

Rio de Janeiro in April 2010 is an example of this type of problem [13]

Although much attention has been paid to these kinds of extreme and natural disasters due to their notable environmental, social and managerial consequences, day to day problems can also cause great damages to entire supply chains if no action is readily taken. In this context, there are numerous sources of risk to be considered within organizations and along their supply chains. However, traditional risk management thinking is no longer enough to achieve a sustainable and competitive supply chain [14], [15]. In this regard, the concept of resilience has considerably changed this view. It searches for developing organizational capabilities in anticipating, adapting, responding, recovering and learning by means of resource management to overcome supply disruptions [14]–[16].

Many studies have already explored and highlighted different resilient practices or strategies [14], [15], [17]–[21], nevertheless they are not always easy to follow or apply, especially in an emerging country. There are very few studies related to building resilience in organizations or supply chains in Brazil [22], [23], although this capability seems to be an emergent need of local practitioners (reportage desastres). In this context, what kind of practices can help companies to achieve organizational as well as supply chain resilience in an emerging country?

The purpose of this paper is twofold: to explore different types of disruptions found in Brazilian manufacturing industries and to identify practices used to build resilience, as well as challenges to achieve it. To do so, a case-based study of four different supply chains was conducted through interviews with individuals from 12 companies in Brazil. Sources of disruption risk and suggestions of practices were collected in order to analyse the cases. As a result, a set of challenges to achieve resilience was identified and discussed.

The manuscript begins with a literature review on risk and resilience in operations management. The methodology section discusses the research design and how data were collected and analyzed. Challenges are presented through cross-case discussion from sources of disruption risk and suggestions of practices. Finally, conclusions, implications and opportunities for further research are highlighted.

II. LITERATURE REVIEW: RISK AND RESILIENCE IN OPERATIONS MANAGEMENT

Numerous factors are capable of creating vulnerability to companies and its supply chains, such as complex networks, long lead-times and plant locations. Thus, Jüttner and Maklan [19] define vulnerability as the susceptibility of the supply chains to likely disruptions. However, the term "likelihood" is more closely linked to the risk concept [24]. Christopher and Peck [17] define it as the probability of a given event versus its negative business impact, which can be arisen from internal, external and environment risk. These two variables are illustrated in Fig. 2, where it is noticed that the highest vulnerability is achieved when the disruption probability

(likelihood) and consequences (impact) are both high. On the contrary, low vulnerability is achieved by low disruption probability and light consequence combination, which normally corresponds to daily activities [25]. Therefore, risk and vulnerability are concepts which can be addressed together but not with the same meaning.

In a study about disruptions, vulnerability and strategies, Steckle and Kumar [2] affirm that the average of critical events and their losses in business have constantly increased since the 90's. In support to the complex results of these studies, Sheffi [8] mapped some of the key source of disruptions that might impact and cause damage to thousand of organization and their supply chains (Fig. 2). It is noticed from this figure that sources can match trends highlighted by The World Economic Forum [9] – Fig.1.

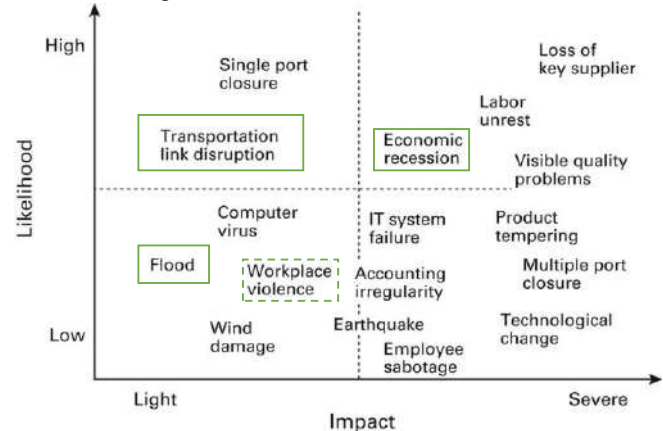


Fig. 2. Matrix likelihood and impact
Fonte: Sheffi [8]

Thus, recognising this current global scenario of risk and disruptions, the trend of the growing number of critical incidents, and its undeniable impact on business, a new thought in supply chain management has arisen in the literature that focuses on preparation, response and recovery actions. This approach has been named as supply chain resilience. According to Ponomarov and Holcomb [26, p. 131], supply chain resilience is defined as "the adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function". For this reason, resilience has become one of the top researched topics in supply chain management due to its capability to promote sustainable futures business.

Admitting that almost every supply chain face disruption of varying severity and types [3], [27], [28]. Christopher and Peck [17] have classified those into: internal, external and environmental. So that, being prepared to any future disruptive event enable companies to take efficient and effective response and therefore being less vulnerable to disturbances [20], [29]–[31]. Thus, "resilience within organisation studies recognises both the ability to absorb shocks in the form of extreme events and an adaptive capability to adjust to new circumstances" [32, p. 325]. So that it is recognised as a responsive capability for

firm performance as well as key dimension of a firm's survival [28].

