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Strategies for handling supply chain disruptions. A cross comparative case study approach

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Abstract

Interest in supply chain disruptions increased after 2001, due to the devastating effects of the recent disruptive event and due to the increasing vulnerability of the supply chains. Although research interest on this topic has been increasing, no such research has been done in Albania. Regarding strategies for handling supply chain disruptions exist different views in the literature, but nearly no one has considered why some companies were successful in handling the supply chain disruptions and some were not. To fill this existing gap, the actual research will attempt to give an answer to the question "Why the severity of the same supply chain disruption is different for companies in the same industry?" The methodology used was comparative case studies, respectively Dell, Nokia, Daimler, Meggle Albania and Fabjus case study. The analysis and comparison of the case studies concluded that the best strategy for handling supply chain disruptions is a combination of resilience and implementation of robust strategies. This research is important for managers as it will provide a specific framework for handling the disruptions. Managers should be aware that the severity of a disruption depends on the company background and organizational culture. These factors can increase the company resilience. Also, they determine the success in the execution of the strategies for managing supply chain disruptions.

Keywords: Supply chain disruptions, Severity, Robust strategies, Organizational culture, Company's background

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1. Introduction

Supply chain disruptions begun to receive special attention after 2001. The main reason was the recent disruptive events, such as the terrorist attacks, earthquakes, tsunami and many others, which had caused devastating losses to global companies (Petit, Croxton & Fiksel, 2013). A second reason was the vulnerability of the modern supply chains. They have been always vulnerable but today they are more vulnerable, as firms are less vertically integrated, and their supply chain is located all over the world. A global supply chain can be efficient in term of costs, but it is more exposed to a high range of disruptions rather than a local supply chain (Tang & Musa, 2011).

Supply chain disruptions are becoming critical for many companies. A recent global report about supply chain disruptions reported that 81% of the companies considered had faced at least one supply chain disruption. All the disruptions had devastating financial and non-financial effects and so they need special attention (Business Continuity Institution, 2014).

Although research interest on supply chain disruptions has been increasing, no such research has been done in Albania. The Albanian companies had faced and also are facing many disruptions, and this research could offer to them some recommendations for handling the supply chain disruptions successfully.

This research is important because it will try to filling an existing gap in the literature.

Literature gap: Three different views exist in the literature regarding strategies for handling supply chain disruptions. The first view argues that companies have to be prepared to face disruptions, by increasing the resilience and robustness of their supply chains. The second view argues that the successful handling of supply chain disruptions depends on the reaction of the company after the disruption happened. The third view considers the first and second view together. Sometimes the same disruption hit companies in the same industry. Some recovered quickly from the disruption while the others recovered with huge loses. None of these views can fully explain why some companies were successful in handling the same supply chain disruptions compared to others. This research will try to fill this existing gap in the literature, by identifying the factors that determine the success in handling the supply chain disruption compared to the competitors.

This research is important for academicians because it is filling an existing gap in the literature, and also it will highlight some new areas that need further research. The research is even more important for the Albanian researchers because no such study has been done in Albania. The research is important for managers,

as it will analyze real-life case studies. The analysis of the case studies will provide a framework for handling supply chain disruptions.

2. Research aim, question and proposition

After the terrorist attack on September 2001, the managers have increased their awareness to supply chain disruptions. Many companies have special departments and specialist that forecast the potential disruptions and prepare the company to face them. Being prepared is the first step in handling supply chain disruptions, but sometimes it is not enough. Companies like Dell, Nokia, Chiquita, Toyota, faced disruptions and even if they were not totally prepared, they handled the supply chain disruptions successfully. Their competitors faced the same disruptions, but they recovered with significant losses or some did not recover. The research will try to analyze this puzzle, by addressing the following research question: Why the severity of the same supply chain disruption is different for companies in the same industry? To answer the research question, the author will analyze the strategies used by the companies for handling the supply chain disruptions Bus and the factors that determined their success compared to the competitors.

To handle supply chain disruptions, it is not a matter of having a resilient supply chain or having implemented a robust supply chain strategy. To design a strategy is easy but the execution is difficult. The same strategy cannot work well for each company. There are cases when companies operating in the same sector were hit by the same disruption, but some survived and some did not. Their success was based on many factors, like company background and organizational culture. This discussion suggests the following research proposition: The severity of a disruption depends on the company background[1] and organizational culture.

