Università degli Studi di Padova

Department of Economics and Management

Master Program in Business Administration

THE NORMALITY OF ADAPTATION

ORGANIZATIONAL RESILIENCE AND THE INTERPLAY BETWEEN RISK AND PROTECTIVE FACTORS

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Academic Year 2017/2018

This dissertation is dedicated to

My parents, for their patience and trust,
My family and friends, for supporting me even when I was angry and disheartened,
To the other Millenials who want to commit to their dreams, do not stop,
And to Doctoress P., nothing of this could have been possible without your help.

Il candidato dichiara che il presente lavoro è originale e non è già stato sottoposto, in tutto o in parte, per il conseguimento di un titolo accademico in altre Università italiane o straniere.

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INTRODUCTION

WHY WOULD A DISSERTATION DISCUSS ABOUT ORGANIZATIONAL RESILIENCE IN 2018?

This was the first question that I asked myself before approaching this project. Beyond any theoretical implication or personal interest, why is this subject of vital importance right now? The answer was clearer than I thought: looking at the news was enough to understand how, today, the world is changing faster than ever, and crises, upheavals and great opportunities as well appear constantly both for organizations and people. It felt important to understand how this extreme volatility could be harnessed, understood, and what was needed to properly navigate these tumultuous waters.

The case of Maschio Gaspardo is just one of the many examples that sparked my interest in this topic: in 2013, the company entered an explosive growth phase which was in contrast with the trend that other firms in Italy were facing due to the recession, yet a negative conjuncture driven by the crisis of the Russian rouble and a downturn in the agricultural machinery sector suddenly turned the indebtedness the firm incurred into to boost its growth in a serious burden (Busaro, 2015). In 2015, due to this situation and the financial tension the firm was undergoing, the founder of the organization took his life (Mandurino, 2015). Even after this immense tragedy though, the firm was able to trudge through the ordeal and after a resizing and a plan to restore its debt (Nicoletti, 2015). The margins improved, and the financial situation began stabilizing (Paolini, 2016), and in 2018 the predicament was finally history, with the group aiming for a more sustainable but constant growth (Sandre, 2018).

Resilience deals with this kind of situations: it contains shocks, crises and perturbances, it helps in overcoming them, in maintaining functioning while under duress, and in a world where trends like the Internet or globalization can abruptly shift the performance of an organization (Hamel & Valikangas, 2003), as the illustrated case demonstrates, it is the key to achieve continued success. And to prevent these tragedies.

Furthermore, given how ascents and downfalls for organizations can happen in a matter of weeks instead of multiple years as in the past (Busaro, 2015), long term adaptation seems to be less suitable than organizational resilience, which is more dynamic and fitting for defusing crises before they occur (Linnenluecke & Griffiths, 2010). The topic though is extremely challenging, given how difficult to formalize and capture it is. It is a multi-faceted construct, sometimes even counterintuitive, dealing with competences and risks that encompass all the aspects of an organization, and it is so ingrained with tacit aspects that scholars might find its study complex and daunting. But it is the key for our future.

Consequently, this dissertation attempts to shed some light on the subject, with the purpose of highlighting the relevant theory on the matter, the connections between the multiple themes resilience deals with and some means to quantify resilience to give practitioners a sketch of their performance in this dimension. Furthermore, the thesis attempts to verify empirically the existence of some constructs that were formulated in the theory, to understand their implications and the real impact they could have in both management science and practice. One of the goals is to show that organizational resilience is a "normal" capability, something that mindful managers put in place simply by focusing on the aspects that are important for their business and that improve the capacity of facing untoward events without losing track of what can damage this capacity or make the firm brittle toward disruptions. It does so through the following chapters:

CHAPTER 1. Here the different fields that discussed resilience are treated, starting from semantic definitions. The seminal papers on the theme are analysed, highlighting the connections with adaptation to novel situations, the influence of strategy and how this capability can be developed at multiple levels in the organization (in individuals, groups or systems). The relevant management literature is reviewed to account for crises that depend on external factors (Meyer, 1982; Staw et al. 1981) and internal factors (Perrow,

1984). The contribution from theory that frames resilience as reliability and from crisis management literature is brought forward to understand how the construct plays a role both during crises and before their appearance in organizations that aren't allowed to fail even once (Roberts, 1990; Weick & Roberts, 1993; Weick & Sutcliffe, 2001; Boin & Hart, 2010). The findings are then generalized for normal organizations, showing how mindfulness allows to shape action so that errors are understood and prevented, and performance is sheltered. The next review is concerned with studies on individual resilience, to understand how it impacts organizations and how it shelters from maladaptive behaviours while favouring positive outcomes (Luthans, 2002a; Masten, 2001). The closeness of the findings with mindfulness is highlighted, as well as the parallels of the development of individual resilience and organizational resilience. In particular, the aspect of how the construct lies on the interplay between risk and protective factors is detailed, showing that the typical, common development of adaptive methods in complex systems can lead to being able to face competently great adversities and risky environments (Masten, 2014). This part also stresses how work performance improves after this capacity is developed in individuals. Then, both to study the construct at an organization level and to move the findings of the High Reliability Organizations research thread from an operational level to a strategic perspective, paragraph 1.5 shows the difference between risk reduction and prevention and the ability to respond to unexpected threats and shifts in the environments (Sutcliffe & Vogus, 2003; Hamel & Valikangas, 2003). Lastly, the theme is brought to a system level through the analysis of the literature on supply chain resilience, which considers how the capability is enhanced both through pre-emptive risk management (Craighead et al., 2007) and a deep understanding of its fallibility, and the need for preparedness toward low-probability, high-impact events (Pettit et al., 2010). This topic is focused on as it provides consistent evidence on how resilience improves results in business-as-usual periods and shelters from lower bound variability, on how it can be developed in multiple ways and how it relates with resource building.

The chapter closes with an attempt to merge the multiple fields of research in a comprehensive definition, while explaining the theoretical background for the definitions of static resilience (Rose et al., 2013) and coping range (Linnenluecke & Griffiths, 2010)

that are used in the analyses from Chapter 3 and 4 and framing the construct as something more than a dynamic capability as intended by Teece (2007).

CHAPTER 2. This part aims to understand the methods that have been developed thus far to quantify the construct, and how this approach can benefit organizations as it helps the demonstration of progresses and the connections between protective factors and competitiveness (Stephenson, 2010). The insight provided by instruments that measure Individual and Regional Economic Performance resilience are presented (Rose et al., 2004; Rose, 2013; Garmestani et al., 2006; Mallak, 1998, Mallak & Yildiz 2016). Then the topic moves on the available scales for organizational resilience, how it can be inferred from Return on Equity (RoE in the remainder of the dissertation) dynamics and its volatility (Markman & Venzin, 2014), how to quantify the aspects that promote resilience and how to aggregate them in measurable indexes (McManus, 2008; Stephenson, 2010) and the limits and advantages of these approaches. The analysis tries to highlight how resilience primarily impacts the resource base of an organization. The last part highlights which doubts these scales raised and the other concerns that weren't solved in Chapter 1, in particular the lack of a connection between risk and protective factors in the reviewed methodologies and possible new ways to interpret the findings from these evaluations. The possibility of splitting protective factors in elements that activate only during crises and aspects that shelter against negative events even during ordinary administration is first presented here.

CHAPTER 3. Starting from the questions proposed in the previous chapter, this part of the dissertation uses the qualitative case study methodology from Yin (2009) to develop definitions, propositions, research questions and methodologies to verify the following ideas. Is there a common pattern to how protective factors counteract risks in different firms? Are there any priorities? What prevents disruptions in business as usual times, or allows organizations not to experience any crisis, and what enables responses and adaptation after an untoward event occurs? When does a firm really risk being overwhelmed by a situation, getting close to a complete loss of function? Is it due to single events, or to the stacking of odds that overcome the response mechanisms of the organization? These inquiries are checked through case studies as they are the most suitable tool to capture qualitative data and answer how and why questions, while having

little control on the research environment and attempting to study contemporary events. The chapter explains the reasons behind the case choices, which involved medium sized firms in the North East Italy Construction and Furniture sectors, the formal propositions and the adopted field procedures. These included a survey based on the Resilient Organisations Benchmarking Tool (2014) that allowed to understand beforehand the firms' dynamics, and a subsequent semi-structured interview with key personnel to verify the collected data and thoroughly analyse the situation while addressing each research inquiry.

CHAPTER 4. Naturally, this part describes and analyses the four cases that were chosen for the study, explaining the facts through the studied theory and triangulating the data both through the survey, the interviews and the match with pre-determined expected case studies. Two cases were performed per sector, one looking for a firm that didn't witness a crisis during the last ten years and one concerned with firms that featured a drop in performance and a successive recovery. The analysis then focuses on understanding the findings from the comparison of these cases. The results were positive, both confirming previous theory and the validity of the employed tools while also pointing toward evidence of the existence of the proposed constructs, showing that there appears to be a pattern between typical operational risks and contextual protective factors and low probability, high consequence risks that require the presence of generic protective factors. Furthermore, the concept of how resilience can be developed through multiple means is reinforced, and the strong contextuality of the elements of resilience is confirmed. The last part explains the study limitations, its conclusions and some research proposals for the future.

CHAPTER 5. This final part summarizes all the findings from the thesis through the theoretical and managerial implications that emerged.

ACKNOWLEDGEMENTS. I would like to thank the firms and the people who decided to participate in the study: their availability and kindness greatly propelled the completion of this dissertation and motivated me to pursue the research. Furthermore, I'd like to thank prof. Martina Gianecchini for the help she provided in setting a proper frame to the thesis while helping me in keeping my head cool, instead of chasing the wrong research patterns. Lastly, I'd like to thank prof. Diego Campagnolo for suggesting me two possible firms that could be interested in participating in the case studies, as they were readily available and extremely supportive.

1. CHAPTER 1

RESILIENCE: THEORETICAL DEFINITIONS

1.1 Introduction

This chapter's main purpose is answering the following question and its associated corollaries. What is organizational resilience? What is its meaning and relationship with other definitions of resilience? Which factors influence it? Can it be developed?

To address all these issues, the core literature on this field of research and the most recent developments will be explored, starting from spurious definitions to reach and discuss the most acclaimed approaches currently predominant in the literature.

As reported by Williams et al. (2017), the concept of resilience has been studied across different fields with various meanings, making it difficult in management science to build a unique theoretical construct. For this reason, this thesis will explore the different meanings currently associated with resilience, checking for similarities with the definitions for its organizational counterpart and trying to understand the facets that different semantic approaches have highlighted thus far.

The English word "Resilience" identifies "the quality of being able to return quickly to a previous good condition after problems" (Cambridge Online Dictionary, 2018) or "The capacity to recover quickly from difficulties; toughness" (Oxford Online Dictionary, 2018), and derives from the Latin verb *resilio* which means "Bouncing back, returning quickly" (Castiglioni & Mariotti, 1976). In materials science, resilience is the ability of a material to absorb energy when it is deformed elastically, in ecology Holling (1973) defined it as a measure of the persistence of systems and of their ability to absorb change and disturbance while maintaining the same relationships between populations or state variables. The definition has been tailored on individuals in psychology (Luthans, 2002),

but supply chain engineering and crisis management literature have tied it to systems and networks as well (Jüttner & Maklan, 2010; Seville et al., 2008).

The variety of definitions in different fields is mirrored in management sciences as well, therefore to follow how the concept has developed over forty years of research and how different authors fit this construct in their theory, the following paragraphs will attempt to summarize the various perspectives, allowing the reader to grasp the nuances of this word. Some attributes however can already be highlighted thanks to the definitions that have already been mentioned:

- Resilience appears to deal with shocks, crises, perturbances in systems and with the consequent ability of this system to maintain its foundation;
- It's a composite concept that benefits from different literature fields, mostly due to its multi-level effects (on individuals, organizations and networks/complex systems) that can be grasped only through perspectives that range from psychological analysis to regional economics;
- Given the plurality of conceptualizations and the links with soft organizational aspects such as culture (Roberts, 1990), collective sense-making (Weick & Roberts, 1993) and dynamic capabilities (Battisti & Deakins, 2015), its measurement so far has proven difficult.

The latest literature reviews on this subject, as well as the contribution from Ann Masten (2014), have tried to merge the different meanings attributed to resilience through the following statements.

- Annarelli & Nonino (2016, page 3) described organizational resilience as "… the organization's capability to face disruptions and unexpected events in advance thanks to the strategic awareness and a linked operational management of internal and external shocks…" proceeding then in the differentiation of static and dynamic resilience;
- Williams et al. (2017, page 742) proposed resilience as "the process by which an actor (i.e., individual, organization or community) builds and uses its capability endowments to interact with the environment in a way that positively adjusts and maintains functioning prior to, during and following adversity";

- Masten (2014, page 10) argued that resilience is "the capacity of a dynamic system to adapt successfully to disturbances that threaten system function, viability, or development".

But, to fully understand the syntheses from these authors, the dissertation moves to the analysis of the most prominent articles and discussions on the topic, starting from when the resilience theme first appeared in management literature in Meyer's and Staw's seminal articles.

1.2 Early Contributions in Management Science

In an environment that wasn't as complex as today's globalized world, Meyer (1982) studied the effect of a doctors' strike in San Francisco that occurred in 1975. His goal was to understand how the environment, and specifically "jolts" (transient, difficult to foresee and disruptive events that affect an organization but rarely threaten its survival), could trigger different adaptive responses from different organizations, and the reasons for which this occurred.

The author examined these answers to the threat and was surprised in noticing that all of them were counterintuitive: Memorial Hospital, that was usually deemed a static, profitable and efficient organization weathered the storm through the suffering of losses and a consumption of financial slack; Community Hospital, with its less formalized structure that often led to financial losses, laid off some employees and worked efficiently to the point where it turned profitable during the period, whereas General Hospital was able to foresee the event three weeks earlier and limited its reaction to some personnel reallocation, facing the strike in a "business as usual" fashion. Other hospitals had similar ways of reacting.

Linnenluecke (2015) highlighted how this paper drew from the "variation-selection-retention" mechanism and organization evolutionary literatures, thus it's not surprising that its main concern was understanding and describing the adaptation methods, rather than framing them as resilient responses. Meyer (1982) in fact described "resiliency" as a mean of adapting that aims at absorbing jolts' impacts and loosening couplings between the organizations and their environment, to reduce deviation and create first order change, an approach that was opposed to "retention" which engendered second-order change by modifying theories of action in the organization.

What really contributed to the future research stream on resilience however was the identification of some factors that affected adaptation, as in later research they were found to influence organizational resilience: pursued strategy, ideologies, adopted structure and slack resources.

According to Meyer's (1982) analysis, the hospitals which pursued a broader strategy and relied on diversification often featured a closer surveillance of their enacted market niches, which allowed for faster perception of external stimuli and improved the response to the jolt, a perspective that was confirmed by research from Urcioli et al. (2014) and, at an industry level, from Garmestani et al. (2006) and Rose et al. (2013). The effects of ideologies, such as culture and shared perceptions of reality and their impact on how organizations cope with threats and difficulty was elaborated upon in the High Reliability Organizations literature (Roberts, 1990; Weick & Roberts, 1993; Weick & Sutcliffe, 2001; Weick et al. 1999) as well as in successive papers on organizational resilience (Gittel et al., 2006) and psychology oriented works (Masten, 2014). The same applies to adopted structure, although in some papers the focus is more on supply chains rather than single organizations (f.e. in Jüttner & Maklan, 2011), and for slack resources (f.e. in Weick & Sutcliffe, 2001; Gittel et al., 2006; Sheffi & Rice, 2005).

In his paper, Meyer (1982) specified that formalized jobs and centralized decisions were associated with less forewarning; that organization ideologies fostering strategic reorientation and organizational change, as well as participation and pluralism in decision making were more likely to affect the adaptation style of a firm than the amount of available slack resources and finally that hospitals which relied on single strategies, had conventional approaches and took more vigorous stances to respond to the jolt required longer periods to return to normal efficiency rates. Moreover, learning was emphasized as an important tool to improve performance during the aftermath of a jolt, and the sedimentation of changes and reaffirmation of the underlying values of an organization was more likely with adaptive ideologies and in pluralist (Clegg et al., 2006) organizations.

These aspects would be further elaborated in an article from Hamel & Valikangas (2003), but even in this seminal work Meyer (1982) concluded that when labeled as crises, environmental jolts could infuse organizations with energy, legitimizing unorthodox acts and destabilizing power structures, leading to positive change and performance

improvements. The last theme that emerged was that adaptation dealt more with qualitative aspects and social norms, rather than quantitative aspects (such as organizational structure and slack resources), and that for these reasons in tranquil times it could be difficult to study and measure, an aspect that once again was further investigated in the following works (Markman & Venzin, 2014; Lee et al., 2013; Somers, 2009).

Meyer's work wasn't, however, the only foundation for future work on resilience. The article on threat-rigidity effects from Staw et al. (1981), albeit not directly addressing the definition of the concept, addressed aspects of responses to threats that would become a cornerstone for research in this field (Linnenluecke, 2015).

Stemming from the same ground as Meyer's article, this paper takes a different approach beginning from the definition of crisis: here it's considered as a major threat to system survival, with little time to react and for which the system is ill-structured to respond. Two main themes emerge: first, there's a similarity with Meyer's jolts as these crises are deemed difficult to foresee, but the perspective turns different given their much broader scope. The situations addressed by Staw et al. (1981) are much more pressing, dealing with corporate collapses which can be viewed, according to the authors, as failures to alter response in the face of environmental change.

Second, the definition deals with a "system", not specifically with an organization. This seminal paper addresses the multi-level aspect of adaptability, which is studied at individual, group and system level, with each layer influencing the others. The findings from these authors are summarized below:

- **Individuals:** when placed in a threat situation, an individual's most well-learned or dominant response may be emitted, even if it's inappropriate to the context. Some physiological mechanisms are responsible for this as stress leads to primitive forms of reaction in human beings and even visual stimuli are more difficult to discern in such situation. However, under duress, performance increases if the optimal response is meant to be standardized;
- **Groups:** a threat tends to consolidate the influence of current leaders if properly addressed, whereas failure weakens their position. Rivalry between groups strengthens intragroup ties, while failure erodes them. These considerations will later be explored in further research (Walker et al., 2014; Seville et al., 2008) which would

highlight how breaking "silos" of thought in networks is important during crises to avoid the fragmentation of objectives and the emergence of conflicting goals, that can hinder system integrity. The authors (Staw et al., 1981) also verified that threats can lead to groupthink and uniformities in decision making, which further increase threat-rigidity, and that this occurs more frequently in situations where more vertical control is exercised, when the threat is external and when the likelihood of success is high (leadership tends to be loosened if there's a threat of failure);

- **Systems:** organizations attempt to cope with sources of adversity by adjusting their internal structure or taking actions to enhance their position in the environment (i.e., they adapt). This study however shows that a threat to the vital part of an entity leads to rigidity, but in situations where the environment radically changes, flexibility and adaptation are the best options. This is in part explained by the constraints that occur during a crisis (time, resources) which may force a system to rely on past knowledge and methodologies and because, according to the authors, in a threatening situation, decisions are taken at higher levels as it's assumed that these figures deviate less from organization's values. This last statement would be thoroughly addressed by the high reliability organizations literature (Perrow, 1984; Weick & Roberts, 1993; Weick & al., 1999; Weick & Sutcliffe, 2001) which would advocate for the need of "on the field" decision-making to properly assess situations and to respond with expertise shaped through organization's values.