III. RESEARCH METHODOLOGY

The case study method [33]–[35] is an appropriate method that fitted these research requirements by investigating the phenomenon in a current real-life context without interfering on the phenomenon. It is therefore considered a relevant method that focuses on the understanding of the dynamic environment within a desired settings [36]–[38], besides being able to explore, explain and describe the phenomenon of interest [33], [39]. Aiming to achieve the rigor and reliability required for empirical research, it follows five stages suggested by Stuart et al. [38]: research questions, instrument development, data collection, data analysis, and disseminate. The remainder of this section follows this structure.

A. Define the research question (Stage 1)

This study is classified as exploratory which seeks to investigate an unexplored point within the literature [34], [40]. Toward this end, research questions that guides this study is: what kind of practices can help companies to achieve organizational as well as supply chain resilience in an emerging country? What-type of question is also common in case studies [33], [41]. This question was deductively derived from the literature review, and it is limited to the Brazilian supply chains to show the context of the research.

B. Instrument development (Stage 2)

To guarantee rigorous and validity of the research, a case study protocol was developed through the specification of all details and requirements [33]. The unit of analysis is Brazilian organizations, with a special focus on the dyadic relationship (supplier-buyer), which is embedded in an uncertainty environment. Four focal companies (buyers) including two of their key suppliers were selected to be part of this empirical study. The reason for choosing a multiple case study is that it allows replication between cases [35], [42]. The particular choice of the manufacturing companies located in Brazil followed a theoretical sampling approach [39], whereby supply chain uncertainty is inherent (considering the examples given in the Introduction) and many different issues may occur in the operations management, differently from developed economies. Moreover, a variety of sectors (drink, home appliance, chocolate, and seeds) provide a rich view of extreme situations, and helps to clarify common issues among companies, as well as identify existing differences [39], [43].

In choosing the case study companies, two key suppliers from each of the focal manufacturing companies (buyers) were chosen to be part of this research. The case selection was performed to obtain literal and theoretical replication [39] through triangulating the opinions and generating results that enhance validity and reliability [44]–[46]. The questionnaire was assessed by knowledgeable people in the field supply chain and a pilot test was conducted before starting the real

data gathering. The questionnaire covers questions about sources of risk and suggestions of practices.

After identifying companies that fit into these criteria, contact was made by e-mail and telephone to present the aim of the study, the methods of data collection and contributions. In addition, a formal letter was attached to the e-mail, providing all the details of the research including the confidentiality of the data shared by them.

C. Data gathering (Stage 3)

Regarding data gathering, semi-structured interviews and secondary data were conducted with 30 managers from focal companies and related suppliers. Most of the interviews were conducted by Skype due to the distance between one company and another [47]. The interviews lasted around 45 minutes each.

Overall, the data gathering process took over five months due to time constraints of the participants. All interviews were recorded and transcribed for further analysis. Additionally, notes, impressions and ideas occurred during the data collection were also recorded and added on the case study database [34]. Furthermore, to increase the reliability of the data gathered, a follow up with e-mails were made in case of missing details during the analysis [39].

D. Data analysis (Stage 4)

After all the interviews had been transcribed, the data was analysed qualitatively using the content analysis method [39], [48], [49]. The aim of this method is to help the researcher extract useful information to provide understanding of the phenomenon in study and, consequently, to build knowledge [48]. As suggested by Kuckartz [50], a correspondence plot was used to mapped the common risk for the cases, and the different risk for each case. This plot was used only for descriptive purpose, using code frequencies by case. To support this step on the analysis, QDA Miner software help create a database of the codes and the cases. As appointed by Miles, Huberman and Saldana [51], data was organized in a Matrix format to extract the identified risks for each case. From the identified risks, a list of challenges was created.

E. Disseminate (Stage 5)

Aware of several criticism regarding the quality of the case studies [33], [34], [38], [52], some considerations were taken in order to ensure rigor and accuracy of this research – External validity, internal validity, construct validity and reliability. There is therefore a limitation regarding generalizability due to the location of the data gathered (Brazil) and types of other companies. Furthermore, Stuart et al. [38, p. 423] affirm that "the researcher does not need to assume that what is observed is truly representative of all similar situations". So that, the intention of this research is to raise practices (and the challenges) of Brazilian organizations and supply chains to achieve resilience.