The article outline is the following: After the introduction section, the relevant literature regarding strategies for handling supply chain disruptions is analyzed. Then, the methodology is explained. After the methodology section the findings are discussed, and the author concludes with limits of the study and recommendations for managers and future research.

3. Literature review

It is necessary to provide some definitions for the main concepts of this research. Supply chain definition: A supply chain consists of all parties involved, directly

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[1] With company background the author means the past experiences of the company in handling disruptions.

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or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves (Chopra & Meindl, 2012). Supply chain disruption definition: A supply chain disruption is an event that might happen in any part of the chain and causes undesired impacts on its (achievement of) objectives and performance (Behdani, Adhitya, Lukszo and Srinivasan, 2012).

3.1 Sources and consequences of supply chain disruptions

The sources of supply chain disruptions are infinite, but for the purpose of this study they are summarized in three broad categories: natural disasters, accidents and intentional disruptions. A natural disaster is defined as any event or force of nature that has catastrophic consequences (Sheffi, 2007). The natural disasters include earthquakes, flood, forest fire, hurricane, lightning, tornado, tsunami, volcanic, avalanche et cetera. Accidents include unanticipated events such as quality accidents, labor accidents, fire, transportation accidents, communication accidents and so forth (Schmitt, Sun, Snyder, & Shen, 2015) Intentional disruptions are the ones that are caused by conscious acts by a person or a group. They can be classified in terrorist and non-terrorist. The last ones include labor strike, adverse media coverage, management manipulations, cyber-attacks and many others (Steckea & Kumarb, 2009).

The consequences of supply chain disruptions can be summarized in financial and non-financial. The financial consequences include cost increase, decrease of incomes, drop in operating income and so forth. The main non-financial consequences are damage to brand reputation and loss of competitive advantage. The last ones are long lasting (Hendricks & Singhal, 2005; Sheffi, 2007; Business Continuity Institution, 2014; Bueno- Solano & Cedillo- Campos, 2014).

3.2 Strategies for handling supply chain disruptions

Regarding strategies for handling supply chain disruptions exist three different views in the literature, respectively supply chain risk management, supply chain disruption management and the integrative framework. Supply chain risk management: The authors of this view stress the importance of increasing the resilience and robustness of the supply chains, which in turn will enable companies to forecast disruptive events and reduce their impacts, in few words being prepared for the disruption. According to them the best strategies for handling supply chain disruptions can be classified in:

- Robust strategies: A robust supply chain strategy is a strategy that helps the company to reduce costs and improve customer satisfaction under normal

circumstances and also helps the company to manage small disruptions and major disruptions by being cost and time efficient (Tang, 2006).
- Security based strategies: The aim of these strategies is to increase the security in all the supply chain, in order to reduce the exposure to severe disruptions (Audry & Bobbitt, 2008; Hilletofth, 2009; Genus & Mafakheri, 2014).
- Resiliency strategies: They help the company to increase the supply chain resilience, which do not merely imply the ability to manage risks but even the capability to do it better than the competitors by gaining competitive advantage. Their aim is to increase flexibility, redundancy and control (Tomlin, 2006; Deane, Craighead and Ragsdale, 2009; Wang, Gilland and Tomlin, 2010; Colichia, Dallari and Melacini, 2010; Marques, Alves and Sousa, 2013; Roh, Hong and Min, 2014).

Supply chain disruption management: The authors of this view argue that a pro-active approach to disruptive events is good, but sometimes the disruptive event hit the company when and where it is not prepared. In this case, a reactive approach is necessary. Companies should be able to design strategies that enable them to handle supply chain disruptions and to recover quickly after the disruptive event. For this approach, we can mention the contribution of (Blackhurst, Craighead, Elkins, & Handfield, (2005) . They provided a three-step process for handling supply chain disruption. Sheffi (2007) realized that corporate culture is an important factor in handling supply chain disruptions.

The integrative framework: For managing the disruptions, both the proactive and reactive perspective is important. By investing in supply chain risk management, many disruptions can be avoided and the supply chain disruption management will be faster if the company has proper planning. However, due to cost and time many risks cannot be always predicted, so more attention must be put to the response strategies. There have been some attempts to offer an integrative framework (Pyke & Tang, 2010 and Behdani et. al., 2012) to handle disruptions. The authors did not consider supply chain risk management and supply chain disruption management separately but interconnected.