Staw et al. (1981) concluded their scrutiny by identifying a few more themes that would become a staple in resilience literature: first, the tension between centralization and pulverization of decision making (further explored by Roberts, 1990; Weick & Sutcliffe, 2001; Barnett & Pratt, 2000; Boin & Hart, 2010), as during a crisis weak links, especially communication ones, tend to dissolve whereas strong bonds are strengthened, further increasing the risk of the creation of decision-making silos that act independently with more remote areas of the system thriving on their own and severing contacts with the core. Second, the reduction of information inputs, and thus the broadness of available responses, under duress, as attention shifts from assessing the situation and the new environment to controlling inter-system relationships. An historic example can be found in the political behavior of Diocletian, Roman emperor between the years 284-305 A.D. (Palazzo & Bergese, 2001). After numerous civil wars, which were crises that threatened

the "organization", separate parts of the Empire began thriving on their own. Diocletian acknowledged this by appointing four governors for each of these areas, but instead of studying the causes of the crises, which were related to many socio-cultural factors, most of his reign was centered on accruing decisional power in the hand of the Emperor and his bureaucracy while reducing it in the Senate and the army. As a result, almost no benefit came to the Empire from these policies, and the causes of the crises kept undermining the Empire until its fall.

Threat-rigidity driven responses thus tend to be a fitting solution in stable environments, but in case of a radical shift they are less appropriate. When threats are unknown, studying them is necessary and variety of information input and diversity in response is what ensures survival through adaptation, aspects which would be considered extremely relevant in the Supply Chain resilience stream of research (Wei & Wang, 2009; Pettit et al., 2010).

Lastly, the authors (Staw et al., 1981) found that individual and group responses to threats resonate across organizations, a facet that would be further explained by psychology research on resilience (Mallak, 1998, Mallak & Yildiz 2016), and that people in key positions attempted to maintain the established power structures and the objective of the organization.

1.3 Resilience as Internal Reliability

Linnenluecke (2015) stressed how research on resilience has always been highly dependent on the studies' context. If the seminal papers were addressing adaptation, rather than resilience, it is because organizational science during that period was dealing primarily with evolutionary theories and interactions with the environment. This led Meyer (1982) and Staw et al. (1981) to analyze the ways in which organizations facing a threat activate specific processes that enable functional or dysfunctional reactions, which have an impact both on performance, strategy and ultimately the firm's survival.

From the late 1980s, the research paradigm shifted from a focus on external "jolts" to crises that were generated internally. Accidents and disasters (such as Chernobyl, Exxon Valdez, Bhopal, Three Mile Island) in industrial settings with complex technology catered the attention of scholars, who focused on the reliability of intra-organizational processes and the avoidance of failures and deviations which, if neglected, could rapidly pile up and escalate into high-consequence events.

Consequently, crisis management literature began influencing resilience literature since its infancy; however, this stream of studies wasn't as concerned as Staw et al. (1981) with crises as events, a perspective that leads to studying the reactions and the aftermath instead of the causes of such occurrences (Williams et al., 2017), but rather as processes that could unfurl over a period and that required attention during pre-events as well. This would lead Williams et al. (2017, page 739) to define a crisis as "a process of weakening or degeneration that can culminate in a disruption event to the actor's […] normal functioning": the studies from Perrow (1984) would provide the basis for such a definition, which emphasizes an erosion in the quality of organizations' processes as a possible source of disruptive events.

1.3.1 Normal Accidents Theory and First Disconfirmation

The book (Perrow, 1984) begins with the description of a man that has an important appointment and is thoroughly prepared to arrive on time. A series of unrelated events begins slowing down the protagonist: after leaving in a rush he forgets his car keys in his apartment; the car keys were in the same keyring as his house keys, which he forgot inside the building, so he relies on his first backup system, a copy of said keys which were under his doormat. However, he had borrowed them to his neighbor, who was nowhere to be seen. He then tried to use a taxi (another backup system) but a traffic jam made it impossible to arrive on time. Even the metro was unavailable because of a strike. This predicament served as an example to show that even if a system has various means of backup, the interaction of multiple failures could lead to a catastrophe. The man, in fact, arrived late to the appointment.

The issue is that this sort of accidents (unintended and untoward events that disturb a system's normal functioning and which damage affects more than one unit, leading to disruption) could happen in contexts such as nuclear power plants where the consequences of a failure are disastrous. Accidents are supposedly normal and inevitable for the following reasons:

- Tight coupling (absence of slack or buffers between two items) between technologies/systems reduces the time available to react as well as the range of available reactions in case of a failure, with a chance for its propagation. This point

would be confirmed in the Supply Chain Resilience literature, which identifies in bullwhip effects a possible source of disruption (Wei & Wang, 2009);

- A complex system might lead to unintended or hidden interactions that an operator is not able to interpret correctly nor to foresee, as for example he relies on indirect or inferential information sources and/or has a limited understanding of the process (as in the Three Mile Island accident);
- In some situations, elements that weren't foreseen as part of the system suddenly factor in, creating "baffling interactions", much like in the example from the man and his appointment.

Perrow (1984) concludes that only through simpler systems or more loose coupling (which would lead to ambiguous or flexible performance standards) these shocks and failures could be absorbed by systems, but this, in his opinion, couldn't be a viable option in technologically complex systems such as nuclear power plants.

Perrow's Normal Accidents Theory soon faced many critiques, with Hopkins (1999) exposing how some disasters aren't "normal accidents" deriving from internal failures that reverberate through a system but rather untoward events deriving from the environment. An example would be crises as intended by Staw et al. (1981), such as the 9/11 terrorist attack (Gittel et al., 2006). Moreover, Hopkins (1999) argues on how decision-making structures are oversimplified in Perrow's (1984) examples, and how they can be more flexible than how they were depicted, and this applies as well to his definitions of centralization/decentralization and the interaction with tight coupling and system complexity. Lastly, the deterministic take of the author on accidents stymied any operational solution.

The merits of Perrow's contribution however are that they stirred discussion over crises that could be generated internally in organizations and that could lead to the same negative outcomes (system failures) as external threats. The focus on small, unrelated errors that could cause unintended consequences would constitute one of the bases for the High Reliability Organizations (HROs) research which is explored in paragraph 1.3.2. The argument that backup systems could increase complexity while still being fallible is also a concern that would be later addressed in the rest of the literature (Weick & Sutcliffe, 2001; Lee et al., 2013; Boin & Hart, 2010; Luthans, 2002, and more), with the perspective that such systems are fundamental to increase organizational resilience but should be kept

as flexible as possible to be able to cope with uncertainty as it arises, reducing automated responses which could be detrimental as in the case of threat-rigidity driven answers.

To move from the Normal Accidents Theory to the High Reliability Organization (HROs) literature, a paper from Roberts (1990) is analyzed. This work describes high reliability organizations as the ones able to operate without failures that could cause catastrophic consequences tens of thousands of times. HROs are characterized by both advanced technology, which requires a specialist's understanding, and high degrees of interdependence among units, employing generalist understanding. They are forced to strike a balance between tight coordination and control, necessary for the reliability of their outcomes, and sufficient flexibility to deal with their uncertain environment.

In this situation, technological failures and human / organization factors have a chance to interact with each other and lead to unintended consequences due to unforeseen interdependences, conflicting goals, environmental uncertainty (Roberts, 1990).

The example that is taken and carefully examined through the study of multiple of such organizations is that of nuclear aircraft carriers – hazardous organizations featuring dangerous and complex technology which can cause unintended interactions, and which often provides indirect information that is difficult to analyze (Perrow, 1984).

However, Roberts (1990) highlighted how accidents, even given such tough premises, never occurred, and attempted to understand how carriers' operators coped with complexity and tight coupling. The findings were the following:

Table 1.1 Elements addressing Complexity and Tight Coupling

ADDRESSING COMPLEXITY	ADDRESSING BOTH ISSUES	ADDRESSING TIGHT COUPLING
Personnel undergoes extensive training to understand all the foreseeable interactions between technologies and how to normally address them, but there is also room for flexibility and creativity when necessary.	Some systems are duplicated (for example, two persons check the coordinates before giving them to the navigation boss) to avoid failure.	The system is extremely mechanistic (and brittle): actions are sequential, communication between navigation and air bosses must be continuous and coordination of all operators must be perfect. This is mitigated through redundancy and a sort of "hidden slack": if everything works correctly, there is tight coupling, however the team can follow different routines if deviations occur. The number of solutions is still limited.
	Overlapping: the same task is performed by multiple people which might not be mainly assigned to that role; it's mostly a substitute for unavailable time as resources are scarce in the ship.	

Activities that would result in a catastrophe when intermingled, such as fueling jets while loading munitions, are kept separate.	All members have a high degree of responsibility and accountability. There's a culture of reliability: there's a tension between centralization and decentralization, and this is resolved only thanks to a culture that provides latitude for interpreting, improvisation and unique action (where necessary).	Bargaining greatly reduces the negative effects of tight coupling: a "gatekeeper", the operations officer, travels around the ship to find an implementation plan that satisfies all the parties involved in an operation (with a maximin solution). This breaks communication silos and allows for lower level management to ensure safe working conditions (enough rest for their collaborators).

Source: adapted from Roberts (1990)

These aspects also address concerns raised on possible antecedents to accidents which can be driven by human factors, such as poor training, motivation and manning (Shrivastava, 1986; cited in Roberts, 1990). As observable, in nuclear carriers, training is continuous, with fresh recruits learning on the job through veteran coaching; motivation is instilled through a culture that rewards responsibility and accountability and manning is covered through role redundancy.

A nuclear aircraft carrier's objective though isn't strictly related with performance, but rather with reliability (Roberts, 1990), so the solution might not appear as being optimized economically, especially given the high amount of slack that is identified. The goal of overcoming the risk of Perrow's (1984) normal accidents is achieved though, proving that a solution to the inevitable occurrence of unpredictable situations can be developed.

Another interesting finding from this paper is that soft aspects of the organization, such as bargaining, culture and the power structure in the carrier are some of the main ways through which these errors and the dilemma between centralization and decentralization are resolved, as discussed earlier by Meyer (1984).

This is achieved through a balance between extreme hierarchy, almost a hegemony, as defined by Gramsci (Clegg et al., 2006), which is the most fitting power structure to manage interdependences, and the practice of deferring to expertise, allowing all the personnel to place a veto on aircraft landing while attributing full responsibility on the matter until its solved (Roberts, 1990), much like in Toyota's production system which allows for "human jidoka", the authority for an employee to stop the production line in case of malfunctioning (Slack et al., 2013).

The author (Roberts, 1990) though highlights how HROs differ from normal organizations not only for their objective but also due to their improved ability to enforce rules through socialization: they are total institutions that can exert considerable top down control, as members cannot walk away nor quit in case of a crisis.

The following literature tried to expand these perspectives, trying to understand whether the approaches utilized in HROs could be extended to normal organizations and whether this could be done in an economically viable way (Weick et al., 1999; Weick & Sutcliffe, 2001).

This is an important step in building theory on what can contribute to resilience, and ultimately what this concept is about, as, by taking the perspective cited in the introduction of this chapter from Annarelli & Nonino (2016), dealing with internal shocks is just as important as addressing external threats, and the issues raised by Perrow (1984) couldn't be solved by the focused insight from Roberts (1990).

1.3.2 Mindfulness, the Core of HROs' Literature

Reliability cannot be summarized as operating without failures altogether. In a late contribution to the literature, Boin & Hart (2010) would describe HROs as being built to prevent incidents from escalating into full-blown crises: mistakes and disturbances are expected, and systems are assumed to fail in unimagined ways in such an organization. On the other hand, Weick et al. (1999) define effective HRO as complex adaptive systems that combine orderly processes of cognition with variations in routine activities in order to sense and manage complex, ill-structured contingencies.

In such a context, developing as many backup systems as possible will never be a sufficiently thorough answer: even the sturdiest of systems is prone to Perrow's normal accidents. Meyer (1984) suggested that social norms and qualitative aspects are more useful to build adaptability than fixed routines and, building on Roberts' (1990) findings, Weick et al. (1999) bring forward a social construct that explains how HROs constantly succeed while facing accidents, threats and high variability: organizational mindfulness.

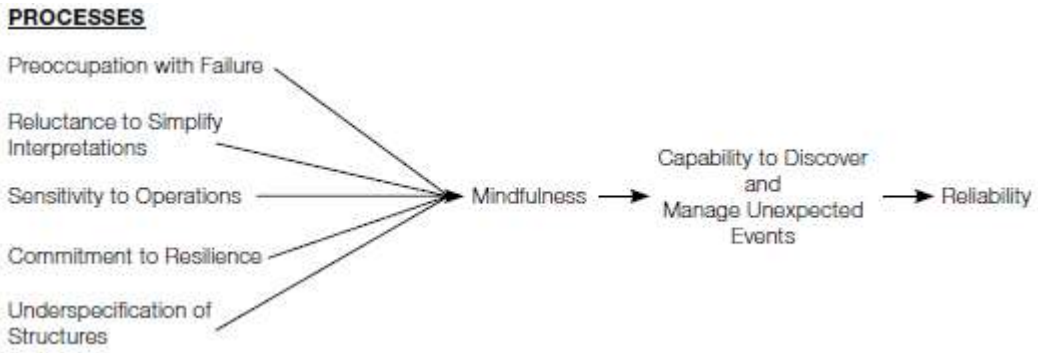
In their view, reliability depends on the lack of unwanted, unanticipated and unexplainable variance in performance. However, an HRO's environment is so rich with the potential for error that to remain reliable it must somehow handle unforeseen situations in ways that forestall unintended consequences. There is still variance in performance, even more so, but it can be anticipated: stability is found in the processes

of cognition that, instead of applying unvarying procedures, constantly revise routines so that they are able to cope with uncertainty (Weick et al., 1999).

This multiplies the ways through which a goal can be achieved and it's a method to develop organizational resilience as intended in Weick & Sutcliffe (2001, page 69), i.e. "the capability of a system to maintain its function [ability to achieve objectives] and structure in the face of internal and external changes and to degrade gracefully when it must".

Weick et al. (1999) argue that such stability in cognition processes can be achieved only through mindfulness, a social infrastructure, i.e. a group of social forces that informs actions of the involved actors and is reinforced by their actions (Weick & Roberts, 1993), that is deliberately designed to notice weak signals, to avoid a drift toward inertia and to effectively manage surprises.

Figure 1.1 A Mindful Infrastructure for High Reliability



Source: Weick et al. (1999)

The complexity of the concept of mindfulness requires a more in-depth study, as it has strong ties with how resilience is built according to the following literature (f.e. in Sutcliffe & Vogus, 2003; Grøtan et al., 2008; Battisti & Deakins, 2015).

Weick & Roberts (1993) draw from the neural networks theory to develop this construct. According to that perspective, any unit's activity is regulated by the activity of neighboring units, connected to it by inhibitory or excitatory links whose strengths can vary according to system design and/or learning. Connected activities thus encode concepts and ideas in organizations much like connected neurons encode concepts and ideas in brains: they provide certain interpretations of reality and shared meanings among individuals. This creates a collective mind which shapes actions of the involved actors and is shaped by their contributions.

The authors (Weick & Roberts, 1993) define heedful action, which is action where people put their care in what is being done: when this happens, processes aren't mere routines or replicas of the past; performance is modified by precedent outcomes, ensuring continuous learning and training as long as the agent is attentive and applies its intelligence to the action.

If actions and processes are heedfully interrelated, which means that there's a deliberate attempt to attribute an unambiguous meaning to an activity system, individual activities are shaped by this super structure and the more this structure is developed, the more heed can be found: the system becomes able to cope with unexpected events as it comprehends them and, given its higher complexity, it is better able to sense and regulate complex events (Weick & Roberts, 1993).

This happens because when connected individuals, who hold related information in different locations of a system, can trade lower-order, detailed and disparate information, they often discover higher-order themes: without heedful interrelations, events become incomprehensible as each actor understands the local situation rather than the joint event (Weick & Roberts, 1993). Agents might act heedfully according to their view, perhaps by applying a routine to solve a problem as usual, but this might be detrimental to the system as a whole. If heedful interrelating fails, people become isolated and the system is pulled apart.

Different, single actions of the participants in a system are thus connected in a meaningful way, something that develops mindfulness and allows a system to grow in complexity and deal with more complex problems. The authors (Weick & Roberts, 1993) apply this theory to groups by showing that developed groups with an underdeveloped mind lead to groupthink, cults and subordination to a system that is envisaged carelessly, assuring thoughtless contributions, whereas under-developed groups with developed minds, such as the personnel in nuclear aircraft carriers after a new round of recruitment, tend to perform well with a lower risk of inertia.

The convolution of these constructs requires an example to better understand what the authors meant to deliver. Consider a soccer team: the objective is known to all its members, they have a set time to score as many points as possible while avoiding goals from their opponents. If said team is a mindful system, each member knows the role of the others, what to expect from them, the strategy to reach the opponents' door and the

meaning of signals (such as shouts or hand-signs) from their teammates. If the system is mindless, these heedful interrelations are missing: an attacker wouldn't know who the other attackers are, what defenders are supposed to do, nor the scheme that should be applied to deploy a possible plan to reach the opponents' door. Signals in this situation become more confusing, as the shared meaning is missing, and each actor interprets them in their own way, creating baffling interactions (f.e. a forward passage that isn't understood, leaving the ball to the opponents).

This greatly increases the chance for "normal accidents": in the mindful system, if a defender is ill-positioned as he attempted to push forward during a counter-attack, a different member of the team might take his role for an action. In the mindless system, such minor error is amplified as no member perceives the overall situation, thus defenders might move to chase the ball (which is their specific role, they are simply following their routine) leaving one flank completely defenseless.

The comprehension of unfolding events is weakened in mindless systems, whereas a smart, mindful system that has carefully engineered heedful interrelations does the right thing regardless of its structure and the turbulence of the environment (Weick & Roberts, 1993).

One last aspect that should be highlighted is that mindfulness is more probable in groups during their earlier stages, as they are still defining interrelations; as they grow older, interrelating becomes more routinely and only the introduction of new members that are trained actively on these interrelations allows to avoid the drift toward inertia. The reasoning behind how the system was built that way should always be manifest, increasing comprehension and allowing for its revision, while improving the overall know-how of the system (Weick & Roberts, 1993).

In Weick & Sutcliffe (2001) and Weick et al. (1999), mindfulness is broken down in the series of processes that lead to the creation of this infrastructure. These processes and their definitions are summarized below:

- Preoccupation with failure. Any lapse is treated as a symptom of possible errors in the system, particularly if several small inconsistencies happen at the same time. This has to happen as HROs cannot learn through experiments: in case of failure, consequences would be too disastrous to bear, so an HRO has to learn from near-misses (when the system is on the brink of collapse, or when processes witness

disruptions but manage to resume functioning nevertheless). This awareness also extends to success, as HROs have to understand the liability deriving from achievements, such as complacency and trust in tried and performing routines. As the environment might shift abruptly, procedures aren't fossilized but rather always attended to, leaving windows for improvements or an increased fit to new situations (Weick & Sutcliffe, 2001; Weick et al., 1999). Learning is also shifted from exploitation (using previous knowledge) and exploration (trial and error) to an exploration of meaningful analogues as a mean to approach problems from new perspectives, and in Weick et al. (1999) this, coupled with attention to failure and situation awareness, seems to create many of the adaptive changes that would be associated with typical learning.

- Reluctance to simplify interpretations. As people are prone to interpret new data in ways that confirm their expectations due to group behaviors (Weick & Sutcliffe, 2001), an HRO has to keep enumerating mistakes as they occur and to avoid an over-reliance on precautions (Perrow's backup systems) as they fit with a simplified view of the world. Assumptions in the collective mind are fewer, and skepticism toward data is encouraged: information that is retrieved is double checked and cross checked to ensure that the right interpretation is given throughout the system.
- Sensitivity to operations. In HROs there's an active, heedful attempt to create and maintain connections and communication between the parts so that no agent misses or neglects details on the meaning and functioning of the activities. Cumulation of errors is forestalled to avoid the alignment and the creation of baffling interactions: if a system behaves differently from what is expected, the routine stops to verify and make sense of what's happening. This can be seen in Roberts (1990) where when an operator noticed he couldn't find his wrench, he called a halt on aircraft landings until the item was retrieved, with a communication to all the actors involved. Like this, situation awareness is developed, and power delegated to the front lines, allowing both for continuous adjustment and errors preventions.
- Commitment to resilience. The example from the previous point is a form of flexible crisis management that is enacted in HROs: resilience is a preparation to inevitable surprises and to absorb the generated change, and these organizations provide formal support to improvisation that is directed to this goal. The operator was commended

after the incident (Roberts, 1990). Taking from Wildavsky's perspective, Weick et al. (1999) argue that a generalized capacity to investigate, learn and act without knowing in advance the situations that will appear is a vital protection against unexpected hazards. There's thus an active attempt to improvise workarounds and contain errors, to foster the capabilities for recovery and fresh thinking and to allow creative solutions which might derail from routines, but not from the collective mind's assumptions and cognitive processes (Weick & Sutcliffe, 2001).