IV. WITHIN-CASE RESULTS

A. Drink Case

To understand the types of risk and disruptions that the Drink Manufacturing (DA) supply chain has been through, interviewees were asked to give some examples. Fig. 3 portrays the sources of risk cited by interviewees of these companies. It is noticed that transportation issue was the most cited risk source that is likely to cause a disruption, and it corresponds to general transportation problems, such as delays in deliveries due to breaks trucks, accidents and traffic jam. In sequence, demand vulnerability, problems in the supplier's production line and the poor Brazilian infrastructure of roads are the second most cited sources of risk. At this point, it is worth noting that some of the transportation issues might be caused by the poor infrastructure of the Brazilian roads.

An interesting point to notice is that only one out of eleven cited sources of risk can be considered an environmental risk, whilst the others are all external risks. Although external risk is more likely to be manageable and avoidable, managers cannot avoid all of them, even though they are aware of the events' unpredictability. Sales person from a supplier have asserted "[...] the last holiday, for example, there was a lot of traffic on the motorways and consequently there were delays in deliveries. So, although we try to avoid it, this can happen". However, most of the risk mentioned by the interviewees could be well-managed through effective communication between buyer and supplier so that managers would be better prepared to manage the available resources and respond in an effective way.

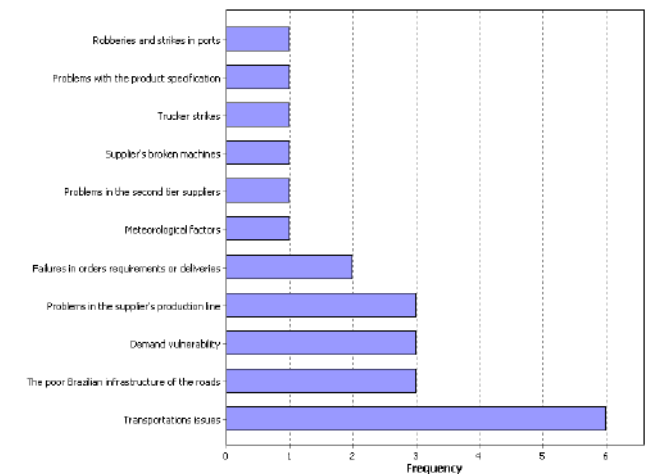


Fig. 3. Sources of risk and uncertainties cited by interviewees in Drink Case

In addition to this, interviewees have also suggested practices that should be applied to their routines in order to achieve a more resilient supply chain. Internally, a strategic manager suggested the development of efforts and actions focused on risk mitigation as a daily routine and not eventually. Externally, interviewees proposed a few points of improvements, such as increasing commitment and collaboration from all members along the supply chain, especially from large companies to its suppliers; better supplier's alignment with the focal company planning and

strategy; creation of supply chain group to discuss possible risks within a particular supply chain and hence how to manage and cope with them; autonomy to make decisions; improving preventive actions; minimal safety stock in customer plants; and having its own transportation. Regarding the external points of improvements reported by the interviewees, it is worth emphasizing that both Drink suppliers have pointed out the need for improvements in members' collaboration along the supply chain.

B. Home Appliance Case

Internal, external and environmental sources of risk and uncertainties cited by the interviewees are exposed in Fig. 4. Although a thirteen risk were cited by interviewees, Home Appliance Manufacturing (HAM) showed to be alerted and aware that unexpected events are likely to occur. In this sense, the Purchasing Manager asserts "HAM, in general, is very concerned about these [risks] and invests a lot in avoiding them, through security, through training, and in many other ways. But losses are likely to happen, even when taking care".

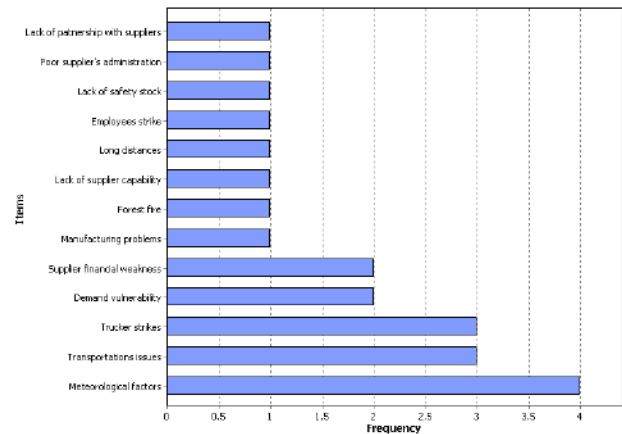


Fig. 4. Sources of risk and uncertainties cited by interviewees in Home Appliance Case

Fig. 4 shows that meteorological factors are more often cited than transportation issues in this second case. The reason is that this manufacturing industry requires on time suppliers' delivery, and both interviewed suppliers are highly vulnerable to changes in the weather to safely delivery the raw materials. In this regard, high level of stock is their main action to avoid supply disruptions. Second, transportation is also a critical factor to the HAM since they apply the just in time system, as mentioned before. Thus, transportation issues and trucker strikes may really impact the focal company's performance. In spite of the fact, some risks will increasingly affect HAM in comparison with others.