4. Research methodology

The research strategy of this study is cross comparative by nature and relies on five case studies, respectively Dell, Nokia, Daimler, Meggle Albania and Fabjus case study. The first three case studies were analyzed separately because the aim of these case studies was to provide some important lessons from the experience of global

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companies in handling supply chain disruptions. As the saying says "A wise person learns from other mistakes while a fool learns from his experience" (Sheffi, 2007).

The lessons from the experience of these companies in handling supply chain disruptions are crucial in the academic and real world. Many researchers have mentioned these case studies, as an example of success in handling supply chain disruptions, but very few have analyzed them in detail. Also, the lessons from their experience have been of critical importance for managers in different companies.

Dell and Nokia are electronics companies while Daimler is an automotive manufacturer. Electronic and automotive manufacturer companies are more exposed to disruptions as their supply chain is complex and global. Summarizing, Nokia, Dell and Daimler case studies do not only bring important lessons for managers and researchers but also they are relevant to the research aim of this study, because they handled the disruption successfully compared to the competitors.

Even, the two Albanian case studies were analyzed separately. The main reasons why the author has chosen these case studies were the availability of information from the managers of the companies and the compatibility of the cases with the research aim of this study. These case studies were compatible with the research aim of the study, as the same disruption hit two companies in the same industry, but one handled the disruption successfully while the other did not. Many companies did not offer information for this sensitive topic, while the plant manager of Meggle and the owner of Fabjus were very available and provided all the necessary information.

The most relevant data collection technique for this research was in-depth interviews face to face, for the following reasons:

- Interview is a data collection method used to gather qualitative data and this research is based mainly on qualitative information.
- For the topic of the actual research, not every person in the company has full information. Only the high level managers have all the necessary information for the disruptive event and the reaction of the company. So in each company, the author could interview only the high level managers.
- A supply chain disruption is a sensitive topic, and many managers do not like to talk about an event that causes them many losses. Some can say: "Why telling you how I handled the disruption? These are confidential information". The interview cannot be the same for everyone, as someone can provide information freely, some are more conservative and each company reacted differently to the disruption. So, the researcher cannot have a list of questions, but only a clear idea of the topics she wants to explore. The interviews were conducted face to face in the period January 2015–June 2015, as sensitive information could not be provided via phone or internet.

5. Case study analysis and the research findings.

Firstly, a brief description of the case studies will be provided. Dell case study: Due to an earthquake in Taiwan, the production of chips in the Hsinchu Park decreased. At the time of the earthquake a high percentage of computer memory chips was produced at this industrial park. Major global companies in the computer industry, like Dell, Apple, Compaq and IBM, were affected by this disruption as they used to buy the specific chips by the Taiwanese suppliers. Dell handled the disruption successfully as it gained market share after the disruption. Apple, Compaq and IBM saw their revenues and market shares declining after the earthquake.

Nokia case study: Nokia was the leading company in the phone industry for a long time. Many years ago, it faced an inbound disruption, as the plant of its main supplier, Philips, was stroked by a lighting storm. Philips could not fulfill the orders of its main clients, Nokia and Ericsson. At a first sight, it was forecasted that the delay will be a week, but in reality it was more than a week. Nokia gained market share after the disruption while Ericson retreated from the mobile market.

Daimler case study: After the terrorist attack the security in the customs points was increased. Many car manufactures like Daimler, General Motor, Ford and many others relied on just in time inventory by keeping nearly zero inventories. As the shipment of many parts was blocked at the Canadian and Mexican board, these car manufactures were obliged to stop the production. Ford announced the closure of four producing plants and reported financial losses while the market share and profits of Daimler increased after the disruption.

Meggle Albania case study: Three years ago, the Kosovo Food and Veterinary Agency announced that the milk produced by two Albanian milk processing companies, Primalat and Fast (produced by Meggle Albania) contained two to three times higher levels of aflatoxin compared to the level allowed by the European Union. The media was immediately informed and these brands of milk were blocked in the Kosovo custom. The production was stopped in the two factories. Primalat reported huge losses and was not able to survive to this disruption. Meggle Albania stopped the production for two months, but it returned strongly in the Albanian market later.

Fabjus case study: Fabjus is an Albanian company, which operates in different sectors like production of plastic, construction sector and food sector (vinegar and lemon juice production). On June 2012, one client called Fabjus and its other main suppliers to postpone the delay by few days. Short time delays were normal in every business, but a small delay turned into a permanent delay. After three days, they received a second call. The orders were canceled. Fabjus was able to recover

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quickly from the disruption, because it sold the major part of the products, whose order was canceled. The other companies recovered too late and with financial losses.