- Under-specification of structures and deference to expertise. Orderly hierarchy can amplify errors due to the possible lapses created by mindlessness. Decision making is more diffused, as well as responsibility and accountability, so that operators may exercise their knowledge on the contingent situation, while maintaining a level of awareness that prevents the drift toward mechanical routine repetition. The loosening of hierarchy also increases the comprehension of complexity, as actors cannot simply defer to authority if an error occurs.

Enacting these processes allows to build resilient systems through the creation of slack resources and alternative means to a goal (a way to loosen tight coupling), which Meyer (1982) and Staw et al. (1981) already stressed as factors that improve adaptability. The ability to deal with a crisis is largely dependent on the structures that have been developed before chaos arrives, Weick & Sutcliffe (2001) argue, and a mindful organization is exactly a type of infrastructure that is meant to contain uncertainty.

Summarizing, in HROs, reliability, and thus resilience to internal and external changes, is built through conceptual slack (Weick & Sutcliffe, 2001), which is the theoretical construct that refers to all the social norms which foster learning from near-misses, the avoidance of simplifications, a culture revolving around double checking information, caring for errors (while being candid about them) and the willingness to question the state of things and the basis of current success. This is the form of slack resources that is produced in these otherwise mechanistic structures, whereas alternative means to a goal are conceptualized as requisite variety (Weick et al., 1999), the fostering of differences in points of view to enhance comprehension of current situations, flexibility in routines, a reduction of the pressure to consensus to reach decisions quickly and to address problems as they appear, bypassing hierarchy where needed. Contingency plans are prepared but they are shaped by an all-hazard approach: they must be designed to face

the unknown and are assumed to be fallible (Boin & Hart, 2010). Their purpose is not to create a system that provides an invariable output but rather programs of carefully aligned activity clusters (i.e. interrelations) which are understood by the agents and activated to face disruption as it arises.

1.4 Resilience as an Individual's Capacity

The next body of literature that is discussed focuses on resilience at the employee level, the interplay between personal characteristics and the system or organization they are part of and whether resilience is a trait (a fixed characteristic) or a state-like construct (something that can be taught, that is transient and that doesn't depend on deep-rooted personal characteristics) (Luthans, 2002 (a & b)).

This approach requires a focus on works pertaining to the positive psychology field, rather than organizational sciences. Nevertheless, given the topic of this thesis, only studies that are related with workplace performance or that frame resilience from a systemic point of view are mentioned as they directly contribute to the research purpose.

Since after the Second World War, psychology has been concerned with human failures, dysfunctions, biases and frailties, and how to deal with these problems (Luthans, 2002a). Resilience was consequently perceived as a capability or trait that allowed people equipped with it to avoid showing psychic disorders, illnesses or pathologies. More recently, psychology studies have turned their attention to positive feelings and the nurturing of people qualities (Luthans, 2002a); nevertheless, both perspectives are important as resilience's output shelters from developing maladaptive behaviors (Masten, 2014) but is also a class of phenomena characterized by good outcomes in spite of serious threats to adaptation or development (Masten, 2001).

Luthans and his colleagues (Luthans, 2002a and 2002b; Luthans et al., 2006; Luthans et al., 2010), however, refer to "resiliency" as a part of an individual's positive psychological state of development, theorized with the name of Psychological Capital (PsyCap). The purpose was to create a construct that was measurable, developable and manageable for performance improvement in workplaces through the accrual in a single term of various positively oriented human strengths and psychological capacities (Luthans, 2002b): these were hope, optimism, confidence and personal resilience.

These sub-definitions stem from the concepts of self-efficacy, defined as a perceptual judgement or belief of how well one can execute courses of action required to deal with prospective situations (Luthans, 2002a). They were described as follows:

- Hope: a cognitive set that is based on a reciprocally derived sense of successful agency (the willpower to reach an objective, a determination to pursue a goal) and pathways (the ability of an individual to identify possible pathways to meet those objectives and the capacity to set milestones and feasible smaller steps that can be used to measure success) (Luthans, 2002a; Luthans et al., 2006);
- Optimism: an active attempt to build confidence through the creation of alternative plans that attempt to minimize the impact of obstacles (Luthans et al., 2006), which allows an individual to expect good things to come (Luthans et al., 2010).
- Confidence/Efficacy: an individual's confidence on his/her ability to mobilize motivation, cognitive resources and actions needed to successfully execute a specific task (Luthans, 2002a). It's optimism applied to a single context or task (Luthans et al., 2010).
- Resiliency: the capability of individuals to cope successfully in the face of significant change, adversity or risk. This characteristic is beyond human adaptation, but derives directly from some basic adaptational systems (Luthans, 2002a), and it's a capability that varies over time and is enhanced by protective factors of the individual or the environment (such as a solid education, a home, a good income) while being reduced by risk factors (abusive relationships, absence of mentors) (Luthans et al., 2006).

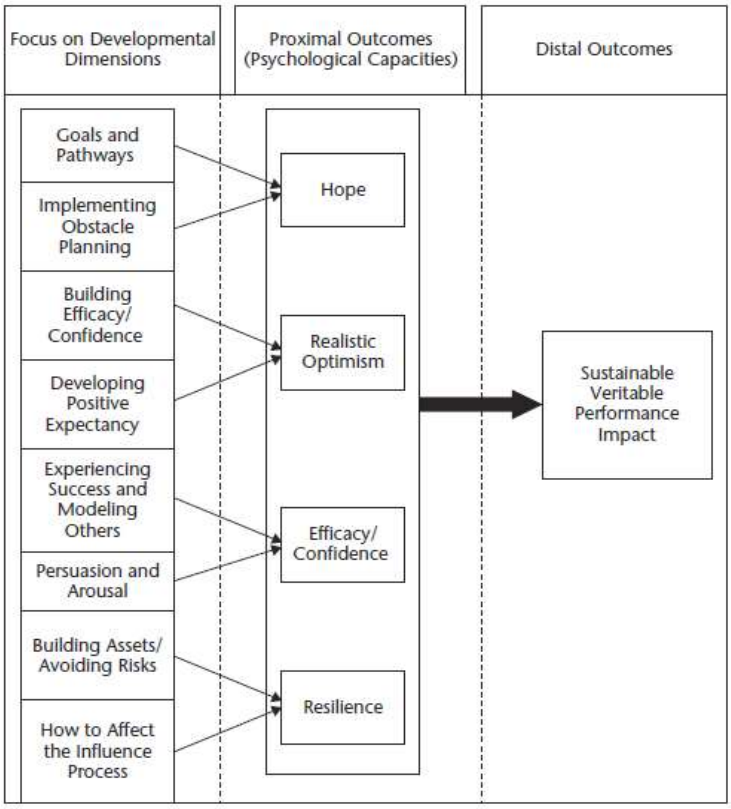
In Luthans et al. (2010), PsyCap was ultimately described as a motivational propensity to accomplish goals and succeed, but this doesn't quite capture the richness of all the sub-definitions the authors identified.

Hope deals with being able to set objectives and attributing meaning to them, optimism is about accepting reality, and the idea that a single plan might not work so more pathways should be developed. Efficacy is about an assessment of the available resources and how they can be deployed to make the various plans feasible, and ultimately all the elements seem to contribute to resilience in a way, as identifying alternative means to a goal was already proven to be an approach that allowed to better face adversity or risk (Meyer, 1981; Staw et al., 1982; Weick & Sutcliffe, 2001).

Psychological Capital in fact merges different aspects of personal resilience as described by Masten (2014) or Coutu (2002), so the split in its sub-components doesn't add much to the discussion. Starting from the perspective that PsyCap partially overlaps with resilience definitions, two more insights from Luthans and his colleagues should be brought to attention.

First, PsyCap is, much like resilience in Masten (2001) and Coutu (2002) and mindfulness in Weick & Sutcliffe (2001), something that can be instilled and trained in individuals. It's not just a characteristic that people (or organizations) are born with, but rather a state-like construct, a stance or complex feeling toward reality that can be developed through interventions (Luthans et al., 2006; Luthans et al., 2010). An experiment on 153 students and 80 managers from Luthans et al. (2010) proved both the existence and developability of PsyCap, confirming the idea from their earlier work (Luthans, 2002a) that much like economical capital, Psychological Capital can be improved through focused investments of time and resources (at least in the short term), and it can be leveraged upon for future return. The following image depicts the micro-interventions that were enacted for this experiment and how they impacted the sub-constructs mentioned earlier, albeit the model had a better statistical fit if the core PsyCap construct was taken in consideration (so the overall effects on the dimensions after the intervention) rather than its constitutive elements.

Figure 1.2 Positive Psychological Capital Intervention



Source: Luthans et al. (2010)

Figure 1.2 also brings up the second contribution from these authors: a better Psychological Capital score translated into a performance improvement both in self-assessments and from the employee supervisors' point of view, which is quite a precedent. Although this paper was focused on confirming a specific view of resilience, this is an empirical confirmation that not only it can be taught to individuals and employees, but that resilience also leads to an improvement in their performance in the workplace: this means that, as speculated in Staw et al. (1982), resilience can be developed on multiple levels in an organization and, as theorized by Weick & Sutcliffe (2001), each level contributes to the resilience of the whole system; moreover, personal performance is increased but, following a resource-based view of the firm, a specific development of resilience/Psychological Capital can also lead to an optimal use of human capital, which can be a key source for competitive advantage given how difficult it is to replicate (Teece et al., 1997).

If resilience can be developed at an individual level with positive outcomes for organizations, its conceptualization should be improved, and the works from Coutu (2002) and Masten (2001, 2014) can help in this task.

Coutu (2002) was attempting to understand why some people and companies buckled under pressure, while others bent and later managed to bounce back. Three points emerged, which are interestingly similar to some characteristics of mindfulness (in Weick et al., 1999; Weick & Sutcliffe, 2001). Resilience was about:

- A staunch acceptance of reality: a down-to-earth view of the parts of reality that matter for survival, with a true understanding and acceptance of the situation that constitutes the base to be resilient and to construct contingency plans that act as a preparation to endure and survive extraordinary hardships;
- A deep belief that life is meaningful: an active search for meaning and objectives that aims at constructing a better future or state of things given current hardships; an attempt to learn from the state of things and to make the present more manageable, reducing its overwhelming factor. This was achieved primarily by infusing the environment with meaning through a strong value system that allows to interpret and mold events, and here Meyer's (1982) comments on social aspects of resilience and HROs literature (Roberts, 1990; Weick & Roberts, 1993) perspective on culture provide further bases to this argument. Coutu (2002) highlights however that resilient people in a company might be a drawback if they survive on their own and act resiliently without following these sets of common values from the organization/group, as their goals might differ from others';
- An uncanny ability to improvise: companies and people that survive regard improvisation and making do as core skills. Organizations in particular tended to defer to experts and allow autonomy at lower levels, so that this operative bricolage wouldn't be thwarted. Once again, the parallel with Weick et al. (1999) concept of sensibility to operations is striking.

Coutu (2002) concluded that resilient behavior seemed to appear if all these conditions were pre-existent: if there is a set perception of reality, hardships, even internment in concentration camps, appeared as a thing to fix, but there was no need to recreate the state of things from the ground. People under pressure regress to their most habitual way of thinking (Staw et al., 1981), but if the structure of reality is properly built they already

know what's needed to move in the right direction, much like in the case of smart systems for Weick & Roberts (1993).

Masten's research, on the other hand, deals primarily with resilience in children during their development phase (from their infancy to their twenties), but the findings can be extended to any complex system given the approach that has been adopted, which draws from systems literature. It is also one of the few studies that employs longitudinal data that cover more than a decade, and even though many of the parallels with organizations have yet to be empirically tested, most of the work deals with sufficient resilience literature from other research fields to provide notable insights for organizational resilience.

In Masten (2001) a theme that can be retrieved in later conceptualizations of resilience (Williams et al., 2017) would appear: an individual cannot be considered resilient if there hasn't been any major threat to his development or adaptation, a demonstrable risk. Risks are actuarially based predictors of undesirable outcomes, drawn from evidence that such status or condition was statistically associated with higher probability of "bad" outcomes in the future.

In children, these risk factors could be bad parenting, being raised in a difficult neighborhood or in a warzone, being discriminated and so on. Each of these risk factors had an opposed asset, or protective factor (also present in Luthans, 2002a) that was its contrary and could shelter from other risks (for example, good parenting, a pleasant neighborhood etc.).

In previous literature, an individual could be assessed as being resilient if he featured no internal problem (low level of distress, absence of psychopathologies) or from an external perspective (good adaptation with the community/society, academic achievement, success in relevant development tasks and so forth). Masten (2001) attempted to see if the presence of assets would lead to a better life outcome compared to the average population. The parallel with resource-based theories on competitive advantages is self-evident (Teece et al., 1997).

The main finding was that risk factors always negatively affected performance of the observed sample, but even in a very high-risk environment, if enough assets were available, the outcome was good nevertheless. In organizations this would later be indirectly confirmed by Gittel et al. (2006), a point that is further developed in paragraph

1.5 but that already foreshadows how merging the insights from the psychology stream of literature provides a great contribution for organizational resilience studies.

Maladaptive behaviors and overall worse outcomes resulted only from a combination of high-risk environments and weak protective resources, with only very few cases appearing in the same environments with enough assets. Moreover, problems were more likely to appear during early stages of development (childhood, teenage) with a significant reduction of maladaptation in young adults, mostly thanks to an increase of the available assets, and the high-performance groups had very similar psychosocial resources (such as better parenting quality, intellectual functioning, positive self-concepts), despite their different environments (high-low risk).

Masten (2001) also brings up some of the possible protective factors that could shelter individuals from risk: caring adults in the family/community (resembling management and governance engagement in an organization), cognitive and self-regulation skills (competences in firms), positive views of self, motivation to be effective in the environment, attachment, authoritative parenting, intelligence, pleasure-in-mastery, intrinsic motivation.

Cumulative competence and stress protection, as well as a focus on the aforementioned adaptive systems, such as intelligence, pleasure-in-mastery and attachment, often led these kids to better than average outcomes, and in high-risk environments, to resilient behaviors.

These concepts were further generalized in Masten (2014), where the author assumes individuals as complex systems and thus could apply part of her reasonings to societies and organizations as well. In the introduction of the chapter, Masten's definition of resilience was already mentioned. That construct was applied in the various proposed studies on children in their different development steps, with competence and success being defined as patterns of effective performance in the environment, evaluated from the perspective of salient developmental tasks in the U.S. society.

A few findings that might also be employed in organizational studies are highlighted: first, competent individuals were less likely to face severe adversity compared to less competent peers, and more likely, when exposed, to have or mobilize resources for positive adaptation. The same was found to be true on individuals with high adaptability, which stems from some fundamental adaptive behavior such as working memory,

cognitive flexibility, effortful or inhibitory control (the ability to suppress impulses or automatic responses to answer in a preferable or novel way to a situation) and the will to learn from unknown situations. Having better personal assets ultimately led to better reactions to trauma.

Second, actively working on resilience and improving the associated protective factors wasn't enough in some situations where stress exposure was continuous and lasted too long. Resilient responses were ordinary for negative events, even in very tough situations such as homelessness or after the separation between mothers and children; however, risk breeds risk and if a previous situation was already difficult, a traumatizing event was found to have a much stronger impact. Preventing stress exposure or mitigating its effect is thus another primary aspect, as stress dose was found to be correlated with the development of maladaptive behaviors. The total absence of risks was also seen as a possible source of maladaptation: a system needs exposure to manageable stress to train and to learn how to respond to novel situations. It's almost like an immunization, and evolution was found to favor organisms that developed adaptively, altering regulatory systems.

These two aspects already show that growing a child in a difficult situation isn't conceptually too different from the development of a collective mind in an organization, and the empirical part of this thesis will stress these parallels. But more relevant topics emerged from Masten's (2014) book.

Soft aspects are some of the most relevant assets that can be developed to foster resilient behaviors: generating hope and giving meaning to events reduces the recalling of failures and negative emotionality (which are considered risk factors); relationships and cultural belief systems shared in community groups play a sustaining role in stressful situations. Moreover, communities can also develop resilience through a set of networked adaptive capacities which are facilitated by resources in the domains of economic development, information or communication systems and social capital (relationships and a community sense), facts that were proven true by Gittel et al. (2006) and that confirm once more the multilevel nature of resilience.

The main argument from Masten's (2014) book merges these disparate perspectives by showing that resilience is, in fact, a sort of "ordinary magic", something extraordinary, such as facing extremely tough situations, that is borne from a series of normal adaptive

systems that are put in place by the individual, its group or family or organization, its cultural system and the society in which he lives in. When enough of these basic adaptive systems work together, risk factors can be faced easily and traumatic experienced confronted with little consequences. When the latter become overwhelming, or if these adaptive systems are found lacking, then the data confirm a tendency toward maladaptation and non-resilient behaviors.

Figure 1.3 "Short List" of Resilience factors and associated Adaptive systems

Resilience factors	Adaptive systems
Effective caregiving and parenting quality	Attachment; family
Close relationships with other capable adults	Attachment; social networks
Close friends and romantic partners	Attachment; peer and family systems
Intelligence and problem-solving skills	Learning and thinking systems of the CNS
Self-control; emotion regulation; planfulness	Self-regulation systems of the CNS
Motivation to succeed	Mastery motivation and related reward systems
Self-efficacy	Mastery motivation
Faith, hope, belief life has meaning	Spiritual and cultural belief systems
Effective schools	Education systems
Effective neighborhoods; collective efficacy	Communities

Note. CNS, central nervous system.

Source: Masten (2014)

These findings highlight how resilience isn't a trait that only few, lucky individuals or systems possess. And it's not even something that stems only from a person through training, as Luthans et al. (2006) argued. It's a mix of normal factors, behaviors and adaptation systems that work together to maintain the functioning and flexibility in face of threat in people and systems. Thus, investing in all the three levels that were underlined by Staw et al. (1981) is likely to develop the organizational resilience capability through the enhancement of the various underlying adaptive systems: self-regulation and mastery motivation were explored by Luthans (2002a, 2002b); spiritual and cultural belief systems by Gittel et al. (2006), learning, thinking and education systems can be identified in some elements to measure resilience in McManus et al. (2008) and Stephenson (2010). The

impact of social networks can be identified in Battisti & Deakins' (2015) ability to integrate external resources after a crisis, attachment in Walker's et al. (2014) stress on how staff engagement improves performance and resilience in organizations.

The list suggests that there are fundamental systems that protect human development under many different circumstances and they are a product of biological and cultural evolution, shared in their basic aspects across many societies (Masten, 2014). If such systems are the roots of adaptability and resilience in complex systems as societies, it's likely to expect organizations to develop their resilience capabilities through similar systems as well.

Moreover, given how resilience can appear through different levels of an organization (Staw et al., 1981), a firm could focus on improving it at an individual level (fostering attachment to the company, improving self-regulation through resilience training, teaching to enhance mastery motivation), group or intra-organization level (a culture and reward system promoting resilience and mindfulness, a structure for continuous formation), or at an inter-organizations or system level (developing deep relationships throughout the supply chain which might provide support in time of need, structuring relationships for flexibility).