In addition to these actions or strategies, interviewees have also suggested points of improvements that should be applied to their routines so as to achieve a more resilient supply chain. Internally, the suggestions were: efforts to increase the level of information sharing, improvements in system to share information in a more rapid and effectively way, and internal process simplification, while externally they were: innovation

in supplier's technology/system to share a more accurate information, better supplier alignment with the focal company planning, and high level of employee's turnover in focal company.

C. Chocolate Case

In respect to the risk sources, all interviewees have mentioned types of uncertainties, which might come from internal, external and environmental events. In this case, however, none of the interviewees reported internal uncertainties; they have only highlighted external and environmental ones. Thus, the external sources of risk pointed out by the interviewees are: supplier financial weakness, problems in transportation, supplier's strikes and policy changes, while environmentally they are pests' incidents and meteorological factors. Considering these uncertainties, it is valuable to highlight that meteorological factors was the most cited risk source in this case. The reason is that chocolate supply chain is very vulnerable to climate changes, and although it can normally be forecasted, it is quite impossible to reverse it. "Eventually, we have pest problems, but you can combat the plague; it doesn't give you a shortfall in crops like the lack of water does." (Sales Manager). Thus, any extreme changes in the long term, such as rainfall frequency and warm weather, impact considerably on crops performance. Fig. 5 shows the sources of risk and uncertainties cited by the interviewees in this case.

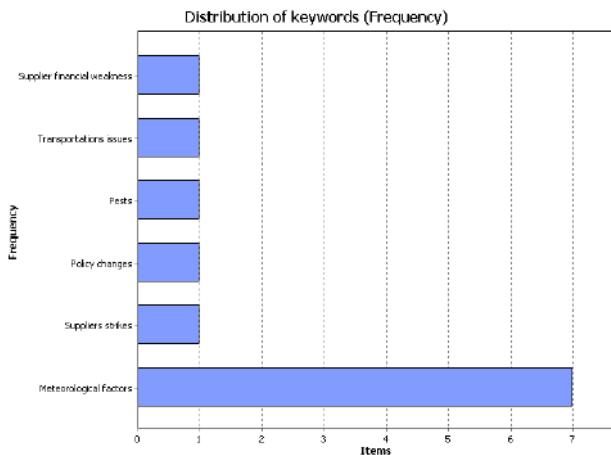


Fig. 5. Sources of risk and uncertainties cited by interviewees in Chocolate Case

In addition to these actions and strategies, suggestions were also proposed by the interviewees so as to create resiliency in the supply chain. Internally, interviewees have suggested that additional efforts and actions focused on risk mitigation should be often made rather than over thinking about cost in times of disruption. Another point is that managers should better explore and understand the internal resources to reconfigure and adapt as needed. Externally, interviewees proposed many other suggestions, such as earlier order placements, creation of groups to discuss possible risks and solutions to a particular supply chain, extra plant abroad to cope with environmental changes, collaboration along the supply chain, and

substitutable product that holds advantage in comparison with the original one.

D. Seeds Case

In this case, interviewees have pointed out sources of risk and uncertainties in their supply chain which cause supply disruptions. Fig. 6 presents internal, external and environmental sources of risk reported by the interviewees. Regarding those risk sources, two of them are worthy to be emphasized. First, one of the internal risk source stressed (internal forecast) is a risk that comes from external or environmental changes (for example, internal forecast is difficult to accurate due to unexpected changes in seasons), while the other two sources (product quality problems and lack of production capacity) are issues that must be managed by other business functions (for instance, quality and production) and not exclusively by Procurement - which is the main focus of this study. Second, it is notable to stress how vulnerable this particular supply chain (agribusiness) is to environmental risks, such as extreme temperature or/and drought, which can highly affect company's operations and performance; recognising that there is no possibility to reverse these situations.

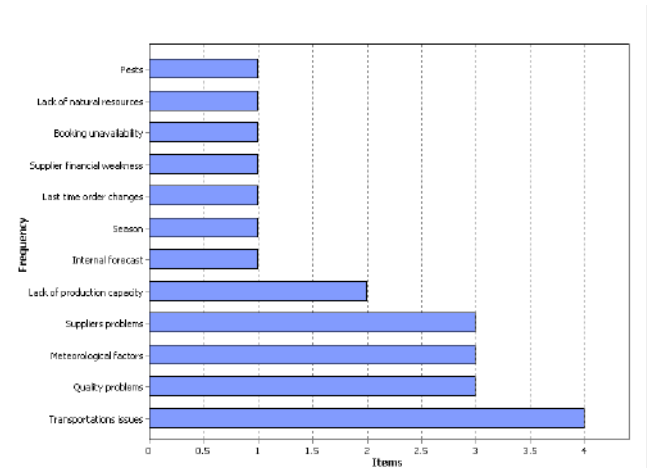


Fig. 6. Sources of risk and uncertainties cited by interviewees in Seeds Case

In addition to the actions or strategies reported to deal with a more severe supply disruptions, interviewees have suggested points of improvements that should be applied to their routines by aiming to achieve supply chain resilience. On this matter, most of the suggestions were made to improve internally rather than externally. Thus, internal suggestions were: efforts and actions focused on risk mitigation, product study and technological development, identification of critical items and development of supplier strategies, and critical analysis of the events. On the other hand, they expose external practices such as earlier orders and increasing partnership with supplier.