5.1 Structure of case study analysis

The analysis of the case studies was structured in four main parts. It started with the analysis of the company before the disruption. The analysis was focused on the following elements: company background, supply chain, organizational culture and organizational structure. Detailed information were collected for each element but in the dissertation were presented only the ones that were relevant for this research. In the second part, the disruption was analyzed. The author described how, when and where the disruptions happened and analyzed its effects in the specific industry. The third part was the most important. The author, firstly, analyzed in detail and chronological order the actions and strategies undertaken by each company after the disruption happened. Then, she attempted to understand why the companies have undertaken such actions and strategies. Lastly, the performance of the companies after the disruption and until now was analyzed. For the first three companies, the financial performance was analyzed as many financial indicators could be found easily. For the Albanian companies, this part was descriptive because it was difficult to find realistic financial information.

5.2 Research findings

All the companies studied in this research faced different types of disruptions. Each disruption happened in different parts of the supply chain and their impact sometimes was spread in all the industry and sometimes just on few companies. However, Dell, Nokia, Daimler, Meggle Albania and Fabjus handled the disruption successfully compared to their competitors. Their success relied on different factors. In table 1 are presented these factors for each company.

TABLE 1: The factors that determined the success in handling the disruptions

	Dell	Nokia	Daimler	Meggle Albania	Fabjus
The factors that determined the successful handling of the disruption	Awareness to risk Agile supply chain Company background Organizational culture Human resources Business model Robust strategy: revenue management Strong relationships with suppliers Human resources	Awareness to risk Agile supply chain Sense of urgency Company background Organizational culture Human resources Robust strategy: postponement Strong relationships with suppliers	Awareness to risk Agile supply chain Sense of urgency Company background Organizational culture Robust strategy: Flexible transportation	Sense of urgency Company background Organizational culture Human resources Full supply chain visibility Robust strategy: revenue management Strong collaboration with suppliers	Sense of urgency Company background Organizational culture Human resources Full supply chain visibility Robust strategy: revenue management and postponement Good knowledge of the customer market

Some companies handled the disruption successfully compared to the competitors due to the capabilities of their managers in analyzing the problem, finding a solution and executing it quickly. Global companies have agile supply chains and manifest a high degree of supply chain collaboration and risk awareness. These factors determined their success in handling the disruption. The Albanian companies do not rely on supply chain collaboration but on vertical integration to have full visibility over the supply chain. However, there are two factors that determined the success of the five companies in handling the supply chain disruption successfully compared to the competitors:

Company background: It refers to the company past experience in handling disruptions. Every company had faced at least one disruption. The disruptions small or big need special attention. After the recovery phase, each company should highlight the most important lessons from its experience in handling the disruption. Obviously, the company can face different types of disruptions, and there is no unique strategy to manage each of them. However, companies that have faced before disruptions, are more aware to risk so they invest more in increasing company resilience. Morever, these companies react quickly when the disruption happens and they did not under evaluate any possible sign that can bring to a serious problem.

Organizational culture: The analysis of the case studies has shown that cultures that manifest the following elements: high level of uncertainty avoidance, high level of collaboration and sense of urgency can handle better disruptions. Companies that do not like uncertainty, try to increase the visibility over the supply chain. In this way, they can detect the weakest links in the supply chain quickly. Supply chain visibility can be increased through collaboration, but not every culture is collaborative. Some societies tend to work in group and to collaborate, while some other companies are more individualistic. The last one can increase supply chain visibility by relying on vertical integration. It is a costly and time-consuming option for global companies but maybe not for local ones.

Dell, Nokia, Daimler, Meggle Albania and Fabjus reacted quickly when the disruption happened while their competitors did not give the same importance to the disruption by reacting too late. The sense of urgency showed by these companies defined their success in handling the supply chain disruptions. Aggressive and active cultures tend to react more quickly than passive cultures.

All the companies analyzed in this research have implemented a robust strategy to handle the disruption. Robust strategies are the ones that help the companies to increase customer satisfaction and profits in normal conditions and also help them to handle small or big disruptions. Each company implemented the strategy that best fitted with its organization. Dell implemented the revenue management strategy as its business model allowed the company to impact directly the customer choices.