There are different patterns to reach resilience in individuals and all derive from the statement that competence begets competence, thus restoring adaptive systems is essential to promote resilient outcomes.

1.5 Resilience as the Adaptability of Business Models

Another stream of research that developed in the same period was concerned with studying resilience in terms of strategic and business model flexibility: Hamel and Valikangas (2003) argued on the idea that in less turbulent times, companies could rely on momentum to sustain their success, whereas at their time, with trends like the Internet and globalization, the world was becoming turbulent faster than organizations were becoming resilient.

The underlying concept was that to face the continuous risks of technological discontinuities, regulatory upheavals, geopolitical shocks, industries disintermediation, nontraditional competitors and shifts in consumer tastes, companies needed to consistently pursue the imperative of being different. Continued success would ride on resilience, described as the ability to dynamically adapt business as circumstances

changed, a parallel with the routine optimization from Weick et al. (1999) but brought from the operative level to a strategic perspective.

This brings to the conclusion that resilience deals with anticipating and adjusting to deep, secular trends, and that abrupt shifts of strategy such as turnarounds are transformations that were tragically delayed (Hamel & Valikangas, 2003), non-resilient answers which were triggered by Perrow's normal accidents on a strategic rather than operational level.

To chase this quest for "zero trauma transformations" that are aimed at chasing opportunities and incipient trends as they arise, without negative repercussions on the organization, Hamel & Valikangas (2003) propose an approach that is close to the one proposed by the HROs literature: a diffusion of decision power to middle managers leaving room for them to perform small investments and experiments to pursue innovation in all the relevant processes for the organization, a stance that also allows a less stiff allocation of resources, which increases flexibility and allows problems to flow toward expertise (Sutcliffe & Vogus, 2003). This is also a way to avoid the shortcomings of centrally planned decisions through a more "market-like" approach, which history has proven to be more resilient and ultimately effective (it's enough to bear in mind the fate of the Soviet Union, compared to more open and decentralized economies).

A similar perspective is adopted by Sutcliffe & Vogus (2003) who build on the research from Staw et al. (1981), Masten (2001) and HRO literature to conclude that resilience was essential in that day's business environment given the high risk of unexpected turns and how this capability allows to manage uncertainty. The idea is once again that competence begets competence, and that even if resilient answers might not appear, being competent in one period sets a company up for competence and resilience in the next period. Therefore, it is imperative to create processes which increase learning capabilities (providing new assets) and reduce risks and stressors to promote the likelihood of positive adjustments.

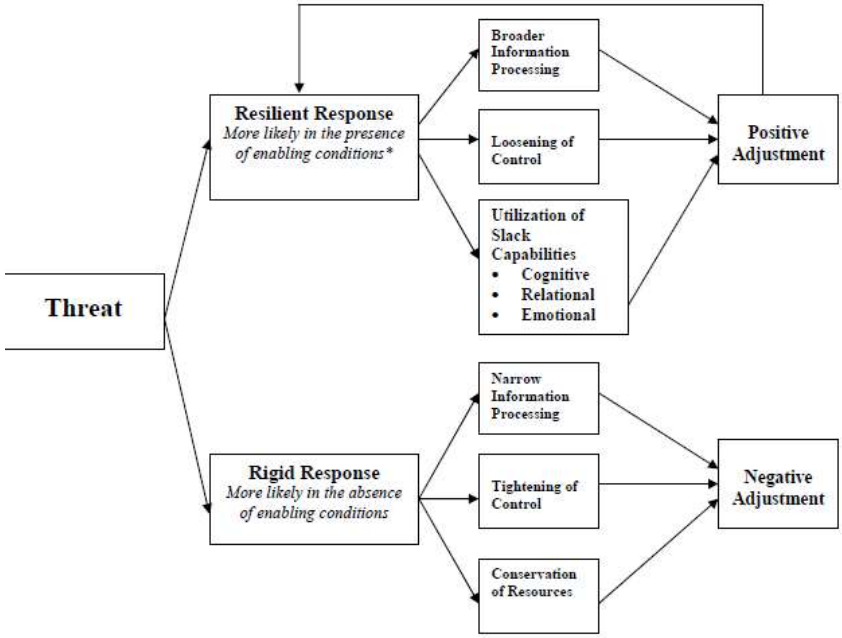
The authors furthermore argue that resilience isn't extraordinary: it comprises a set of processes promoting competence, efficacy restoration and growth that allows to maintain positive adjustment under challenging conditions. Some examples that are deemed more effective than a simple reduction of risks were discussed: allowing active individual choice and self-organization while attributing responsibility is a good way to promote

resilience, as knowledgeable decisions are taken by operators who can understand the consequences.

In groups, variety becomes a way, along with learning, to expand the collective knowledge base and to increase the ability to sense, register and regulate complexity (Sutcliffe & Vogus, 2003), with a clear reference to mindful practices from Weick & Sutcliffe (2001). Group-efficacy feelings are also to be promoted to increase confidence, competence and mastery motivation.

Organizations on the other hand would need to balance growing (enhancing variation and innovation) and building competence, a stance that promotes efficiency. Growing expands behavioral repertoires, providing a deep and broad range of possible actions which, according to Weick et al. (1999), fosters resilience and improves information processing and perception; focusing on efficiency instead affects mastery motivation systems as an organization feels it can achieve success. The findings from Sutcliffe & Vogus (2003) are summarized in figure 1.4.

Figure 1.4 Resilient and Rigid Responses to Threat



Source: Sutcliffe & Vogus (2003)

Various processes lead to resilience in an organization according to this stream of research, just like in individuals. Barnett & Pratt (2000), adopting a view of resilience as crisis response, argue that business models and strategies can be willingly put under stressful conditions by the top management through a so called “autogenic crisis”.

Crises (Barnett & Pratt, 2000) are considered as limited, unanticipated threats to a system's survival, featuring heavy disruption of processes and core assumptions as well, effects that might overwhelm emotional, cognitive and behavioral capacities. If, however, the associated threats are latent, a system can initiate an autogenic crisis: it begins moving in advance and pre-adapting to future adversity, generating a highly functional bundle of disconfirming data that allows to "unfreeze" a situation and to act on it flexibly, instead of through a threat-rigid response.

This way, processes can be unlearned and re-learned by the organization through a structured "near miss" (in HRO terms), acting like a buffer to the real crisis as the environment is more controlled and power is willingly decentralized to allow experiments and errors while providing a psychologically safe setting.

The perspective from Barnett & Pratt (2000) though is very focused on the idea that organizations can sense in advance the crises which might hit them, a view that is closer to Annarelli & Nonino's (2016) definition of organizational resilience. Gittel et al. (2006) on the other hand provide us with an analysis of a crisis that couldn't possibly be precisely foreseen, the 9/11 terrorist attack to the World Trade Center and its effects on the airline industry.

The sector was deeply shaken after this unforeseen, untoward event, with a 20% reduction of very short flights demand in the U.S. and an 11% reduction for short-medium flights that were still within U.S. borders. Various companies were analyzed, yet two of them, Southwest Airlines and US Airways, were very similar in size, business scope and strategy. However, after the crisis, the first one witnessed growth and good performance whereas the second lost market share and faced controversy between employees and management staff.

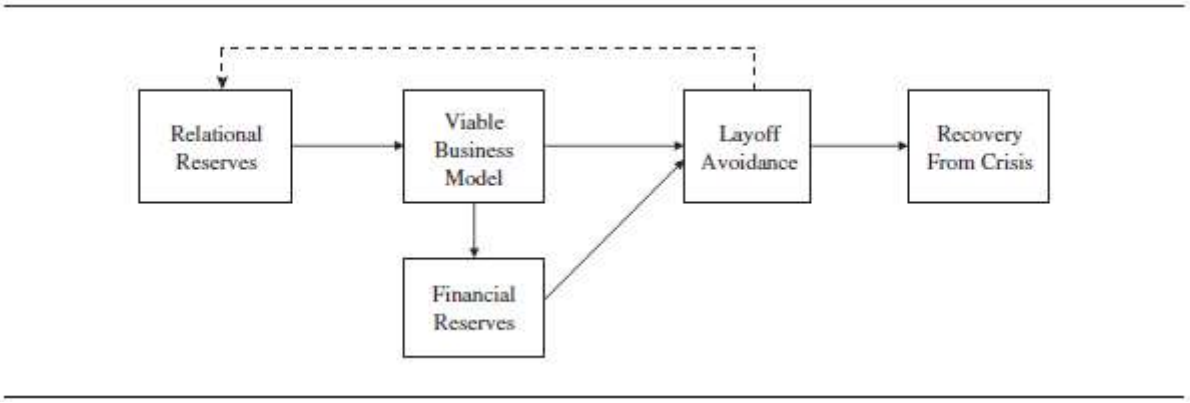
Gittel et al. (2006) stress how Southwest wasn't planning to respond to a sharp reduction in demand due to terrorist attacks, however it was a firm that adopted the all-hazard preparation stance that Boin & Hart (2010) would discuss years later. The company was reportedly managing in good times as though they were bad times, carefully strengthening relationships with employees, building up financial reserves instead of relying on high levels of debt and avoiding to take risks through inorganic growth, etc.

The authors (Gittel et al., 2006) identified these as the main sources of competitive advantage after the crisis: instead of laying off employees, a measure that was found to

work only in the short term through a relief in cash flows at the cost of a long-term reduction in recovery speed, Southwest used its financial reserves and leveraged on the trust of its workers (through a wage reduction and the promise not to cut jobs) to absorb the first impact of the crisis. The negotiations that ensued with the unions didn't feel pressuring, and the firm managed to acquire market share from its rivals and to adapt its business model. There is a clear consistency with Meyer's (1982) findings.

Three were the key findings of the paper: resiliency requires positive relationships and relational reserves as a prerequisite, but financial reserves are also extremely important to absorb the initial shock and buffer the company long enough for it to adjust the business model to the new situation. Layoffs destroyed shared values, trust and loyalty in US Airways, a fact connected with its weak financial position, and this greatly delayed the recovery of the company as job security is essential for sustained innovation and productivity, which was sorely needed after the environmental shift (Gittel et al., 2006). These effects also highlight a loss of mindfulness in US Airways, as the commonality of culture was undermined and employees felt like the company wasn't caring for them, which led to an increase in strikes that further impaired aircraft and labor productivity. Southwest instead fostered their collective mind, and this allowed them to capitalize on the investments in social capital as they could reduce their operating costs while retaining their workforce, tweaking their strategy and business model so that it could fit the new environment.

Figure 1.5 Conceptual Model of Organizational Resilience



Source: Gittel et al. (2006)

This perspective further highlights how resilience can be developed in multiple ways in companies, and that it's not circumscribed in the ability to foresee and adapt in advance

to possible environmental jolts. The flexibility of business models and strategies could rely either on innovation in strategy, as for Southwest Airlines, or on supply chain resilience, another stream of research which is expanded upon below. This branch should be considered as a natural evolution of what was discussed in this paragraph, as instead of taking the perspective of a single firm, whole supply chains are analyzed, looking at their innovation, business models and strategic stances from a complex, higher level system point of view.

1.6 Supply Chain Resilience

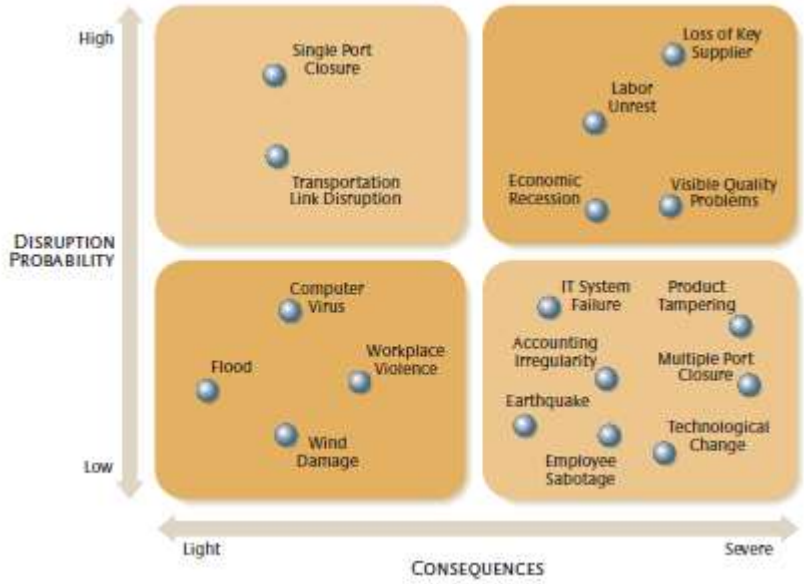
The articulation of the literature discussed in this paragraph connects once again themes featured in crisis management literature with supply chain management suggestions while framing them from the point of view of organizational resilience to understand which activities can be put in place to absorb disruptions and bounce back after untoward events. As a clarification, this paragraph uses the definition of supply chain provided by Pettit et al. (2010, page 1), which is "the network of companies involved in the upstream and downstream flows of products, services, finances and information from the initial supplier to the ultimate customer".

The analysis begins from the article written by Sheffi & Rice (2005) which builds on the research from the business models adaptability literature and frames some empirical examples of resilience (or absence of it) as primarily supply chain related issues. One of these stories is concerned with the effects of the 9/11 terrorist attack on U.S. supply chains: Toyota had to halt the production in its North American facilities within hours after the event. The argument was that even though risk and uncertainty in that day's business world primarily stemmed from demand issues, such as customer expectations, global competition and greater product variety, managers still had to cope with disruptions in the supply chain.

How to cope with these is a strategic issue, as resilience can be achieved either by increasing flexibility or creating redundancy. The latter however creates primarily a cost through the duplication of resources, while the first provides a considerable competitive advantage. According to the authors (Sheffi & Rice, 2005), the first step to build a resilient enterprise was identifying vulnerabilities, which are the inabilities of a system to cope with adverse impacts or the degree of susceptibility to disruption of the system (Linnenluecke & Griffith, 2010). If firms managed to understand what could go wrong,

the likelihood of the event and the consequences associated with it, building flexibility to face the disruption could be turned in an investment.

Figure 1.6 Sample of a Vulnerability Map for a Company



Source: Sheffi & Rice (2005)

This approach would be later refined by Pettit et al. (2010) identification of a possible measure for vulnerabilities (the likelihood of an event times the potential severity) to help practitioners in understanding where investments were more crucial.

Furthermore, Sheffi & Rice (2005) identified some elements in the supply chain where flexibility could be enhanced to build resilience. At a supplier's level, a strategic decision on whether to employ multiple sources or single ones with deep, integrated relationships had to be taken accounting for the associated vulnerabilities.

From an internal point of view, the ability to respond to disruptions in processes could be answered through flexibility. Apple and Dell for example faced a component shortage from the same shared supplier in a very different way: the first tried to substitute it with a lower quality component, generating a wave of customer dissatisfaction which led to a number of refunds and orders cancellations that ultimately reduced their quarterly revenues. Dell on the other hand always worked with a build-to-order perspective, so they steered customers toward products they knew they could build reliably, affecting demand to absorb the shock.

Control systems in a supply chain should also become more flexible to provide timely and detailed information which reduces baffling interactions between the firms, and a

shared culture among the members was also deemed important to provide the same interpretation of facts and strategies.

This initial input was the primer that began closing the gap between supply chain management and resilience literature, thus, unsurprisingly, many constructs that were already analyzed in previous chapters are discussed and labelled differently, but the underlying concepts remain quite similar. The authors clearly show perspectives that are close to mindfulness, previously analyzed in HRO literature, and adapt them to a supply chain level.

While previous literature was focused on improving protective factors and assets that would enable resilient answers to threats, this thread stressed how acting on risks and a proper risk management is also an instrument to achieve resilience. Craighead et al. (2007) argue that supply chain disruptions are unavoidable, but that this inherent risk of disruption, which is tied to vulnerabilities, can be reduced preemptively through proper design.

Three main design faults can lead to disruption in supply chain operations (Craighead et al., 2007): an excessive node density, meaning that most of the actors involved are in the same geographical area, which leads to more entities being likely to be affected from crises due to their proximity; a chain that is too complex, meaning that few nodes receive flows of information, materials or people forward, backward and within-tier, increasing the severity of a disruption caused by a single node's malfunction; absence of warning capability or other communication issues, which exacerbate disruptions in a supply chain due to the misalignment between demand and supply.

A mindful approach to designing a supply chain, with a preoccupation with errors and possible issues that might arise due to these characteristics, may reduce efficiency, but Craighead et al. (2007) believe that it's one of the few ways to properly address risks and increase supply chain level resilience. Moreover, the involved organizations should develop mitigation capabilities, routines or predictable patterns of activities that allow a supply chain to recover quickly from a manifest disruption and to create awareness of a pending disruption. The faster a problem is addressed, the lower its severity, as there is less time for it to reverberate.

The idea that mitigating capabilities in logistics are linked with supply chain resilience is reinforced by Ponomarov & Holcomb (2009). The authors identify some characteristics

that should be incorporated in supply chains design to reduce risk: event readiness, efficient and effective response plans and the capability to recover from disruptive events. Their perspective focuses on improving stability, the velocity at which a system returns to equilibrium, however Holling (1973) already discussed how this concept differs from resilience, which is more related to the persistence of a system than with finding equilibria per se.

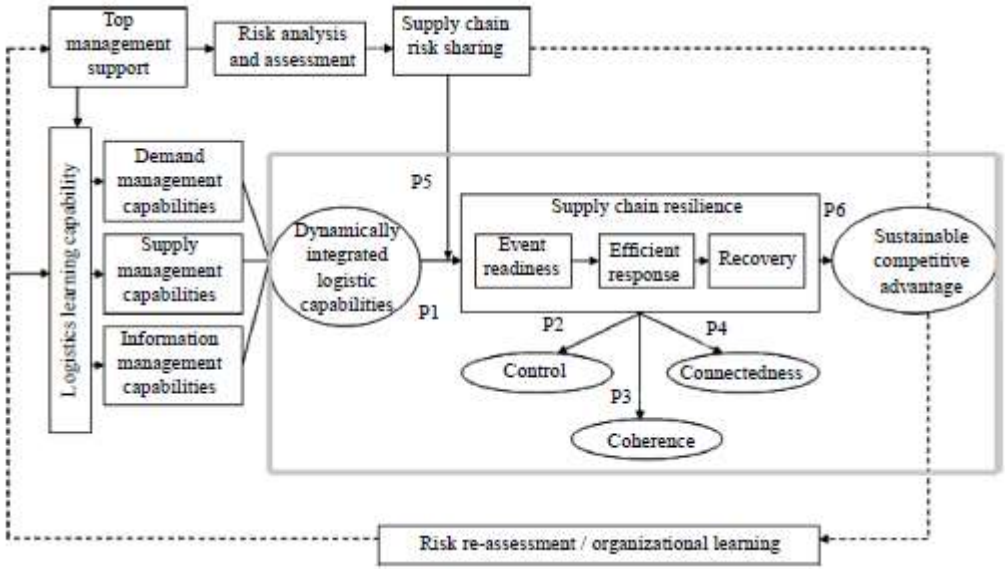
Furthermore, Ponomarov & Holcomb (2009) highlight that supply chain resilience doesn't deal only with operations quality and their ability to recover, but also with staff's psychological stability: one of the best ways to deal with disruptions is improving confidence at a supply chain level in their opinion, which is gained with the perception from operators that they are able to recover or adjust quickly to adversity and change. Visibility and control improve this characteristic, but in general the authors highlight the lack of a holistic perspective that can account for all these aspects of resilience.