V. CROSS-CASE RESULTS AND DISCUSSION

Fig. 7 illustrates the results from the cross-case related to how each source of risk is associated to each supply chain sector. This figure is a preliminary result from the correspondence analysis (Fig. 4, 5, 6 and 7) to identify how

each case is identified with some specific risks. The common disruption risks observed among the cases are: transportation issues, pests, meteorological factors, supplier financial weakness, trucker strikes and demand vulnerability. Regarding to those, transportation issues were the common disruption risk for the four cases, whilst meteorological factors and pests have affected more on Chocolate and Seeds case, since they depend on natural resources. Trucker strikes have been identified in the HAM and Drink case, as they use trucks (or road channel) for transportation modes. Demand vulnerability is identified in Drink case, and then in HAM. This result considers different types of sazonality events that might impact demand and consequently production schedule and flow.

Apart from this result, the other identified risks demonstrated to be specific from a particular sector, as exhibited on the dotted-line boxes in Fig. 7. The highlighted risks (in bold) within the dotted box were observed more than once in the case, according to Fig. 3-6. It therefore shows the critical risk for these sectors, which need attention from the managers to understand the causes from past experiences and develop actions to deal with future events caused by these risks.

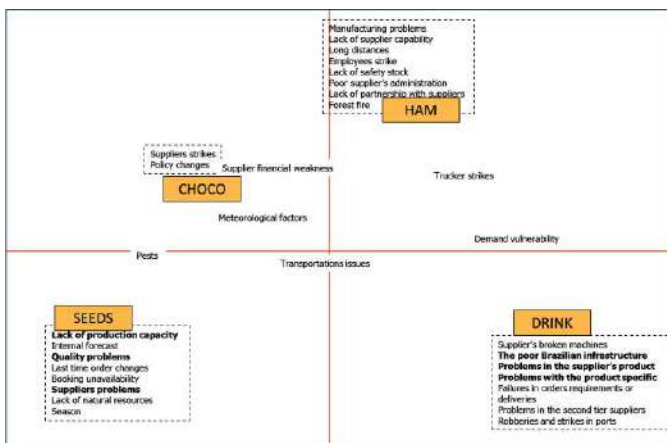


Fig. 7. Map of sources of risk by industry

Aligned to these results, Table I describes the internal practices identified through the four cases. Among the six internal practices raised from interviewees, the most highlighted is the “efforts and actions to risk mitigation”. They recognize that risks exist, and they must develop actions to mitigate it, however there is still a lack of effort to avoid them effectively. To achieve that, “critical analysis of disruptions events” can help managers deal with it, as well as enrich the knowledge management. As ways to rapidly identify and explore the risk, the use of IT system seems to be an effective tool. Furthermore, they highlight the advantage to study the product structure and resources (eg. technological ones), as well as the internal processes to improve the the effectiveness of the response. Finally, autonomy of managers to make decisions in times of disruption was a highlighted practice that help managers to increase the response when face a disruption.

TABLE I
INTERNAL PRACTICES IDENTIFIED FROM CASES

Internal practices	DRINK	CHOCO	SEED	HAM
Efforts and actions to risk mitigation	x		x	x
Improvements in IT system to share information in a more rapid and effectively way		x		
Simplification of internal processes through better understanding of the resources		x		x
Product study and technological development			x	
Managers’s autonomy to make decisions	x			
Critical analysis of the disruption events			x	
Developing actions for knowledge management		x		

Table II shows the external actions, considering the upstream side of the chain. The commitment was identified as the main practices to develop the other practices, such as “supplier's alignment to the focal company demand planning and strategy”, and “alignment of IT system for the supply chain members”. The same practice can help the creation of supply chain groups to discuss risk and to offer solutions and preventive actions. Other practice emphasized is the encouragement of small (and nearby) producers to grow a substitutable raw-material. So, in case of any shortage due to transportation issues, it is faster to overcome it. At last, minimal safety stock is a common strategy to in the Brazilian industry to deal with the unstable environment.