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Nokia implemented the postponemnet strategy as it had a flexible supply chain, while Fabjus implemented this strategy because it was the best strategy for the type of products it produced. So each company designs the robust strategy that according to them is the most suitable with their organization. To design a strategy is easy but the execution is difficult. This research revealed that the execution of the robust strategies depended on the company background and organizational culture.

6. Conclusions

Nowadays, companies are more vulnerable to supply chain disruptions. These disruptions can happen in different part of the supply chain and they can have different sources but in many of the cases they have devastating negative impacts and need special attention. Dell, Nokia, Daimler, Meggle Albania and Fabjus were hit by the same disruption as their competitors, but they recovered quickly while their competitors recovered with huge losses or some did not recover. To find the reasons behind their success, this research attempted to give an answer to the following question: Why the severity of the same disruption is different for companies in the same industry?.

To answer this question, the research strategy used was case studies. Five case studies were analyzed, respectively the success of Dell, Nokia, Daimler, Meggle Albania and Fabjus in handling the supply chain disruptions compared to their competitors. The analysis of the case studies revealed that the severity of supply chain disruptions depends mainly on the company reaction when the disruption happened. Normally, the severity of the disruptions is low for resilient companies, as they are prepared to face disruptions. Resiliency can be increased through supply chain flexibility and supply chain collaboration.

Based on the discussion in section 5.2, the author can conclude that the severity of a disruption depends on the company background and organizational culture. These factors can increase the company resilience. Also, they determine the success in the execution of the strategies for handling supply chain disruptions. The research proposition of this study holds on, based on the analysis of the five case studies.

The best strategy for handling supply chain disruptions is a combination of resilience and implementation of robust strategies. The last one depends on company background and organizational culture.

6.1 A framework for handling supply chain disruptions

Every company has to be prepared to face disruptions, as in this way it will reduce its vulnerability to disruptions. This is the first step for handling supply chain disruptions. The author recommends the following actions to decrease supply chain vulnerability:

Identify and prioritize vulnerabilities: The likelihood and consequences of a disruption are different for different companies, so each company should have a specific department that analyze the possible disruptions that can happen, their likelihood and their consequences. The companies can create a disruption catalog, which will categorize the disruptions based on their sources, consequences, likelihood of happening, and so forth. It is important that the information is updated at least on a yearly basis. It will be perfect if all the supply chain partners will have a disruption catalog. Based on this information the company can decide which disruption has the priority compared to the others.

After you have identified and prioritized the disruptions you should decide how you can reduce the probability of the disruption happening and its consequences. The following actions are recommended: Increase flexibility: Flexible companies can handle better disruptions. Companies should increase flexibility in production, inventory, supply and distribution. The author would like to stress that each company, based on its financial position, industry and type of product it produces, should decide in what part of the supply chain to increase flexibility. For example, flexible transportation is important for companies that sell products in different countries while flexible production is easier for firms that sell nearly standardized products.

Increase supply chain visibility: Today many supply chains are global and complex, so it is difficult to monitor and manage them. If one part of the supply chain is weak, all the supply chain will be weak. The best suggestion to discover the weakest link quickly is collaboration and continuously information exchange with all the companies in the supply chain. If supply chain collaboration is not easy, companies can try to do not outsource the critical parts of the supply chain or to be nearly vertically integrated. In this way, they can have full control and visibility over the supply chain, and the disruptions can be detected quickly.

Increase supply chain security: All the people in the company have to be trained in handling supply chain disruptions, and emergency teams have to be created. When the disruption will happen the emergency team will be focused on handling the disruption while the company will be focused on what it is good doing (producing or selling).

Understand your business model and culture: Companies have different cultures and different business models, which sometimes help them to face disruptions and sometimes impose limits in handling disruptions. So it is suggested to understand who are the strengths and limits of the company's business model and organizational culture. When managers have to design strategies for handling supply chain disruptions, they have to consider these strengths and limits as the last ones will determine the success of the strategy execution.

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Learn from the other companies' experience: A wise person learns from the experience of others while a fool learns from his experience (Sheffi, 2007). A successful company avoids doing the same mistakes done by its competitors. So, managers have to be kept informed about their industry and competitors. They have to analyze how the other companies in the industry reacted to several disruptions and what can be learnt from their experience.

Being prepared is the first step to handle supply chain disruption successfully. But what managers can do when the disruption happens?