Ponomarov & Holcomb (2009) also stressed a vital point that wasn't clearly addressed in the previous literature: to generate competitive advantage, a company must be faster at creating options and realigning resources than its competitors. The dynamic integration of logistics capabilities enables supply chain resilience, which is the adaptive capability to prepare the supply chain for unexpected events, to respond to them and to maintain continuity of operations, and this can lead to competitive advantage as even disruptions created by innovation, new product launches and so forth can be easily absorbed by the system. The authors raise this argument from a resource-based perspective of the firm, which establishes that firms obtain competitive advantage by accumulating internal resources that are rare, valuable, difficult to imitate (Teece, 2007), with the underlying idea that resilience is a set of resources and capabilities that can be employed to boost an enterprise's success.

This competitive advantage is also deemed sustainable as it reinforces itself, because it enables competence and resilience in future periods (Sutcliffe & Vogus, 2003). The authors (Ponomarov & Holcomb, 2009) also verified that designing for resilience improved control, coherence and connectedness throughout the supply chain, and that risk sharing between the members of the chain would enable more effective decision making under uncertainty, improving how mitigating capabilities led to resilience.

The following scheme summarizes this view.

Figure 1.7 Supply Chain Resilience Framework



Source: Ponomarov & Holcomb (2009)

Following this train of thought, Pettit et al. (2010) proposed that supply chain resilience increases as capabilities (attributes required for performance or accomplishment) increase and vulnerabilities (fundamental factors that make an enterprise susceptible to disruptions) decrease, mirroring Masten's (2014) perspective on how protective and risk factors affect resilient responses.

Pettit et al. (2010) also noted how, in contrast with Boin & Hart's (2010) view, risk management and the ability to sense and address in advance any possible threat don't build resilience directly. This approach entails examining all possible outcomes of a project or process, weighing risks and potential returns, but it relies on past and subjective information, thus it can rarely foresee low-probability, high-consequences events like the ones highlighted in Gittel et al. (2006). This perspective slightly detached the direction of resilience studies in supply chains from traditional risk management and business continuity planning, fleshing out how even in logistics not everything can be accounted for and how resilience should be more concerned with building resource bases for the future.

In particular, Pettit et al. (2010) underlined how there should be a fit between capabilities and vulnerabilities: excessive vulnerabilities would result in excessive risk (and the negative outcomes that risk accumulation can bring to a system, as Masten (2014) noted), while excessive capabilities would erode profitability. Performance improvements derive

from striking a balance between the two. Research from Fantazy et al. (2009) confirmed empirically the need for this fit, which varied along with the core strategy of a firm.

In parallel, Linnenluecke & Griffiths (2010) suggested that to cope with uncertainty, enterprises developed risk and crisis adaptation mechanisms, which increase their coping range (the range of normal variability with which an organization can cope, which is extremely context dependent). However, while adaptation is gradual and it's a response to some form of external pressure that requires a different fit between firm and environment, resilience is more dynamic and concerned with addressing challenging conditions as they occur and defusing them before they escalate, further stressing the difference with a risk management perspective that would attempt to avoid these conditions. In fact, reducing risk chance does not improve resilience in terms of ability to bounce back from adversities (Jüttner & Maklan, 2011).

The authors (Linnenluecke & Griffiths, 2010) also identified four characteristics that appeared in long-living companies and supply chains, mentioning however that these weren't resilience predictors but rather measures of sources for past successful coping with adversity: sensitiveness to the business environments and a capability for quick responses to changing conditions; a good sense of cohesion, identity and community among employees; decentralization of decision making but with feedback systems that could influence central decision nodes; a conservative approach to financing featuring low risk.

These characteristics brought differences in response mechanisms, suggesting that some organizations have different underlying qualities or capabilities that allow them to be better equipped against uncertainty, and Jüttner & Maklan (2011) tried to assess empirically which adaptive capabilities and resources help supply chains in preparing for unexpected events.

The assumption that was followed is that while risk management in supply chains can help in reducing vulnerabilities, not all risks can be prevented, and other characteristics focusing on readiness, responsiveness and recovery were necessary to deal with unforeseeable events (Jüttner & Maklan, 2011).

Four factors were identified:

- Supply chain flexibility, which comprises the number of options available to absorb shocks;

- Velocity, the ability to quickly address problems and the lead time required to reconfigure the supply chain;
- Visibility, the capability to sense the unfolding of an event;
- Collaboration, an attitudinal disposition of the members across a supply chain to align forces and objectives in case of a risk event.

Some dimensions have been thoroughly explored at a firm level in operations management literature, with flexibility and velocity directly translating in competitive advantage and operational excellence, while visibility typically affects customer perceptions (Slack et al., 2013). Jüttner & Maklan (2011) though isolated the effects of these characteristics in different supply chains during the 2007 financial crisis and the successive recession. Flexibility helped in containing negative effects on cost and revenue targets, allowing the reallocation of capacity within the internal and external network of the supply chain, with positive returns on performance. Velocity speeded up the pace of adaptation and of demand pick-ups. Visibility allowed to see the risk from partners (which reportedly increased with opportunism during information sharing), making it easier to accommodate shocks and increasing the range of possible actions. Uncollaborative supply chains also reduced the ability of some examined systems to react, as independent and opportunistic choices pursued different goals.

If these supply chain characteristics provide competitive advantage in normal, routine operating times (Slack et al, 2013; Jüttner & Maklan, 2011) and contemporarily enable resilience, they should be inspected with more attention, as they might solve the dilemma raised by Sheffi & Rice (2005) between accruing costly slack resources and developing capabilities that improve resilience and performance.

1.6.1 Resilience Enabling Elements and their Impact in Supply Chains

To complement the literature examined above, this paragraph explores some of the possible enablers of resilience to further improve the understanding of this construct at a supply chain level, while moving toward a more comprehensive theorization of organizational resilience. The goal is also to employ studies which verified impacts on performance from these elements, displaying how organizing firms around resilience enablers can provide competitive advantage.

The first characteristic that is discussed is flexibility, analyzed through an empirical study from Fantazy et al. (2009) which explored the relationship between different kinds of flexibility and performance in small and medium Canadian manufacturing enterprises. The assumption is that flexibility requirements encompass all the functions of a firm, and the paper attempts to verify the impacts on strategy and performance of an organization and its supply chain, considering that being competitive as a single business is not deemed enough in today's world. Due to the absence of consensus in the literature on which dimensions provide the most flexibility, the authors focused on the five aspects that impact the competitive position of a firm in the market, as they are directly perceived by customers (Fantazy et al., 2009; Slack et al., 2013, Kotler et al., 2012) and that were most frequently cited: new product flexibility, product flexibility, delivery flexibility, information systems flexibility and sourcing flexibility. These dimensions seemed the most appropriate to measure overall supply chain flexibility, while featuring enough variety to highlight differences in their connections to performance and strategy of a firm. Supply chain strategies were summarized as innovative (first-entrants in new markets, early technology adopters), customer-oriented (more mature market, exceptional customer service, reasonable quality and competitive prices) and follower strategies (very mature market state, tight cost control, low cost production). The measures that were employed were both financial (net profit, sales growth) and non-financial (customer satisfaction, which is the perception of value received over price, Fantazy et al., 2009; Kotler et al., 2012) and lead-time performance (time between the receipt of an order and its delivery, Fantazy et al., 2009; Slack et al., 2013).

The following tables show the results of the study.

Table 1.2 Impacts on Flexibility and Performance of Different Business Strategies

Impact on Flexibility	**Supply Chain Strategy**		
	Innovative	**Customer-Oriented**	**Follower**
New Product Flex.	Strong, Positive	Slight, Negative	Negative
Product Flexibility	Negative	Positive	Slight, Negative
Sourcing Flexibility	Negative	Positive	Negative
Information Systems F.	Negative	Positive	Negative
Delivery Flexibility	Non-Significant	Positive	Negative
Impact on Performance			
Net Profit	Positive	Slight, Positive	Non-Significant
Sales Growth	Strong, Positive	Negative	Non-Significant
Customer Satisfaction	Negative	Positive	Negative
Lead-Time Performance	Negative	Positive	Negative

Source: adapted from Fantazy et al. (2009)

Table 1.3 Direct Effects of Flexibility Dimensions on Performance Dimensions

Flexibility Dimension	**New Product**	**Product**	**Sourcing**	**Information Systems**	**Delivery**
Impact on Performance					
Net Profit	Positive	Non-Significant	Positive	Non-Significant	Non-Significant
Sales Growth	Positive	Non-Significant	Slight, Negative	Slight, Negative	Positive
Customer Satisfaction	Negative	Positive	Positive	Positive	Positive
Lead-Time Performance	Negative	Non-Significant	Positive	Non-Significant	Positive

Source: adapted from Fantazy et al. (2009)

Moreover, the study found that supply chain flexibility helped supply chains adopting an innovative strategy in achieving better non-financial performance, while in customer-oriented chains financial performance wasn't improved this way.

Fantazy et al. (2009) conclude their analysis by stressing how innovative supply chains tend to pursue new product flexibility, which has positive impacts on net profits and sales growth; customer-oriented supply chains sacrifice part of their profitability to provide high value through flexibility, as they attempt to create more long-lasting relationships with their customers to foster sustainable growth with a variety of products and services after sales. Follower supply chains limit their need for flexibility by narrowing product range and reducing the frequency of modifications.

Applying the product life-cycle theory (Kotler et al., 2012) and Kano's model on Attractive Qualities to these findings helps in refining the analysis. Follower firms are more oriented to cost compression and face a relatively stable market, greatly reducing their need for flexibility. Their margins are in general lower and their sales growth almost non-existent, explaining the impact of their strategy on performance. Innovative firms must satisfy the basic needs of their customers, without the necessity to rely on delighting factors such as a quick delivery or excellent service to achieve sales, as there is a lower need for differentiation. This partially explains the impact of their strategy on non-financial performance, and how investing in supply chain flexibility mitigates this effect. The opposite is true in more mature, customer-oriented firms which need to differentiate on their service quality to maintain a clear position in a market, while focusing on customer lifetime value rather than on a single transaction.

Flexibility however, especially in sourcing, helps to meet customer expectations and directly, positively impacts performance, even if in non-financial dimensions (Fantazy et al., 2009). Investments in this area not only provide the firm with resilience capabilities

(Jüttner & Maklan, 2011), but also with competitive advantage. However, some types of flexibility are more relevant in different stages of the life cycle in which the supply chain's products are, confirming Pettit et al. (2010) idea that blindly investing on resilience capabilities can be detrimental.

Finally, Urcioli et al. (2014) also verified that flexibility can be achieved through demand management: proper marketing and economic incentives are also a way to cope with disruptions, especially in energy supply chains.

Urcioli et al. (2014) also stressed the importance of vertical cooperation to anticipate, identify, react and learn from incidents, which moves the topic of this discussion toward supply chain collaboration.

In 2008, Soosay et al. noticed that to enable a supply chain strategy, coordination was essential, as it allowed to align objectives, to open communication channels, to share resources, risks and rewards among participants, a series of aspects that improve operational and innovation performance of the chain. The authors identified reciprocal and positive effects between innovation and supply chain collaboration, further reinforcing the idea that investments which foster other performance measures tend to increase resilience as well. This is unsurprising as tighter coordination and cooperation in a supply chain can be interpreted as the development of a collective mind that surpasses the single organization, improving systemic resilience.

The last two elements of supply chain resilience are discussed below, as visibility and velocity of reconfiguration are closely tied. Velocity interpreted as a short lead-time was discussed by Fantazy et al. (2009) with the label of "delivery flexibility", and Craighead et al. (2007) already mentioned its benefit.

Visibility throughout the supply chain is defined as the extent to which the involved actors have access to and share information which they consider as key or useful to their operations (Lee & Rim, 2016). It's a dimension that drives reconfigurability by providing strategic and tactical information which is essential to lower uncertainty, improve coordination and enhance customer satisfaction, ultimately ameliorating the strategic performance of a supply chain (Wei & Wang, 2009). The authors frame supply chain visibility as one of Teece's (2007) dynamic capabilities, as it allows to renew competences and reconfigure organizational resources to capture competitive advantage in a shifting environment.

Wei & Wang (2009) stress how visibility provides real-time information that enables sensing, seizing and competitiveness maintaining capabilities, thus, in a supply chain context, visibility must be developed to improve these dimensions. Four enabling processes allow reconfiguration: sensing the environment, learning, coordinating activities and integrating resources. Visibility improves the performance of all these aspects as it provides market intelligence about customer needs, it allows sharing of information across the supply chain (which activates organizational learning and experience accumulation), it improves decision-making processes by providing critical information on dependencies in the system and it helps in building a collective identity for the supply chain.

Working on the improvement of this dimension is once again similar to the process of developing a collective mind (Weick et al., 1999), highlighting yet another way through which supply chains can achieve resilience. Lee & Rim (2016) argue that operational performance during disruptions and responsiveness improve as this dimension is enhanced, and that the discrepancies between planning and execution, which is unintended variability, decrease thanks to the feedback provided by high visibility.

This digression discussing single components of resilience was aimed at showing the theoretical and empirical evidence of the benefits of resilience development, even in its basic elements. It's yet another way to cope with uncertainty which relies on network resources and capabilities rather than on internal strengths, giving practitioners another dimension on which they can focus their attention to seek solutions which provide the bases for resilient outcomes while creating competitive advantage. Furthermore, the parallels with theory on mindfulness, organizational and individual resilience show that the adaptive factors or systems exist almost identically in each of the three levels identified by Staw et al. (1981).

Lastly, these empirical studies help in confirming how working on dimensions that foster resilience provide firms and supply chains with capabilities that also improve their performance and competitive advantage, thus a question is raised. Is focusing on an organization's strengths and dynamic capabilities, as intended in Teece et al. (1997) and Teece (2007), a similar approach to Masten's (2014) and William's et al. (2017) development of protective factors? Paragraph 1.7 attempts to unify the perspectives that

have been shown thus far and to provide a more comprehensive view of organizational resilience.

1.7 Conclusions: What is Organizational Resilience?

The previous paragraphs should have conveyed how multifaceted resilience is, but a few recurring themes have emerged and will be underlined below. The analysis of resilience can be split in two temporal dimensions: when a crisis, an untoward and unanticipated event that surpasses the typical coping range of an organization, occurs, what Rose et al. (2013) defined as "static economic resilience" is witnessed. A system reacts to the shock in an attempt to maintain function, employing its endowments to cope with the situation (Williams et al., 2017). These crises occur when risk factors, actuarially based predictors of undesirable outcomes (Masten, 2001), turn into reality and overcome the typical response mechanisms available for an organization that would allow to manage the situation in a "Business as usual" fashion (inherent resilience in Rose, 2004), triggering the need to resort to ingenuity, bricolage and out-of-the-box thinking to maintain the organization's alignment with its objectives.

A mindful approach during a crisis allows to identify different, unconventional resources that can be employed or leveraged upon to cope with the situation. These are not circumscribed to financial slack: Williams et al. (2017) mention cognitive capabilities (constructive conceptual orientation, accuracy and timeliness of information-sharing and problem solving), behavioral capabilities (ingrained routines which facilitate the processing and sharing of information and decision-making), emotion-regulation capabilities (similar to Psychological Capital) and relational capabilities (social connections that enable access to and exchange of resources in the network, such as supply chain coordination) as some alternative instruments that enhance resilience. However, these can be interpreted as scarce resources that can be depleted during a crisis: managerial and staff attention is limited, as is their capacity to modify routines mindfully, individual resilience endures up to a breaking point when stressors aren't addressed for too long (Masten, 2014), leadership can be questioned and lose its directive power if it's not able to quickly address the issues at hand (Staw et al., 1981).

However, before and after the first answer to a crisis or a near-miss, in organizations that manage to avoid crises altogether (Roberts, 1990), there is another phase in which these assets or endowments are created for future use and risks are mitigated, or preemptively coped with.

The ability to deal with a crisis is dependent on the structures that were developed ex-ante (Weick & Sutcliffe, 2001), as the time constraint of the event doesn't allow the creation of new resources due to their "stickiness" in the short run (Teece et al., 1997), nevertheless changing environments can be addressed through gradual adaptation in business as usual times, focusing on the fit between the firm and its niche (Linnenluecke & Griffiths, 2010). The business model and the firm's strategy, as well as the complementary assets which enable their functioning, can be dynamically adjusted to fit secular trends, chase opportunities and develop protective factors (Hamel & Valikangas, 2003), and this is primarily achieved through dynamic capabilities which allow the sensing and seizing of opportunities and the maintenance of competitiveness, activities that ultimately shape the organization's unique asset base (Teece, 2007).

Following Masten's (2014) and Williams et al. (2017) view of adaptive systems and protective assets as the bases for resilient behaviors, preparing and responding to untoward events is normal, but as endowments increase a system can cope with more risks. Individuals in particular obtain similar levels of performance in high and low risk environments if their resources and capabilities are enough. Teece et al. (1997) on the other hand argue that valuable, rare and inimitable capabilities create resources and establish durable competitive advantage in an organization, thus developing capabilities such as mindfulness, flexibility, routines that develop psychological capital are all investments in resilience that contemporarily benefit an organization's position in its market, as stressed for example by Sheffi & Rice (2005). The same authors though warn practitioners against developing excessive slack resources, which are costly: the theme emerges also in Pettit et al. (2010) who stressed how excessive capabilities erode profitability while excessive vulnerabilities would result in additional risk, which, if cumulated, leads to crises both in operations (Perrow, 1984) and strategic decisions (Hamel & Valikangas, 2003).

Consequently, endowments, assets, capabilities and in general the protective factors which allow a system to maintain function and perform well under duress should be built with a clear idea of the risks that are ordinarily and extraordinarily faced by the organization, balancing investments in accordance with the requisite variety of the context or niche in which it is operating. Available resources and the repertoires of responses should be at least as complex and nuanced as the problems that the system must withstand, structuring inherent resilience in a way which allows coping with uncertainty to be normal. Roberts' (1990) analysis of how multiple protective factors are built to face all possible hazards and crisis situations in nuclear aircraft carriers, at the expense of efficiency, shows that systems can be unbalanced even toward excessive reliability.

This approach though isn't enough to ensure safety and performance in case of unforeseen variety, the moment when static resilience is required: some organizational slack which can be used for addressing extraordinary events, whether they are external threats or opportunities or the concurrent manifestation of multiple risk factors, must be stored in the system so that it may deplete or employ these resources instead of completely losing its function and structure. Quite often, partially explaining the normality of resilient behaviors, this "hidden slack" isn't immediately visible before the crisis occurs, as evidenced by Meyer's (1982) analysis of Community Hospital, Gittel's et al. (2006) view on the relational capital of Southwest Airlines, the ingenuity manifested by nuclear aircraft carriers' officers in dealing with unexpected weather conditions (Roberts, 1990), the opportunities for improved decision-making which arise from cutting overhead (Teece, 2007) and diffusing power to front-lines in hierarchic organizations (Weick & Sutcliffe, 2001).

A mindful approach to structuring this "emergency" slack warrants for an explanation of why each protective factor is stored and which kind of latent, generic risk factors it can contrast. Moreover, firms could actively choose which risks are better confronted through "normal" measures, including them in their coping range, and which could be addressed with deliberately built slack resources. A comprehensive example can be found in Morgan Stanley's response to the 9/11 terrorist attack (Walsh, 2001), where an evacuation plan and backup offices were established beforehand. These were already built slack

resources, but during the crisis what really mattered were the leadership, quick decision-making processes and accountability of employees (endowments which were unrelated with crisis prevention per se but were vital in optimally dealing with the issue). This allowed 3,694 of the 3,700 employees of the largest tenant in the World Trade Center to survive the event, while afterwards, thanks to the "employees' welfare first" ideology of the managers, normal performance was quickly resumed thanks to the aid of over 300 grief counselors which helped workers in facing trauma and coping with their emotions, restoring the system's resilience in all the three dimensions, individuals, groups and system, identified by Staw et al. (1981).

Leadership, accountability and the "employees' welfare first" culture weren't backup systems structured to be activated in case of terrorist attacks, but rather capabilities that could be flexibly deployed if the need raised, moving decision-making from a process that lasted six to twelve months with many "painful meetings and bruised egos" to a process that produced decisions every five minutes (Walsh, 2001). These elements were "hidden slack" for the organization, but in structuring organizational resilience they could be considered as sources of static resilience in case of unanticipated threats.