TABLE II
EXTERNAL PRACTICES IDENTIFIED FROM CASES

External practices	DRINK	CHOCO	SEED	HAM
Commitment and collaboration from all members of the supply chain through partnership	x		x	
Supplier's alignment to the focal company demand planning and strategy	x	x	x	x
Creation of supply chain group to discuss risks and ways to manage and cope with them	x			x
Improving preventive actions	x			
Minimal safety stock in the customer's plant	x	x		x
Alignment of IT system for the supply chain members		x		
Encourage small producer to grow a substitutable raw material				x

From the internal and external practices, it was possible to identified challenges to apply those (Fig. 8). Internally, there is insecurity from some managers to share information, which diminishes the time response and the effective actions. Financial resources were also an identified challenge considering that some types of IT system are costly, or in other situations, the internal procedures do not fit the IT resources, which make them use different resources that are not integrated in the system. Although managers’ autonomy to

make decision increase the response in time of disruption, the rigid hierarchical structure of the focal company in the CHOCO case showed to be a challenge.

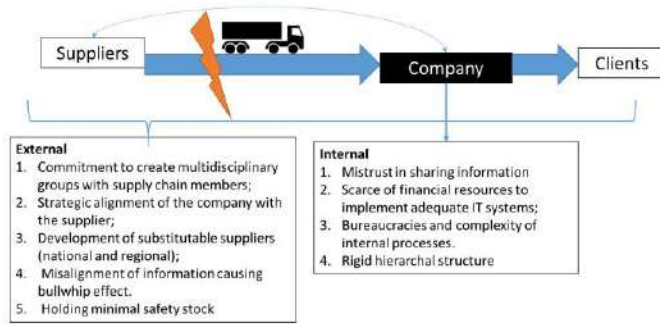


Fig. 8. Challenges faced on the studied cases

Externally, the commitment to create team groups for risk discussion raised as a challenge, as each company along the supply chain do not have the culture to share this kind of information, as well as strategic information. In this case, interviewees mentioned the issue of time constraint or supplier distrust. As a result, the information misalignment might result the bullwhip effect. Developing of national or regional supplier is also a challenge, because in some case specific resources are rare to be around, and when it exists, suppliers might not achieve the quality requirements. Finally, as the minimal stock help to deal with demand uncertainties, the question is: which member of the chain will hold the stock? This is a challenge because nowadays companies want to become lean in their operations to reduce cost and lead time. Nevertheless, becoming lean might increase external risk. Therefore, the results of this study have shown that suppliers normally hold (in their plant or in the warehouse through VMI) a minimal stock for the focal company.

VI. CONCLUSION

The concept of supply chain resilience is currently excelling compared to other approaches to supply chain management as it enables an organisation to prepare for, respond to, and successfully recover from disruptions. For this reason, understanding the company's vulnerabilities and knowing how to effectively act to mitigate them is fundamental to survive in today's complex and dynamic business environment. This exploratory study sought to explore different types of disruption risk found in Brazilian manufacturing industries and identifies the internal and external practices used to build resilience, as well as the challenges. As a result, 30 types of disruption risk were identified, in which six of them have shown commonalities among the cases. Regarding the practices, 14 practices (7 internal and 7 external) were suggested to help managers to deal with the disruption and enable the companies through the supply chain to prepare for, respond to, and successfully recover from those. Although the practices have the responsibility to achieve resilience, it was identified 9 challenges (4 internal and 5 external) to use them effectively.

The findings of this study help to understand the current disruptive risk that might impact the studied section in Brazil. Additionally, it highlights practices as well as challenges that managers must pay attention to truly achieve supply chain resilience in the current Brazilian environment. Although these findings came from beverage, chocolate, home appliance and agribusiness sectors, they are not limited to these supply chain sectors only. Managers from other sectors, and also from other location (such as Central America), can make use of the factors to build resilient capability for dealing with critical situations and effectively responding and recovering from them.

