facing. It is knowing that everyone is in the same boat, that you are not alone. Everyone was not sure what to do. It is all very uncertain. So, I think this support shows that everyone is together in this. (P7)

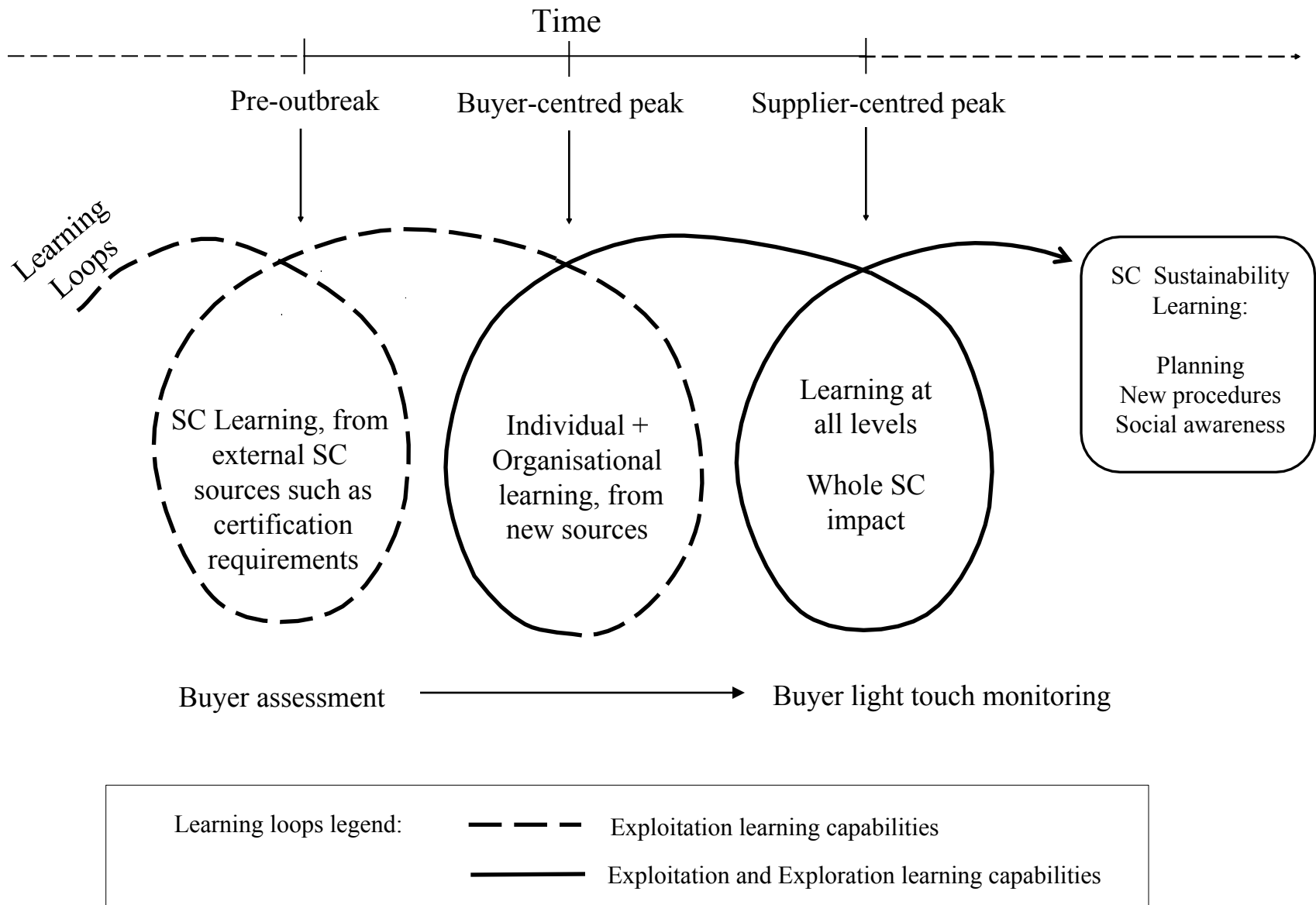
The only thing we did not stop thinking about was sustainability. We are increasingly realizing how essential this is going to be and I am not talking from a commercial point of view, but from the point of view of food security, security of supply. This pandemic showed just how fragile we are. (P10)

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P2, P5, P7, P10, P11

During the outbreak, there was a greater recognition by SC members of their roles in supporting each other and building relationships. It seems that a more consistent perception of who is in contact with managers emerged. Inter-organisational relationships became more evident as well as its importance to achieve sustainability.





**Figure 1: Emerging Economy Supplier Learning Trajectories during COVID-19**