An even more immediate example of how a firm can organize its resilience-enabling endowments to address risk is debt. By knowing the degree of flexibility that an investment requires, a firm can choose to invest primarily through equity or to employ debt to benefit from an optimal capital structure (Koller et al., 2015). If the company knows it can absorb resources from other revenue generating streams, or that through relational capital with other stakeholders it can forestall the risk of business erosion that might arise due to high indebtedness, it could actively embrace the risk of incurring in this debt. If these resources are unavailable on the other hand, it could rely only on equity to benefit from a less constrained capital structure.

Organizational resilience then relates to coping with unexpected adversity as much as it deals with mindful resource and capabilities building and risk assessment to find a balance that is both economically viable and reliable enough to maintain functioning under duress.

The balance can be achieved through the careful creation of systems that provide competitive advantage without incurring in excessive vulnerabilities, and that can be reconfigured to address threats and predicaments. The questions that this view rises are where this balance point can be found, how much risk can be assumed before additional resilience-enabling capabilities should be developed, which assets and risks exist and the trade-offs between foregoing an asset (thus increasing risk) to invest in another.

The high contextuality of this perspective makes generalizations tough, as it considers firm-specific capabilities and resources to be the key through which resilience is achieved. What a risk or asset is might be clear theoretically, but high indebtedness, excessive turnover, the absence of a responsibility and accountability culture might have different scales and meanings across sectors.

Much like in brand management then, where investments are made to reinforce the core resources and values attached to a brand, building for resilience should focus on reinforcing the adaptive systems which are related to the core activities and sources of competitive advantage of an organization.

Organizational resilience is thus a stance that applies mindful practices to shelter key resources while capitalizing from them to contain risk and build success for future periods, something more than a dynamic capability as intended in Teece (2007). This can't however translate directly to superior economic returns as capabilities and resources are a necessary condition for competitive advantage, but not a sufficient one, given that other factors, such as market conditions and power, also play a role.

Moreover, the pervasiveness and multilevel nature of resilience allows to intervene in different aspects of the firm, turning organizational resilience into something more than the mere sum of individuals' resilience (Williams et al., 2017) and allowing for improvements both within the organization and in the relationships and interactions with other relevant stakeholders.

2. CHAPTER 2

MEASURING RESILIENCE

2.1 Introduction

Chapter 1 focused on describing what organizational resilience is, its theoretical components and outcomes and the relationship between the construct and the development of resources and capabilities. Even though the concept was thoroughly fleshed out, showing its many facets and its pervasiveness, measures of resilience haven't been discussed thus far, requiring a chapter that elaborates on the matter.

Finding a scale to measure resilience is useful for an organization as it helps in demonstrating progress toward becoming more resilient and it highlights the ties between this factor and competitiveness (Stephenson, 2010). Moreover, it provides a basis for scientific interventions that are meant to improve resilience and it could help in pinpointing the balance between risks and protective factors that was discussed earlier, while also allowing benchmarking with other organizations as well.

The issue is that resilience is linked with social and cultural factors within the organization (Stephenson, 2010) and its supply chain, as shown earlier, and not exclusively with a low indebtedness or the firm's size and other readily measurable dimensions. Moreover, its impact on performance is difficult to discriminate as resilience is mostly concerned with building resources for the organization, which may translate in competitive advantage but does not do so assuredly, as more factors like market power and the overall economic situation of the regions in which the organization operates also play a role. In fact, a study concerned with understanding how a resilient approach influenced results after an earthquake in New Zealand confirmed a stronger impact on preserving or altering the resource base of a firm, rather than its performance (with the

analysed constructs, a proactive posture and the ability to integrate resources from external sources, explaining only 3% of the variability in net profit) (Battisti & Deakins, 2015).

These difficulties are also related to the absence of a clear definition of "organizational resilience" which led different authors to develop alternative frameworks to measure this dimension: some are more oriented to workers' resilience and how it influences the organization (Mallak, 1998, Mallak & Yildiz 2016, Walker et al., 2014), some with industry or regional level resilience, taking a perspective which is oriented primarily toward economic theory (Rose, 2004; Garmestani et al., 2006; Rose et al., 2013). Other perspectives were concerned with safety and crisis management in firms (McManus et al., 2008; Patriarca et al., 2017). All these points of view tackle different aspects of resilience and shouldn't be neglected, just like in the previous section the analysis of resilience across different levels in an organization allowed to enrich the discussion.

A common aspect though is that these measures are relative, mostly due to how context specific resilience is. Markman & Venzin (2014) attempted to build a more quantifiable index based on the idea that resilience was a "persistent superior performance", but the problems with such a definition have been discussed above. The chapter will show these main trends in resilience measuring, showing their benefits and limitations and the contribution to the overall literature on the subject, and whether they can be adapted to understand the risk-protective factors dichotomy that is adopted throughout this thesis.

2.2 Insight from Individual Resilience Measurements

Understanding and quantifying resilience at an individual level is the first step to work on organizational resilience, as crises can lead decision makers to being overcome by events (Roberts, 1990, Weick & Sutcliffe, 2001) deeply affecting how a firm confronts tense situations. Mallak (1998) was one of the first authors who attempted to measure how employees could show resilience in their workplace, displaying positive adaptive behaviors that were matched to the immediate situation with minimal psychological stress.

As resilience is a concept which is close to mindfulness, Mallak (1998) tried to capture its underlying constructs: bricolage, described as the ability to work under pressure, access appropriate resources and create order out of whatever is available; attitude of wisdom, which is a mix of curiosity, skepticism and a reliance on multiple information

sources; and the presence of a virtual role system, the capacity of a team to work even without all of its members thanks to its vision, purpose and members' ability to assume different roles.

Six factors had emerged in his first research, which measured goal-directed solution seeking, problem avoidance, critical understanding of the situation, role dependence, information source reliance and resource access in employees in the health-care sector. However, his later studies (Mallak & Yildiz, 2016) managed to reduce the measured factors to four: active problem-solving, team efficacy (how well an individual works as a team member to achieve a goal important to all), confident sense-making, and bricolage (constructing solutions only with readily available resources).

Moreover, in this study, Mallak & Yildiz (2016) highlighted, following the trend in psychological analysis of resilience, how these factors are protective factors for an employee, counteracting individual risk factors and enabling the taking of action in the face of adversity. This perspective is relevant as, combined with Masten's (2014) contribution, these elements can be interpreted as positive adaptive systems related to learning, thinking and self-regulation, and they can be improved to bolster organizational resilience.

However, Walker et al. (2014) stressed how even though individual resilience is the basis of organizational resilience, the latter is more than the sum of this capability in each employee, especially if "second order resilience" is considered, which is the development of new capabilities that improve this dimension rather than the simple ability to bounce back from adversities. This can be built through the organization, showing how there is another measurable and improvable layer of resilience: the authors (Walker et al., 2014), whose work draws from the New Zealand researches from the "Resilient Organizations" team, reported the main themes and measurable elements that may contribute to resilience building in their approach, which are shown in the table below.

Table 2.1 Themes and Elements of Resilience

Resilience Themes	**Leadership and Culture**	**Networks**	**Change-Readiness**
Elements	Leadership	Effective Partnerships	Unity of Purpose
	Staff Engagement	Leveraging of Knowledge	Proactive Posture
	Situation Awareness	Breaking Silos	Planning Strategies
	Decision Making	Internal Resources	Stress Testing Plans
	Innovation & Creativity		

Source: Walker et al. (2014)

This research thread will be further analyzed in paragraph 2.4. The argument that concerns individual resilience measuring from Walker et al. (2014) is that employee's engagement and wellbeing (Staff Engagement), as well as Leadership, lead to an enhanced organizational resilience through measurable changes in individuals. High involvement from staff members in their job and organization led to more concern toward the firm and spurred people to go beyond what was required or expected off them. This increased workforce adaptability, showing a tight connection between individual and organizational resilience.

Through Masten's (2014) lenses, more individual adaptive systems can be recognized in these elements: social networks, attachment, communities, reward systems. These factors improved resilience in young people and are expected to perform even among employees. More scales and dimensions are available to measure individual's resilience, such as Connor-Davidson's one. As they deal primarily with resilience to traumas and psychological disorders, they aren't included in this study. However, they might be useful in providing more means to assess employees' overall resilience, becoming useful tools for the understanding of which dimensions can be improved by a firm to benefit its own organizational resilience.

2.3 Insight from Regional and Sectorial Resilience Measurements

According to Rose (2003), organizational resilience emanates both from internal motivation and public or private policies. This means that to properly measure how a system can cope with adversity, it can simulate how its performance is affected under duress and whether a different policy or decision can mitigate or exacerbate the effect. The perspective embodies the idea that resilience ensues in moments that cannot be considered as "business as usual", and that cannot be addressed by regular risk management in firms.

The author doesn't assume the point of view of a single firm, but rather the performance of a region: the study calculates the maximum regional output of water utility providers under normal conditions, adopting a standard fixed-coefficient approach. Afterwards, the effects of a possible disruptive event, an earthquake, are simulated in two different scenarios: with and without a prevention policy. In the first case, older pipes are replaced with plastic ones, while in the latter no change is applied to the distribution network.

The results show that direct water outage would be estimated at 50% in the case with no changes, with a total output reduction of 33,7%, whereas if the pipes are substituted water outage is limited to 31% and output reduction to 21%. This method allows to easily compare the effectiveness of the policy from the resilience point of view by checking the impact on the firm's output and can provide practitioners with an interesting tool to evaluate and compare investments by understanding the output variation in case of an unexpected and untoward event, allowing to compute the expected value of the solution. In this example, without considering other benefits from the pipes change policy, the region would feature 19% less water outage and 12,7% lower output reduction in case of an earthquake or similar facility-disrupting crisis.

For more ordinary shocks, Rose (2013) suggests computing direct static economic resilience, which is the ability of a firm or sector to absorb a shock (such as the curtailment of some critical inputs) as the percental avoidance of the maximum economic disruption that such shock would bring about. A good starting point is a linear relationship between an input supply shortage (f.e. tonnes of wheat) and the related output (f.e. tonnes of produced wheat flour). Economic resilience is how this linear relationship is disconfirmed and up to which point.

The model is grounded on economic theory alone, consequently showing a flaw that Rose (2013) himself highlighted, but it can still provide a basis to quantitatively understand the impact of decisions throughout a supply chain or to inform decision-makers about the expected additional resilience that a new policy can deliver. This scenario analysis perspective relies on the idea that managers can foresee possible untoward events which go beyond the usual coping range of their organization, bringing it closer to a crisis management study than a resilience study, but exploring different low-probability, high-impact events can increase the response repertoire of the organization to similar events, and this ultimately improves resilience (McManus, 2008) and suggests a possible way to measure its outcome.

Another relevant contribution from sectorial resilience analysis comes from Garmestani et al. (2006): the authors used low volatility in employment within an industry as an approximation for higher resilience, considering that more resilient industries would feature less variation in their firms' dynamics, requiring the adding or shedding of employees less often. The previous chapter discussed how soft organizational aspects like

culture are relevant to foster resilience: this suggests that even at a firm level a lower volatility of employment can be a sign of resilience, as Weick's mindfulness has more time to develop in the members of the organization and to enable resilient behaviors in employees.

Lastly, both Garmestani et al. (2006) and Rose (2013) attempted to grasp whether firm size could influence resilience, albeit at a sectorial level. Their findings suggested that a higher variability in the firms' dimensions within a sector led to higher resilience, as they constituted a more diversified economy texture which was better able to withstand shocks. At a single firm level, the authors argued that size leads to more formalization, task differentiation and specialization, constituting a liability in case of resilience-testing shocks, however larger firms could still be more resilient than smaller ones due to their better ability to cope with these shocks thanks to their improved knowledge and the larger resource stock they can draw from. Size would become an interesting topic for studying resilience in later contributions, showing how it brings both benefits and limitations for adaptive responses (Stephenson, 2010; Markman & Venzin, 2014; Battisti & Deakins, 2015). This aspect is further analyzed at a single firm level in the empirical part of the dissertation.

2.4 Measuring Organizational Resilience

After drawing some insight from other streams of research on resilience, this paragraph reaches the core of the chapter: understanding which scales have been developed to measure this construct at an organization level. Various approaches have been attempted, and the most prominent will be listed below: one particular stream of research, the "Resilient Organisations" project from Canterbury University in New Zealand, will be explored in detail as it includes most of the theoretical perspectives analyzed in the first chapter. The final part of this section will critically discuss the different contributions.

The first method that will be considered is the VOLARE measure from Markman and Venzin (2014), which is somewhat of an outlier. This view assumes that return on equity (RoE) is a suitable long-term performance indicator as long as its volatility is contained, compared with the industry average. This happens because RoE measures include both external market forces and firms' own results, therefore a positive, stable value highlights reliable operations which aren't altered by contingent factors, offering a measure for resilience interpreted as sustained above-average profits.

The shortest period required for a proper evaluation is 10 years: first, a homogeneous sector is chosen, then the average ROE for each firm and its volatility are computed. Afterwards, the results are analyzed through a logarithmic regression. Clearly, hardly quantifiable measures such as leadership styles, culture etc. are eschewed from this analysis, but so is temporary advantage.

A high VOLARE score is given by above average RoE with lower than average volatility: it helps in showing whether a growth path is sustainable over a 10-year period and whether the risk level that is assumed is fitting or not. The principle of affordable loss is favored, with resilience (i.e. high VOLARE scores) being tied primarily to organic growth than to all-or-nothing opportunities.

The authors (Markman & Venzin, 2014) analyzed the bank sector and checked for significant differences between organization characteristics and high VOLARE scores. Size appeared to be a shock absorber that shielded firms against unexpected competitive forces and market turbulence, along with the stability and solidity of a firm's home market. The impact of these components was connected to a reduced lower-bound volatility in performance, though this could also be achieved through a strategically focused internationalization which allowed spreading risk in different geographical markets.

A proper environment, given by healthy macroeconomic policies enhancing market efficiency and stability and even social development, along with product diversity which helps in spreading risk, had a lesser but still relevant positive effect on VOLARE scores. Despite this, delving deeper in the findings, the authors stressed how these factors weren't what thoroughly explained high VOLARE scores: firms like Banco Santader, which featured a strong organizational value system, specialized capabilities and a focus on enhancing their competences rather than diluting them, were the ones showing the highest results consistently.

These elements suggest once more how capturing resilience only through performance-related indicators doesn't provide a comprehensive picture of the concept; moreover, different conceptualizations of resilience lead to different measures.

The VOLARE method has another fault which other approaches attempt to overcome: it's a lagging indicator which relies on past measures of profitability rather than on the current performance, becoming a useful tool for scenario analysis and for checking

historic results, but losing its value for the assessment of short and medium term organizational resilience. Starting from this criticism, the next reviewed approaches include qualitative information as well, focusing on softer organizational aspects. The contribution to resilience of elements such as adaptive capacity, mindfulness, culture, mentality silos breaking, and other aspects is captured.

To better understand the similarities between these different perspectives, they will be ordered in table 2.2, showing which are the primary theoretical factors that are analyzed. Organizational resilience encompasses different aspects in a company, thus breaking it down in its components is the first step to create a relevant measure.

Table 2.2 Different Perspectives on Measuring Resilience

Author(s)	Year	Resilience Indicators	Overall Perspective
McManus et al. **Seville et al.**	2008	Situation Awareness Management of Keystone Vulnerabilities Adaptive Capacity	Resilience in the face of crisis situations, coping with or adapting to disasters
Somers	2009	Goal-Directed Solution Seeking (absence of) Risk Avoidance Critical Situation Understanding Virtual Role System Reliance on Multiple Information Sources Access to Resources	Resilience as being able to bounce back and to become better able to cope with surprise, thrive in the face of adversity
Stephenson	2010	Adaptive Capacity Planning Capacity Size Participation in Exercises Organizational Performance	Refinement of McManus' measures, 2 factors instead of 3: adaptive and planning capacity. Other dimensions partially explained resilience scores
Lee et al.	2013	Commitment to Resilience (*) Network Perspective (*) Situation Awareness Management of Keystone Vulnerabilities Adaptive Capacity	Resilience as ability to adapt, being reliable, managing disruptive challenges, thrive during crises
Walker et al.	2014	Collaboration (Internal & External) Employee Engagement & Wellbeing Learning from Experience Leadership – Senior & Middle	Starting from "Resilient Organisations" project, it's a view primarily focused on Human Resource Management
Battisti & Deakins	2015	Proactive Posture Resource Integration (from external network) Age (negatively correlated)	Role of dynamic capabilities in maintaining resource base and performance after a crisis or disaster, creating resilience
Organizational Resilience Index (BSI Group)	2017	Leadership (includes financial aspects) People elements Process elements Product elements (includes innovation) Medium size as the most resilient Age negatively correlated with resilience	Comprehensive measure starting from Denyer's (2017) review. Organizational resilience is achieved by balancing preventative control, mindful action, performance optimization and adaptive innovation
Patriarca et al.	2017	The following Dynamic Capabilities: Responding Monitoring Anticipating Learning	Safety Management approach, resilience engineering to cope with complexity and maintaining functioning in face of threats
Factors highlighted with a (*) have a solid theoretical background but had weak explanatory power during the studies			

The views will now be discussed in detail, showing their overlapping themes. All of them adopted structured surveys to measure resilience and checked which other aspects had an impact on these values, such as size, firm age, firm performance.

McManus, Seville et al. (2008) built the foundation of the "Resilient Organisations" project, an attempt to identify factors that enhance resilience in organizations to improve communities' resilience after an earthquake in New Zealand. To measure the construct, three main factors were analyzed: situation awareness, management of keystone vulnerabilities and adaptive capacity. The first factor captures how a firm understands its stakeholders, their interrelation and the environment in which it operates, with a deep understanding on which are the minimum operating requirements for the organization. It allows to prevent and mitigate risk. The second is an evaluation of how a firm addresses its vulnerabilities, showing which risks are already in place and whether they are critical or not for the organization. A vulnerability with a high criticality, meaning that the vulnerable component's disruption can lead to the impairment of the whole system, is managed poorly if the firm is not prepared to deal with it during a crisis. Lastly, adaptive capacity includes the culture and dynamics of the organization that allow for timely and appropriate decision-making, including the ability to alter its structure and to withstand perturbations.

Figure 2.1, taken from McManus et al. (2007) shows the components of each of these categories. The authors however didn't attribute any weights to the measurement of each component or category: each of them provides an equal contribution to the overall measure of relative resilience. The survey provided a numeric value ranging from 1 (very low) to 5 (very high) for each component; afterwards, this was collated through a multiplication with the value of other components within the same category to understand the total performance of said category. The multiplication between the three categories provided the "relative overall resilience" value, which returned a resilience profile of the studied organization.

Figure 2.1 Resilience Indicators

Resilience Indicators					
Situation Awareness		**Management of Keystone Vulnerabilities**		**Adaptive Capacity**	
SA_1	Roles and Responsibilities	KV_1	Planning Strategies	AC_1	Silo Mentality
SA_2	Understanding of Hazards and Consequences	KV_2	Participation in Exercises	AC_2	Communications and Relationships
SA_3	Connectivity Awareness	KV_3	Capability and Capacity of Internal Resources	AC_3	Strategic Vision and Outcome Expectancy
SA_4	Insurance Awareness	KV_4	Capability and Capacity of External Resources	AC_4	Information and Knowledge
SA_5	Recovery Priorities	KV_5	Organisational Connectivity	AC_5	Leadership, Management and Governance Structures

Source: McManus et al., 2007

Some clarifications on these components are necessary to understand how they overlap with other authors' perspectives. Roles and responsibilities consider the "virtual role system" theorized by Weick and measured by Mallak (1998). In fact, the "situation awareness" category features various concepts underlying mindfulness in organizations, such as the understanding of the environment and its connections.