REFERENCES

- [1] S. M. Wagner and C. Bode, "an Empirical Examination of Supply Chain Performance Along Several Dimensions of Risk," *J. Bus. Logist.*, vol. 29, no. 1, pp. 307–325, 2008.
- [2] K. E. Stecke and S. Kumar, "Sources of Supply Chain Disruptions, Factors That Breed Vulnerability, and Mitigating Strategies," *J. Mark. Channels*, vol. 16, no. 3, pp. 193–226, Jun. 2009.
- [3] J. Blackhurst, C. W. Craighead, D. Elkins, and R. B. Handfield, "An empirically derived agenda of critical research issues for managing supply-chain disruptions," *Int. J. Prod. Res.*, vol. 43, no. 19, Oct. 2005.
- [4] M. Christopher and M. Holweg, "Supply Chain 2.0": *Managing supply chains in the era of turbulence*, vol. 41, no. 1. 2011.
- [5] U. Jüttner, H. Peck, and M. Christopher, "Supply chain risk management: outlining an agenda for future research," *Int. J. Logist. Res. Appl.*, vol. 6, no. 4, pp. 197–210, 2003.
- [6] M. Christopher and H. Lee, "Mitigating supply chain risk through improved confidence," *Int. J. Phys. Distrib. Logist. Manag.*, vol. 34, no. 5, pp. 388–396, 2004.
- [7] N. O. Hohenstein, E. Feise, E. Hartmann, and L. Giunipero, "Research on the phenomenon of supply chain resilience: A systematic review and paths for further investigation," *Int. J. Phys. Distrib. Logist. Manag.*, vol. 45, pp. 90–117, 2015.
- [8] Y. Sheffi, *The Power of Resilience: How the Best Companies Manage the Unexpected*. Cambridge, Massachusetts: The MIT Press, 2015.
- [9] World Economic Forum, *The global risks report 2018, 13th edition*. 2018.
- [10] "New Brazilian corruption probes and their consequences," *The Economist*, São Paulo, 20-Apr-2017.
- [11] D. Biller, "Brazil's Highs and Lows," *Bloomberg*, 05-Oct-2018.
- [12] C. Castro, "Piora a qualidade," *CNT Transporte Atual*, vol. 264, Brasília DF, pp. 18–27, Oct-2017.
- [13] T. Phillips, "Floods and landslides kill 95 in Rio slums after city's worst rainstorms | World news | The Guardian," *The Guardian*, Rio de Janeiro, 07-Apr-2010.
- [14] A. Ali, A. Mahfouz, and A. Arisha, "Analysing supply chain resilience: integrating the constructs in a concept mapping framework via a systematic literature review," *Supply Chain Manag. An Int. J.*, vol. 22, no. 1, pp. 16–39, 2017.
- [15] M. Kamalahmadi and M. M. Parast, "A review of the literature on the principles of enterprise and supply chain resilience: Major findings and directions for future research," *Int. J. Prod. Econ.*, vol. 171, no. 1, pp. 116–133, 2016.
- [16] N.-O. Hohenstein, E. Feisel, E. Hartmann, and L. Giunipero, "Research on the phenomenon of supply chain resilience: A systematic review and paths for further investigation," *Int. J. Phys. Distrib. Logist. Manag.*, vol. 45, no. 1/2, pp. 90–117, 2015.
- [17] M. Christopher and H. Peck, "Building the Resilient Supply Chain," *Int. J. Logist. Manag.*, vol. 15, no. 2, pp. 1–14, 2004.
- [18] J. Blackhurst, K. S. Dunn, and C. W. Craighead, "An empirically derived framework of global supply resiliency," *J. Bus. Logist.*, vol. 32, no. 4, pp. 374–391, Dec. 2011.
- [19] U. Jüttner and S. Maklan, "Supply chain resilience in the global