Organize internally and then externally: When the disruption happens the first thing to do is to analyze the potential effects of the disruption and the best strategy to handle it. You have to find the root of the problem and the possible solution. For example, Nokia first redesigned the chips (organize internally) and then it started to search for alternative suppliers (organize externally).

Teamwork: Work as a team not as a group. In a team people communicate freely with each other, give their opinion, have the same interests and objectives and trust each other. Nokia handled the disruption successfully compared to Ericsson, because it has worked as a team while Ericsson as a group.
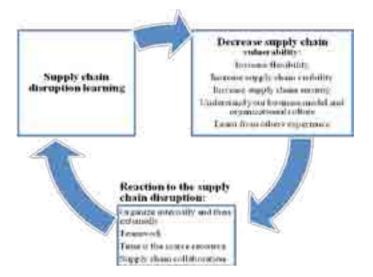
Time is the scarce resource: When the disruption happens, there is no time to loose, every second is a matter of death or life. Companies have to react quickly when the disruption happens.

Supply chain collaboration: Supply chain disruption in many of the times did not happen to the focal company but to the supply chain partners. The actions and strategies of each partner should be coordinated and the decision-making process should involve all of them. This in turn will help the companies to recover quickly, and the collaboration efforts will be increased in the future.

The disruption happened, the company reacted and everything turned back into normality. However, the process of supply chain disruption management should not stop here. The managers should ask: What can be learned from this experience?.

In Figure 1 is presented the framework for handling supply chain disruptions, discussed in the previous paragraphs. Firstly, the company should invest in decreasing the supply chain vulnerability, by following the steps presented in the first box. All these steps can decrease supply chain vulnerability but also they can help the company to react effectively and efficiently to the disruptions. Secondly, the company should react quickly when the disruption happens, and it should collaborate with all the supply chain partners. Lastly, the company must be able to highlight the most important lessons from this experience, as they will help the company to improve its resiliency. The process of handling supply chain disruptions, is an ongoing process, when each step must be coordinated with the other steps.

FIGURE 1: The framework for handling supply chain disruptions

6.2 Recommendations for Albanian managers

The author thinks that there is need to invest in three specific directions in order to increase the efficiency and effectiveness of the supply chain disruption management process.

Investment in knowledge: Many Albanian managers were not accustomed with the term supply chain disruption. Supply chain disruption management was confused with crisis management or risk management. The managers should follow specific courses in supply chain disruption management. In Albania these courses are not present and this can be a limit.

Investment in human resources: Each company should have a supply chain trouble-shooter manager. This person would be engaged in the process of handling supply chain disruptions. He will work to increase the supply chain resilience and to recover quickly when the disruption happens.

Investment in collaboration: The analysis of the case studies has shown that collaboration makes easier the process of supply chain disruption management. Supply chain collaboration includes many elements like information sharing, incentive alignment, decision synchronization and so forth. These elements are interrelated with each other, so the Albanian companies should invest in all the elements not just in one of them. Collaboration is easy when you have the right supply chain partners, so invest more in the phase of supply chain partner selection. They should be selected not just on cost basis. Other factors should be considered like degree of integrity and existence of synergy.

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7. Research limits and recommendations for future research

The main limit of this research is related with the Albanian case studies. It would have been better if more Albanian case studies would have been analyzed, especially case studies related to outbound disruptions.

Another research limit is the analysis of the case studies from the focus of the focal company due to cost and time. The impact of the disruption and the reaction of the other companies in the supply chain was not analyzed.

In the actual research was analyzed the success of five companies in handling supply chain disruptions. These companies were from different industries. This can be a limit because the result would have been more reliable, if they were related with a certain industry.

The last limit, but not the least, is related with the methodological choice. As the results derive from the analysis of only five case studies, they have a high degree of specificity. The results should be handled carefully, taking into consideration their specificity. Also, the data were collected using in depth interviews, a method that is affected by subjectivism.

As inbound disruptions were studied more in this research, it is better that the future researches focus on outbound disruptions. One option could be to analyse separately each type of disruption, or to analyse together cases of outbound and inbound disruptions to see if companies handle in the same way these types of supply chain disruptions.

Future researches could analyse a certain disruption during all the supply chain. In this case, it will be studied the impact and reaction to the disruption of all the companies in the supply chain from the suppliers to the customers.

Future researches could be more industry specific. A disruption can happen more often in one industry compared to another and some strategies for handling disruptions could be more successful in some industries, so it would be better to focus the analysis on a particular industry.

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