The management of keystone vulnerabilities deals with already present (or absent) resources of an organization, measuring the reliability of physical and intangible assets that favor or hinder resilience. Redundant resources, network effects both from the supply chain and other stakeholders, readiness to crises given by culture and processes are included in this category. Finally, adaptive capacity primarily dealt with what enabled or hindered recovery during a crisis.

McManus et al. (2008) furthermore stressed how multiple resilience indicators were influencing each other, for example with Roles and Responsibilities being correlated with Organisational Connectivity. This points toward two ideas: that each indicator shouldn't be considered in isolation as several of them are intertwined and that competence in some dimensions begets competence in others, as conceptualized by other authors (Sutcliffe & Vogus, 2003; Masten, 2014).

Before discussing the development of McManus' theory, Somers' (2009) work is investigated, as it starts from Mallak's (1998) measures of individual resilience to create an estimate for an organization instead. In his Organizational Resilience Potential Scale (ORPS), Somers captures resilience as a pattern of actions, rather than a prescribed series of activities, that attempts to maximize the capacity of the organization to adapt to complex situations. The indicators that build the scale consider access to needed resources and the ability to fill multiple roles, drawing from Mallak's theoretical work, while the other four dimensions which are listed in table 2.2 focus on aspects closer to Weick's et al. (1999) concept of mindfulness.

Even though with several limitations, primarily concerning the fact that only public municipalities were surveyed, which implied a lower degree of control on budgeting in these organizations, the study underlines how mindfulness and single actors' resilience are a key feature for resilience and how both aspects can be estimated reliably; moreover, the overlapping measured themes with McManus' indicators show how different streams of research point toward the same dimensions to establish a scale to evaluate organizational resilience.

The indicators identified by McManus were thus verified even in other unrelated research. Consequently, it's unsurprising to find how they turned into the cornerstone for further scale developments. In 2010, Stephenson used McManus' indicators to benchmark the resilience of various industries in Auckland. Factor analyses consistently featured the best results with two factors, describing firms' adaptive capacity and their planning capacity. This allowed the creation of a more parsimonious scale, resulting mainly from different wording of McManus' components, which led to the following model.

Figure 2.2 Stephenson's New Model of Organizational Resilience

Organisational Resilience Factors	
Adaptive Capacity	**Planning**
Minimisation of Silo Mentality	Planning Strategies
Capability & Capacity of Internal Resources	Participation in Exercises
Staff Engagement & Involvement	Proactive Posture
Information & Knowledge	Capability & Capacity of External Resources
Leadership, Management & Governance Structures	Recovery Priorities
Innovation & Creativity	
Devolved & Responsive Decision Making	
Internal & External Situation Monitoring & Reporting	

Source: Stephenson (2010)

Most of the used components are directly taken from McManus' (2008) research, while others have been rephrased or moved within categories. Each component weighed equally to evaluate total resilience. Single constructs were measured through questions that were similar to the ones used in McManus (2008), however the final resilience score was assessed through a benchmark at an industry level, showing the relative performance through the percentile in which the firm positioned itself. Stephenson (2010) judged as "fair" resilience measures which were within one standard deviation from the mean; further detachment from the industry average indicated superior or below-average performance (within two standard deviations, and beyond for extreme results).

This provides an excellent tool to analyze industry level resilience and relative performance within peers, but if a benchmark or a reference study is unavailable, the methodology might lose part of its value. Regardless, adopting the scale can allow both for longitudinal studies within a firm, showing which areas were improved or undermined, and for an overall assessment of the perceived resilience of the organization.

Another relevant finding was that size, the participation in emergency exercises and organization performance could be used as factors which explained portions of variability in the "Organisational Resilience" score. 6% of the variability could be explained by size, 52% by the participation of exercises in resilience within the firm and different measures of performance, such as a positive and stable cash flow (16%), high profit to sales ratios (11%), high returns on investments (15%) and caring for staff (8%), could also be used to understand variance within the study. However, none of these measures provided evidence for direct causality, in contrast with the components of resilience. Nevertheless, they show how an active approach to resilience can have a strong impact on its improvement, and that there are significant links between performance and resilience.

The author (Stephenson, 2010) stressed how these dimensions primarily showed that firms with more resources to draw upon during crises can feature higher resilience scores, thus working on improving the core business of an organization is also beneficial to its resilience. Even though causality wasn't proven the other way around, the analyzed constructs provide resources that boost performance in business-as-usual times, though the findings couldn't clarify to which extent.

After Stephenson's work, Lee et al. (2013) tried to summarize the different approaches attempted by the "Resilient Organisations" project: even though no relevant findings

emerged, the authors discussed two more constructs that were tested and consequently discarded after their factor loading was found less effective compared to Stephenson's and McManus' models. They should've provided a measure of "Resilience Ethos", the orientation to being resilient of an organization, through the measurement of its commitment to resilience and its participation in the industry network (Network Perspective).

Stephenson (2010) already disconfirmed these two components of resilience, but so did Somers (2009) who highlighted how the municipalities' involvement with their community, just like involvement in the industry community, had no statistically relevant explanatory effect on resilience measurements.

Walker et al. (2014) were the next to review the "Resilient Organisations" findings, and summarized the main themes as shown in table 2.1. However, they were concerned with improving organizational resilience through Human Resource Management practices, and thus they suggested four different aspects that could be analyzed: leadership, collaboration (internal and external), employee engagement and wellbeing, the capacity to learn from experience. This perspective is just a different take on the same theme, but it stressed once more how aspects connected to people are the most relevant to improve resilience in organizations, and thus they deserved more detailed scales which weren't equally weighed as Stephenson's or McManus' components.

Another contribution from New Zealand's researchers came from Battisti & Deakins (2015), who tried to capture how two specific dynamic capabilities, which were already considered in past studies as relevant to breed resilient outcomes, impacted on firms' resource base and performance volatility after a disaster. Proactive posture, described as the attention and strategic focus to changes in the environment and tightly related with learning, was deemed a capability that could defend a firm's resource base during crises while also reinforcing resource integration, the second capability which focuses on acquiring and integrating new resources from external sources in the event of a disaster. Both had an impact, explaining part of the variation of firms' resources after a disaster-related change (around 17%).

This effect shows that working on capabilities that favor resilient outcomes, however they may be conceptualized, has a positive and measurable effect on preventing resource degradation after a crisis and on recovering them after the event. Nevertheless,

maintaining or improving the resource base after a disaster had a lesser, yet significant, impact on performance, explaining 3% of the variation.

Building dynamic capabilities that enable resilience is thus a reliable method to protect the resource base of an organization in case of crises. Teece (2007) highlighted how these capabilities also provided competitive advantage and resources in business-as-usual times, however performance is affected by other factors. Therefore, measures of resilience should consider primarily whether the resource base is positively affected by a resilient approach, rather than performance: Stephenson's findings (2010) couldn't capture a clear causal effect on economic dimensions for this reason.

Finally, Battisti & Deakins (2015) found that firms were subject to a liability of oldness. As their age progressed, they became less able to respond to crises, with older firms having their resource base more negatively affected after disaster events. This verifies empirically Weick & Roberts' (1993) hypothesis for which older firms with established routines are less likely to feature resilient answers in face of threats, and was further confirmed by the Organizational Resilience Index (BSI Group, 2017) which will be discussed now.

Although this index from the British Standards Institution (BSI Group) is not an academic paper, it stems from the theoretical review performed for the Group by Denyer (2017). The institution attempted to capture, starting from this theoretical background, which were the most important dimensions, according to practitioners, that led to a highly resilient organization. Four recurring themes emerged, each with different underlying constructs, which are summarized in the following table with their importance ranking within brackets.

Table 2.3 BSI Group Organizational Resilience Index Themes and Components

Resilience Themes	**Leadership**	**People**	**Process**	**Product**
Components	Reputational Risk (1)	Awareness, Training and Testing (10)	Information and Knowledge Management (5)	Innovation (6)
	Financial Aspects (2)	Culture (13)	Business Continuity (8)	Adaptive Capacity (12)
	Leadership (3)	Community Engagement (14)	Governance and Accountability (9)	Horizon Scanning (16)
	Vision and Purpose (4)	Alignment (15)	Supply Chain (11)	
	Resource Management (7)			

Source: BSI Group (2017)

Just like in Stephenson's (2010) research, the index considers sectorial average estimates and creates a benchmark through which organizations can understand how they are performing relatively to peers in dimensions that favor resilience. The adopted perspective however tries to distinguish which aspects are the most relevant for organizational resilience, suggesting that not all dimensions are perceived as being equally important. This allows to establish priorities on which elements should be improved first and to compare the perceived performance with the criticality of each element. Reputational risk, for example, was deemed as the single most relevant aspect to maintain resilience in the long term, with firms actively trying to perform well in this dimension. Supply chain, on the other hand, has a perceived average impact on resilience, but most firms admit that they manage this aspect poorly, which constitutes a moderate risk to resilient outcomes.

The last discussed measurement method for resilience adopts a different perspective, focusing on safety management and stemming from the resilience engineering field of research, and was proposed by Patriarca et al. (2017). Its relevance is tied to how, just like in BSI's Index (2017), elements of resilience are thought to have different impacts on overall resilience.

The construct is first divided in four cornerstones (the Resilience Analysis Grid), which are the abilities to respond, monitor, anticipate and learn from threats. The authors suggest maintaining a similar weight in the scale for these factors. Their elements, however, are extremely context-specific: the ability to respond for example may rely on experience, internal protocols and teamwork, but different industries might place a different emphasis on either of these components. An environment where tacit knowledge is more relevant might value more experience and teamwork over internal protocols.

Consequently, each construct is weighted through the analytic hierarchy process, a framework which allows to assign relative importance to each item in the grid and to understand the different impact on the total score.

2.5 Discussion

If a formal definition of organizational resilience is not yet agreed upon, its estimation methods are even more debated. The different takes that have been discussed come with both unique insight and flaws, thus finding the most fitting approach appears to be primarily a matter of what the research is attempting to isolate.

Markman & Venzin's (2014) VOLARE scale is appealing due to how its underlying components are quick to measure and readily available (especially for public companies) but using RoE to understand resilience leaves some factors out of the equation. This approach could benefit from using Enterprise Value variations (and their volatility) as an additional dimension through which VOLARE is computed. This way, the index would consider all the resources comprised in the organization rather than its yearly performance only: the previous section showed evidence of how resilience has stronger ties with resource building than with the economic bottom line; if the enterprise value is estimated through a discounted cash flow approach (Koller et al., 2015), more variables are accounted for, including the information on whether profits were generated through sustainable investments that, through capital expenditure, keep on renewing the resources of the firm or through divestments that improve RoE measures in the short term, but deteriorate profitability in the long term. Even with this change though, VOLARE measures are still lagging indicators that can only verify whether the firm was managed with a resilient approach in the past, but their predictive value is questionable.

Mallak & Yildiz (2016) Workplace Resilience Index, on the other hand, is an excellent tool for human resource management practitioners to evaluate and improve individual resilience, but it doesn't capture the whole organization's capability to respond to threats.

Rose's (2013) methodology is a precious instrument to build scenario analyses that can be employed to assess how well a single investment in resilience would perform. It's bound to evaluate *ceteris paribus* situations, with only one policy being put in place, yet it can help in comparing which would be the optimal investment in different resilience components. The issue is that it can capture the overall static and dynamic resilience of

an organization, with and without the new mitigating policies, but it fails in separating the components of resilience in the base case scenario.

On the other hand, the scales that were developed to assess organizational resilience, summarized in table 2.2, are the ones addressing most of the themes that concern this thesis, as they attempt to grasp a measure which includes individual, group and inter-organizational aspects. Though McManus' et al. (2008) and Stephenson's (2010) models are more explanatory from a qualitative point of view, they might be improved through the weighing of each resilience component according to the importance for the sector, as suggested by Patriarca et al. (2017). This could be achieved either through the analytic hierarchy process or through an evaluation of which generic risk each resilience factor is attempting to mitigate. The purpose is primarily to understand how different components might be more or less useful to develop an underlying resilience factor: the next studies that wish to measure organizational resilience should attempt to pinpoint not only if there are some components that are chiefly important, but whether this applies across different firms or sectors as well.

The measures from BSI Group (2017), McManus et al. (2008) and Stephenson (2010) managed to capture most of the adaptive systems that the literature has identified thus far, yet, as argued by Pettit et al. (2010), an excellent resilient profile might not be the optimal target from a business standpoint, and even considering how improving single elements of resilience has positive effects on other dimensions as well (McManus et al., 2008; Stephenson, 2010), the impact, for example, of establishing business continuity plans or leadership might have varying effects across multiple organizations and sectors (Patriarca et al., 2017).

Some more aspects weren't considered: first, risk factors and the interplay with the protective factors weren't analyzed quantitatively in the reviewed literature. Arguably, a low score on some resilience elements, such as silo mentality, can be interpreted as an indicator of risk, following the insight found in Masten (2014). Moreover, an organization could ask itself: how often is this protective factor put to a test? How vulnerable is the organization to a change of that element? What would happen if that specific component of resilience deteriorates? Would the organization risk collapse, or would it still adapt?

This leads to a second conclusion: measures of resilience should capture how sensitive each element is to change and the negative effects on performance measures stemming

from changing each protective factor to understand whether they are critical or not for the organization. Could a company still survive if its excellent relationship with employees is damaged? Can it withstand financial difficulties, or any misstep in this area might cause severe disruption across the organization? Analyzing how a variation in each resilience element alters the outcomes for the firm can provide a better picture for the managers, who would then be able to focus resilience investments in an area instead of improving components that aren't constantly subject to stress.

Another aspect that was highlighted in Chapter 1 is missing from the available scales to measure the construct: organizational resilience can be theoretically split in "day-by-day" resilience, which is the normal coping range of the organization and the amount of variability it can manage without having to resort to additional resources or capabilities, and static resilience, when unforeseen events cause the organization to be confronted with novel situations that require adaptability instead of the typical responses within the coping range. The analyzed scales assume that there is no difference between improving elements that continuously buffer against volatility, for example a good knowledge and information management within the organization, and the factors that activate only in case of more complex situations, like giving recovery priorities. The difference could be relevant and should be tested, as it would divide resilience building in a phase working specifically on addressing frequently appearing variability and another one devoted to brace the organization against unlikely, yet potentially catastrophic, events.

One of the conclusions from the previous chapter was that the response repertoire of the organization should be at least as complex and nuanced as the situation it has to deal with, thus another dimension for the analysis of resilience could be the pairing of each component with the risk it helps controlling: is it an unlikely risk with the possibility for a huge impact, or a constant risk factor that should be held in check during business-as-usual times? This would provide scales that factor in risks, following the most recent trends in this research field which do not even consider a behavior as resilient if it's not facing any risk factor at all (Masten, 2014; Williams et al., 2017), which can be used to direct investments in resilience with even more heed. Furthermore, this approach could help researchers in identifying if some elements are more "generic", being useful to improve resilience for any firm in any sector and situation, or more specific, either for the analyzed sector or the contingent situation that the organization is facing, allowing also

the split between elements that improve the business-as-usual coping range and components primarily devised to enable adaptability during unforeseen crises.

Lastly, the effects on performance indicators after the improvement of resilience elements have not been thoroughly understood yet: Soosay (2008), Fantazy et al. (2009) and Wei & Wang (2009) identified some direct ties with firms' results, stressing how some components of supply chain resilience improve financial indicators while others enhance customer satisfaction or other less evident dimensions. Many other authors cited across this thesis also hinted at the connection between resilience and superior performance. A full understanding of these effects might be difficult to reach until an agreed and shared theoretic definition and measure of organizational resilience is devised, yet scholars who wish to contribute to this field of research should bear in mind the practical importance of understanding how resilience affects the overall organization output, just like in Rose (2013).

2.6 Conclusions

The previous paragraph raised many questions, and developing a comprehensive measure of resilience which accounts for all the details that were noted is still a daunting feat. Table 2.4 summarizes the inquiries that have appeared thus far, laying the basis for the remainder of this work which will attempt to identify patterns that verify or disconfirm the theoretical deductions that were presented.

Table 2.4 Questions Raised after Literature Review

Theoretical Question	Basis for the Question	Practical Implication
Can Resilience Components (protective factors) and the associated risks they help mitigating be divided between firm specific and generic components?	Resilient answers are often divided between normal behaviors, which is adaptability within the typical coping range of the organization (inherent resilience, as defined in Rose, 2004, or mindfulness during operations, as defined by Weick & Sutcliffe, 2001), and extraordinary feats, such as Southwest Airlines' or Morgan Stanley's responses to crises (Gittel et al., 2006; Walsh, 2001). Generic protective factors are mostly slack resources which can be depleted during a crisis to absorb the shock, focusing primarily on the development of endowments for the firm, while specific protective factors are active attempts to expand the coping range of the organization outside of crisis times, for example through the reduction of vulnerabilities.	A positive answer would clearly identify which factors address low probability, high impact events (generic risks and protective factors) through resource building and which are primarily concerned with mitigating typical operational risk. This would help practitioners in choosing where and why they would invest in resilience building factors, according to the needs of the organization.

Is there a tipping point in which risks overcome protective factors, leading to a crisis that threatens the survival of the organization? Can it be identified preemptively?	HRO literature identified this situation when operators are "overwhelmed by events" and cannot address all the contingent variability. A shift in customers' preferences might be a minor nuisance for a resilient firm, or a devastating blow for a brittle organization which was relying heavily on the current habits of their clients. Only crises as intended in Staw et al. (1981) should be considered for this inquiry as manageable jolts are either within the coping range of the organization or can be answered to through static resilience.	Knowing beforehand if the organization may face a serious threat to its survival, either due to the deterioration of a protective factor or the appearance of a new risk, would be an important tool for managers to activate processes meant to restore organizational resilience before the crisis ensues.
Sheffi & Rice (2005) and Pettit et al. (2010) noted how risks (vulnerabilities) might have a different relevance for different organizations. Does this apply to protective factors as well, or do they have a similar importance? Can this difference be applied across sectors, or is it industry specific?	Masten (2014), McManus (2008) and Stephenson (2010) haven't weighted resilience components (or protective factors) in their studies. However, Patriarca et al. (2017) and BSI's resilience report (2017) suggest that there are differences between the importance of each protective factor.	If each protective factor is equally important, organizations could invest on any of them indifferently (from a resilience standpoint). If differences exist, investing in some specific factors should be the primary goal for decision-makers. If these differences are verified not only within an industry, but even across sectors, some resilience components should always be preferred to others.
When is a protective factor actively matching a risk? When are additional investments required? Is it possible to develop a unique mean of analysis to answer these questions?	Pettit et al. (2010) suggested to avoid an over-investment in resilience enabling capabilities (HROs like nuclear aircraft carriers are a perfect example of resilient systems that aren't economically optimized).	Developing resilience per se might require scarce resources which decision-makers would rather allocate to different projects. An understanding of which protective factors are considered as "active", meaning they constantly mitigate a risk or will be used in case of a crisis to address the new risks, or when they are "inactive", meaning that there is an excessive slack, would provide additional information for practitioners to direct their investments in resilience.
What's the precise impact on performance (in terms of avoided losses or direct output improvement) of enhancing specific resilience components?	The theoretical increase of competitive advantage through the improvement of dynamic capabilities has been theorized by Teece (2007). Effects on various performance dimensions have been highlighted in other works in this research stream, but the effects always seem to be context specific.	Understanding if there is a pattern in the effects on performance deriving from the improvement of a certain component would provide more information to managers, helping their decision-making processes.

The proposed questions are clearly intertwined, and most of them are concerned with understanding how and why resilience is built from its components and how it interacts with risks. Consequently, considering how a clear-cut measure of organizational resilience has yet to emerge, a survey would be inappropriate to test and understand the implications of these inquiries. Following Yin's (2009) perspective, a multiple case study methodology would be more appropriate, as this thesis is attempting to study a contemporary phenomenon in depth which is also strongly connected to its context.