- financial crisis: an empirical study,” *Supply Chain Manag. An Int. J.*, vol. 16, no. 4, pp. 246–259, 2011.
- [20] K. Scholten, P. S. Scott, and B. Fynes, “Mitigation processes – antecedents for building supply chain resilience,” *Supply Chain Manag. An Int. J.*, vol. 19, no. 2, pp. 211–228, 2014.
- [21] V. Jain, S. Kumar, U. Soni, and C. Chandra, “Supply chain resilience: model development and empirical analysis,” *Int. J. Prod. Res.*, vol. 7543, no. July, pp. 1–22, 2017.
- [22] C. R. Pereira, M. Christopher, and A. L. da Silva, “Achieving supply chain resilience: the role of procurement,” *Supply Chain Manag. An Int. J.*, vol. 19, no. 5/6, pp. 626–642, 2014.
- [23] M. Bradaschia and S. C. F. Pereira, “Building Resilient Supply Chains Through Flexibility: a Case Study in Healthcare,” *J. Oper. Supply Chain Manag.*, vol. 8, no. 2, p. 120, 2015.
- [24] M. Maslaric and D. Mircetic, “Assessing the trade-off between lean and resilience through supply chain risk management Todor Backalic Svetlana Nikolicic,” *Int. J. Ind. Eng. Manag.*, vol. 4, no. 4, pp. 229–236, 2013.
- [25] Y. Sheffi and J. B. R. J. Rice, “A Supply Chain View of the Resilient Enterprise,” *MIT Sloan Manag. Rev.*, vol. 47, no. 1, pp. 41–49, 2005.
- [26] S. Y. Ponomarov and M. C. Holcomb, *Understanding the concept of supply chain resilience*, vol. 20, no. 1, 2009.
- [27] A. Wieland and C. M. Wallenburg, “The influence of relational competencies on supply chain resilience: a relational view,” *Int. J. Phys. Distrib. Logist. Manag.*, vol. 43, no. 4, pp. 300–320, 2013.
- [28] I. Golgeci and S. Y. Ponomarov, “Does firm innovativeness enable effective responses to supply chain disruptions? An empirical study,” *Supply Chain Manag. An Int. J.*, vol. 18, no. 6, pp. 604–617, 2013.
- [29] S. Y. Ponomarov and M. C. Holcomb, “Understanding the concept of supply chain resilience,” *Int. J. Logist. Manag.*, vol. 20, no. 1, pp. 124–143, 2009.
- [30] T. J. Pettit, J. Fiksel, and K. L. Croxton, “Ensuring Supply Chain Resilience: Development of a conceptual framework,” *J. Bus. Logist.*, vol. 31, no. 1, pp. 1–22, 2010.
- [31] S. G. Azevedo, K. Govindan, H. Carvalho, and V. Cruz-Machado, “Ecosilient Index to assess the greenness and resilience of the upstream automotive supply chain,” *J. Clean. Prod.*, vol. 56, pp. 131–146, 2013.
- [32] N. Johnson, D. Elliott, and P. Drake, “Exploring the role of social capital in facilitating supply chain resilience,” *Supply Chain Manag. An Int. J.*, vol. 18, no. 3, pp. 324–336, 2013.
- [33] L. M. Ellram, “The use of the case study method in logistics research,” *J. Bus. Logist.*, vol. 17, no. 2, pp. 93–138, 1996.
- [34] R. K. Yin, *Case Study Research: Design and Methods*, vol. 26, no. 5th, 2014.
- [35] H.-G. Ridder, “The theory contribution of case study research designs,” *Bus. Res.*, vol. 10, no. 2, pp. 281–305, 2017.
- [36] K. M. Eisenhardt, “Building theories from case study research,” *Acad. Manag. Rev.*, vol. 14, no. 4, pp. 532–550, 1989.
- [37] J. Meredith, “Building operations management theory through case and field research,” *J. Oper. Manag.*, vol. 16, no. 4, pp. 441–454, Jul. 1998.
- [38] I. Stuart, D. McCutcheon, R. Handfield, R. McLachlin, and D. Samson, “Effective case research in operations management: A process perspective,” *J. Oper. Manag.*, vol. 20, no. 5, pp. 419–433, Sep. 2002.
- [39] C. Voss, N. Tsikriktsis, and M. Frohlich, “Case research in operations management,” *Int. J. Oper. Prod. Manag.*, vol. 22, no. 2, pp. 195–219, 2002.
- [40] M. Barratt, T. Y. Choi, and M. Li, “Qualitative case studies in operations management: Trends, research outcomes, and future research implications,” *J. Oper. Manag.*, vol. 29, no. 4, pp. 329–342, 2011.
- [41] N. W. H. Blaikie, *Designing social research : the logic of anticipation*. Polity Press, 2010.
- [42] K. M. Eisenhardt, “Better Stories and Better Constructs: the Case for Rigor and Comparative Logic,” *Acad. Manag. Rev.*, vol. 16, no. 3, pp. 620–627, 1991.
- [43] C. W. Craighead, J. Blackhurst, M. J. Rungtusanatham, and R. B. Handfield, “The Severity of Supply Chain Disruptions : Design Characteristics and Mitigation Capabilities,” *Decis. Sci.*, vol. 38, no. 1, pp. 131–156, 2007.
- [44] N. K. Denzin, “The elephant in the living room: Or extending the conversation about the politics of evidence,” *Qual. Res.*, vol. 9, no. 2, pp. 139–160, 2009.
- [45] A. Langley and C. Abdallah, “Templates and turns in qualitative studies of strategy and management,” in *Building Methodological Bridges (Research Methodology in Strategy and Management, Volume 6)*, vol. 6, D. D. Bergh and D. J. Ketchen, Eds. Bingley, UK: Emerald Group Publishing Limited, 2011, pp. 201–235.
- [46] N. K. Denzin and Y. S. Lincoln, *The SAGE handbook of qualitative research*. 2011.
- [47] H. Deakin and K. Wakefield, “Skype interviewing: reflections of two PhD researchers using Skype,” *Qual. Res.*, 2013.
- [48] L. Bardin, *Análise de Conteúdo*, 7th ed. Lisboa, Portugal: Edições 70 - Brasil, 2008.
- [49] G. R. Gibbs, “Analysing Qualitative Data,” in *The Sage Qualitative Research Kit*, 2007, pp. 38–55.
- [50] U. Kuckartz, *Computergestützte Analyse qualitativer Daten. Eine Einführung in die Methoden und Arbeitstechniken*. Opladen/Wiesbaden: VS Verlag für Sozialwissenschaften, 1999.
- [51] M. B. Miles, A. M. Huberman, and J. Saldana, *Qualitative Data Analysis*, 3rd ed., vol. 1. Thousand Oaks, CA: SAGE Publications, 2014.
- [52] S. a. Seuring, “Assessing the rigor of case study research in supply chain management,” *Supply Chain Manag. An Int. J.*, vol. 13, no. 2, pp. 128–137, 2008.