Furthermore, attempting to provide a measure for these phenomena without verifying their existence beforehand would create a lapse in the chain of evidence, reinforcing the

need for theory-testing case studies. The next chapter will focus on attempting to outline a case study methodology that could reliably test these concepts.

3. CHAPTER 3

DEVELOPMENT OF THE CASE STUDIES

3.1 Introduction

A foreword is needed before moving to the definition of the case studies and their associated protocol. Yin (2009) implied that the first step to build a proper research is the understanding of the questions that the tool is meant to test and, possibly, answer to. Consequently, some definitions need to be formulated before the propositions, and their possible rival explanations, are laid out.

Starting from these constructs, the following paragraphs will first establish the frame and context within which the cases will be analysed, describing the reasons behind the choices, and then the procedure that will be adopted during the collection of the data. This will lay the basis for the fourth chapter of this dissertation, which will discuss and compare the results and the eventual changes applied to the protocol, if any were necessary.

Table 3.1 Definitions used in the Case Studies

Concept	Adopted Definition
Organizational Resilience	A stance that applies mindful practices to shelter key resources while capitalizing from them to contain risk and build success for future periods; also the maximum disturbance an organization can withstand before losing structure and control (Linnenluecke & Griffith, 2010)
Risk	Actuarially based predictor of undesired outcomes (Masten, 2001)
Vulnerability	Inability of a system to cope with adverse impacts or the degree of susceptibility to disruption of the system (Linnenluecke & Griffith, 2010)
Inherent Resilience	Typical response mechanisms that allow organizations to cope with variability through a business-as-usual approach (Rose, 2004)
Static Resilience	Answers to untoward and unexpected events that are beyond the typical coping range of an organization (Rose, 2013). In this phase, organizations' endowments may be depleted (Williams, 2017)
Coping Range	Range of variability an organization can normally cope with (Linnenluecke & Griffith, 2010). This doesn't require changes in the organization's operations or in the business-as-usual allocation of resources
Protective Factor	Resources, capabilities, endowments, adaptive systems that enable resilient responses and adaptation
Generic Protective Factor	A protective factor that is meant to address generic risks (low probability, high impact events, possibly unforeseen). A large amount of cash would be a typical example.
Contextual Protective Factor	A protective factor that mitigates the typical operational risk of the considered organization. An example could be a process to replace missing critical inputs.
Crisis	A major threat to a system's survival (Staw et al., 1981)
Resilience Threshold	Situation in which adverse impacts, stemming from risks and vulnerabilities, overcome both inherent and static resilience, or in which the system fails to adapt and maintain its function and structure. Similar to Linnenluecke and Griffith's (2010) threshold, though there wasn't a specific theoretical definition.
Active Protective Factor	A protective factor which absence or deterioration would certainly reduce the organization's performance (current or when static resilience is demanded).

3.2 Initial Propositions and Rival Explanations

Table 2.4 summarized some of the main concerns that the literature review has raised, but a proper methodology requires the clear statement of the research questions that will be asked and the possible alternative facts that might explain the phenomena (Yin, 2009). Table 3.1's contents will be used to provide sound definitions through which the propositions will be stated.

The first issue that will be considered is that protective factors can be built in many ways. Theory suggests that they could be divided in flexibility enabling factors and slack resources (Sheffi & Rice, 2005). The cases analyzed by Meyer (1982) feature both:

Memorial Hospital suffered heavy losses but relied on its financial slack, General Hospital simply adopted personnel reallocation to flexibly counteract the jolt. This division though doesn't clearly interpret responses to untoward events such as Southwest Airlines' one, described by Gittel et al. (2006), which was based on asking employees to bear salary cuts for a short time in exchange for the assurance that there wouldn't have been layoffs. The main difference can be identified when the concepts of static and inherent resilience are used in the analysis: General Hospital's response is a stark example of inherent resilience, as even its managers stated that the strike was treated in a business-as-usual manner through procedures that were typically enacted in case of personnel shortage. The processes were tailored to the organization and might not have been replicable as efficiently in other firms. They were meant to improve the coping range of the organization and worked accordingly.

Financial slack was clearly a buffer that could help in handling untoward events through static resilience, for Memorial Hospital. The employee-friendly culture of Southwest Airlines though cannot be described directly as a slack resource: it wasn't purposefully built to face economic downturns and it was operative, providing value for the organization, even in business-as-usual times. Nevertheless, it could serve as a buffer in case of a crisis thanks to the accumulated relational capital of the firm, which indeed costed effort to build up over time. Given these examples and other hints that were met across the literature, the research will attempt to answer to the following question.

> Q1 – Protective factors can be divided between the contextual and generic category. The first includes factors that constitute inherent resilience and are designed to improve the coping range of the organization, the latter includes factors that accumulate slack resources or hidden slack meant to be employed when static resilience is needed.

One more follow-up statement could be verified:

> Q1a – Generic factors are replicable across different firms and sectors with similar impacts on resilience, contextual factors are embedded in the organization and highly depend on the contingencies it has to deal with, improving resilience only within the specific coping range.

Some more clarifying examples can help in fixing the reasoning behind these hypotheses. In Morgan Stanley's case (Walsh, 2001), leadership and the employee-first culture could

be labelled as generic factors: other firms can focus on them and replicate them, showing usefulness during events that are beyond the typical coping range in any sector. On the other hand, plans that allow to resume production if a critical input is missing in a manufacturing plant, or the elements of supply chain resilience identified by Jüttner & Maklan (2011), or the alternative by-the-book answers operators in nuclear aircraft carriers could adopt during specific deviations from the devised flow of action (Roberts, 1990) enhanced the coping range for the organization but wouldn't develop resilience in completely different contexts.

Both propositions have some equally compelling rival explanations that must be considered for a thorough analysis:

> R1.1 – Protective factors that constitute inherent resilience also build up static resilience, with slack resources improving the normal coping range and contextual flexibility enabling factors that mitigate even non-operational risks.
>
> R1a – Contextual and generic factors are replicable in any organization with similar positive effects on resilience building.

Furthermore, another rival explanation can be formulated:

> R1.2 – Contextual protective factors are the operative declination of generic protective factors, being more specialized but better able to cope with the associated risk.

R1.2 would suggest a different take on protective factors, stating that only generic factors are relevant for building resilience, whereas their contextual application would just be the mean through which each organization reifies the theoretic factors and which might be identified as the backup systems proposed by Perrow (1984), much like in the relationship identified by Masten (2014) in figure 1.3 between resilience factors and their underlying associated adaptation systems.

The next proposition that the case studies will try to address is based on Masten's (2001) findings which suggest that resilience is a normal behavior and that, usually, protective factors forestall different risks. When the current risks exceed the available protective factors, a crisis ensues, demanding a response through static resilience. This concept can be exemplified through the definition of homeostasis from Connor & Davidson (2003) and the collapse phase in Linnenluecke & Griffith (2010). The first implies that

individuals are typically in a state of biopsychospiritual balance, which enables adaptation to circumstance even with the presence of internal and external stressors. If, however, the protective factors which typically manage these stressors turn ineffective, this equilibrium is broken, starting a crisis. The parallel between individuals and systems from the resilience standpoint has been discussed in chapter 1, thus this idea might be applicable to organizations.

Linnenluecke & Griffith (2010), on the other hand, suggest that organizations can usually adapt to a certain amount of change in a given time while retaining their structure and functioning. This is the typical organizational resilience, but if the change surpasses the organization's capacity to deal with it, a phase of collapse ensues, which is a reduction of performance that might be irreversible and might determine the disaggregation of the system.

These perspectives point toward the following research question:

> Q2 – Organizations witness crises when current risks are beyond their inherent resilience capability; in this situation, the less specialized factors which constitute static resilience are employed. The resilience threshold is surpassed once the available protective factors are less impactful than the contingent risks or the active vulnerabilities, which are the negative events the organization is not able to deal with.

The associated rival theory which will be tested is:

> R2 – The resilience threshold can be surpassed even when protective factors are in place and contingent risks are held in check, with a single event which overcomes both inherent and static resilience.

An example that would come to mind when thinking of R2 is Fukushima's nuclear plant accident after the tsunami on March 2011, where protective factors were existing and typical seismic risks were supposedly accounted for. A paper from Lipscy et al. (2013) though pointed out how the measures that should have avoided the disaster were underestimating the threat and thus constituted a vulnerability for the plant, meaning that the resilience threshold would very likely be overcome by a tsunami of that magnitude. Consequently, more empirical checks are necessary to verify whether Q2 or R2 are the most applicable explanations for how crises ensue.

Another theme that the case studies will attempt to understand is whether protective factors have a different impact on resilience, similarly to vulnerabilities, and whether this is true for the same factors across different industries or not. The doubt was raised considering how Patriarca et al. (2017) proposed different weights for resilience enabling factors, and firms answering the survey from BSI group (2017) reported differences in the perceived importance of each factor according to the interviewed managers, as stated in table 2.3.

> Q3 – Protective factors have different importance in building resilience, with some being critical and others being secondary or irrelevant.
>
> Q3a – These differences in importance are applicable across sectors.

Consequently, the rival explanations would be:

> R3 – Protective factors are equally important for an organization, without any prioritization.

Which would also invalidate Q3a. If, though, Q3 was found true, another rival theory must be tested:

> R3a – Even though protective factors have different impacts on resilience, this does not replicate across sectors. Factors' importance varies given the context or industry.

Finally, the last theoretical answer that the case studies will seek is concerned with the matching of protective factors and risks. Pettit et al. (2010) suggested not to overinvest in capabilities which might deteriorate profitability while providing little additive protection against vulnerabilities. Moreover, McManus (2008) and Stephenson (2010) identified multiple protective factors that can help in building resilience. Even if these factors didn't satisfy question 3, thus having a similar importance in improving resilience, the returns on investing in each of them might not be linear. Following the perspectives from Masten (2014) and Williams et al. (2017), resilient behaviors do not appear unless a risk or vulnerability becomes active, turning into a negative event for the organization. After all, there wouldn't be a need to adapt without an active threat (or opportunity) for the system. Consequently, protective factors are built primarily to shelter from risks and vulnerabilities, either through inherent or static resilience, although they may also

constitute the basis for competitive advantage given that many resilience factors feature similarities with dynamic capabilities identified by Teece (2007). To identify when investing in or enhancing a protective factor is relevant, each factor could be tied to the risks or vulnerabilities it helps coping with: formulas to evaluate the likelihood and impact of a foreseen risk already exist, and the effects of generic risks such as economic downturns, earthquakes and other possible primers for crises can be estimated for example through Rose's (2004) methodology, which can also compute how much of the negative outcomes can be negated by protective policies.

Yet, there might be better qualitative questions that can help in roughly assessing if a protective factor is doing its job or if it is likely to help coping with a risk should it turn into reality. Such questions could also allow firms that excel in certain protective factors, for example in business continuity planning, to understand the opportunity costs of a deterioration of that factor, seeing the direct, likely impact that it could have if, for instance, the continuity plans were sloppier. Some of these questions will be tested throughout the case studies, though they go beyond the scope of this dissertation: the primary concern is with the following research question.

> Q4 – Protective factors can reach an efficient point where, *ceteris paribus*, further investments would provide decreasing returns, here intended as positive effects deriving from the factor (avoidance of losses or business erosion, reduction of downward performance variability, increases in relevant performance dimensions) minus the costs sustained to improve said factor.

Indebtedness and its connection with a capital structure's performance already suggest the possibility that this efficient point exists: a rickety financial position constitutes a risk which can greatly deteriorate the performance of a firm when it's over-leveraged. An optimal capital structure provides the best returns while an exceedingly safe one foregoes the benefits deriving from tax savings, though the risks of overly high debt are far more punishing on performance than an excessively cautious capital structure (Koller et al., 2015).

The poor management of debt and financial aspects has been already discussed in Chapter 1 as a risk factor, contrasted by its optimal management which constitutes a protective factor, thus the need for its optimization from the resilience standpoint doesn't need

further inquiries from a theoretic point of view. It remains to be seen if the same applies to other protective factors.

Logic though helps in answering this inquiry: a factory with no extinguishers is more vulnerable to fires, but after enough of them have been installed, more would be redundant and constitute a slack resource, providing only minimal added resilience and value. In this case, the extra extinguishers might be an almost irrelevant protective factor.

3.3 Choosing the Cases

As part of the planning for proper case studies, the reasons behind their choice must be explained (Yin, 2009). First, a multiple cases approach was chosen not only for the more solid evidence it can provide, but also because the formulated propositions, in particular Q2, Q3 and Q3a, require the investigation and comparison between multiple organizations.

The following list enumerates some of the reasons that guided the choice:

- Case studies allow to capture more qualitative aspects compared to surveys, and an experiment wouldn't have been possible given the low degree of control a researcher can have on complex organizations such as firms and even more so on the economic context they operate within;
- Different firms possess different protective factors, thus studying more than one organization within a sector can help in identifying the differences, if they exist, that the propositions attempt to verify;
- As resilient answers ensue upon the actualization of a risk which shifts environmental conditions and requires adaptation from the organization, the sectors selected for the study should have witnessed the activation of a risk, for example an economic downturn, which involved most of its members. This allows to check the effect of a single, major threat that could be beyond the typical coping range of the organization and that is almost similar for any organization within the industry, just like in the paper from Gittel et al. (2006) where the reduction of flights within the US affected the whole airline sector;
- Some of the questions wish to test whether protective factors apply in a similar way to any organization or whether different sectors require different resilience enablers. This concerns primarily generic protective factors, as contextual ones

are expected to vary across industries, and the possible existence of a similar pattern for crises, identified by the resilience threshold;

- Consequently, at least two sectors are necessary for this study, both having witnessed a similar shock (economic downturn) and with firms that have experienced similar patterns in their economic performance during the period of analysis, facts that ultimately benefit the comparability of the cases;
- Two patterns of performance will be accounted for: one firm per sector should have withstood only minor effects, suggesting that its inherent or static resilience were enough to weather the storm; the second firm should feature a severe dip in its performance signaling a crisis situation, followed by a recovery phase which would show a different kind of resilient answer where the initial static resilience wasn't enough to cope with the risk, possibly signaling a situation where risks and vulnerabilities overcame the ability to manage variability of the organization. If the recovery was successful though, the firms would likely be able to show how they developed or discovered new protective factors to counteract the predicament, providing additional clues on the interplay between risks and protective factors;
- Given how size has mixed and non-explanatory effects on resilience (Garmestani et al., 2006; Rose, 2013; Stephenson, 2010), the study should focus on firms that are similar on this aspect. Larger firms though are expected to have more protective factors given their broader resource bases, whereas smaller organizations would witness the contrary. As a consequence, the study should consider medium size companies, which are less likely to be affected by the size effect;
- As Fantazy et al. (2009) identified that different strategic orientations lead to different impacts on performance dimensions from protective factors, the selected cases should consider organizations with a similar strategic scope, increasing comparability yet again.

To summarize, meeting these requirements means identifying two sectors which withstood an economic downturn; then two medium-sized firms per sector, one witnessing a decrease in performance and a recovery within the downturn period, another experiencing either growing or constant performance during the same period. This defines

the unit of analysis, circumscribing it in a single organization and avoiding the focus on whole supply chains: these will be considered as fixed and external elements, unless the interviewed firms state that they have an active role in influencing supply chains or sector dynamics. The fact that the selected organizations are medium-sized should reduce the chance of this happening and avoid the blurring of the effects that influence a single organization compared to the ones reverberating across the whole chain of value.
The sectors that were identified as being suitable for the analysis were the Italian Construction and Furniture industries.

3.3.1 The Furniture Sector

This sector was already undergoing major changes in Italy during 2005 (Crepaldi, 2011): the manufacturers were adapting their business models to the competition from emerging economics, such as Poland and China, a situation that was reducing the export from Italy to the rest of the world, slowing down industry growth. In 2008, the producers had apparently been able to cope with the increased competition deriving from globalization, but both the sector and Italy's internal economy were beginning to suffer from the global economic crisis which started in 2007 (Possamai, 2013). Between 2007 and 2012, the Italian furniture industry members experienced a severe reduction in revenues which brought the overall output from 42 billion to 28 billion euros, with more than ten thousand firms having to close due to the new market condition, fraught with a weak demand both in the home market and in developed countries such as the US or the rest of Western Europe (Manzo & Banfi, 2013). The situation was deeply connected not only to the global crisis, but also to the contraction of the Construction industry worldwide, which reduced the demand for newly crafted furniture.
The presence of some risk factors emerges from these facts. First, the sector used to rely primarily on the internal market, especially due to its fragmented nature: only 218 of the almost twenty-nine thousand firms of the industry featured revenues above 16 million euros in 2017 (Mancini, 2018) showing that even after the crisis there wasn't a consolidation within the sector. This precluded the access to external markets for some smaller firms, which constituted the only opportunity to perform well during the crisis (Manzo & Banfi, 2013).

Moreover, the sector's performance relates to the Construction industry, which due to its cyclical nature wasn't faring well during the negative economic conjuncture that Italy has witnessed since 2009.

Revenues have begun picking up pace in 2016, due to the improvement in the available income for Italian families and a small betterment in performance for the Construction industry, and even though competition from lower-wage countries is still a threat for Italian furniture manufacturers (Repubblica, 2017), innovation and a stronger presence in foreign markets have been leading the recovery in 2017 (Dell'Olio, 2018). The sector managed to recover to pre-crisis export and revenue levels, showing promising signals for the coming years (Confartigianato, 2018).

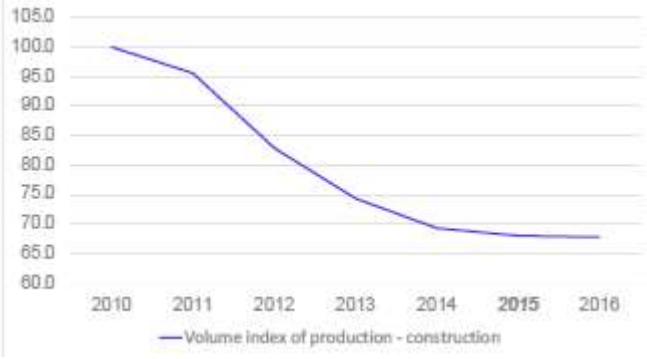
Thus, this Italian industry is a perfect example of a similar risk applied to all its members: the pressures from a shrinking home market and the need to maintain both high innovation standards and manufacturing quality to counter the rise of new low-cost competitors in other countries activated new risks for the involved firms, setting up an excellent environment for case studies in the resilience field. Moreover, the recovery of the whole industry in the last two years allows to study with higher precision which companies followed the economic cycle, which ones managed to recover earlier, and which are still bearing the negative effects of these additional risks.

3.3.2 The Construction Sector

If the Italian furniture sector has suffered from the economic crisis that has influenced the country from 2009 to 2016, the construction sector, due to its deeper connection with the gross domestic product (GDP) performance, has fared even worse (Freddi, 2018).

The data showing the volume index of production in the Italian construction sector shows the dramatic effect the crisis had on the considered companies' revenues.

Figure 3.1 2010-2016 Volume of Production Index in the Italian Construction Sector



Source: European Commission (2018)

A 30 % decrease over five years in a sector that literally lays the foundations for GDP growth in a country is a clear signal of a crisis per se, but the reasons behind this sharp decrease require a quick overview:

- The crisis, which led to lower average wages and a severe credit crunch both in the residential and non-residential sub-sectors, greatly slowed down demand up until 2015 (Freddi, 2018);
- The sector has suffered from a lack of productivity improvements for over two decades, as shown in figure 3.2. This effect is not restricted to the Eurozone, it has in fact been verified across the globe, with the manufacturing sector achieving 1.7 times higher productivity compared to the construction one in 2010 (Changali et al., 2015). This constitutes a vulnerability for the industry, as operating margins are slim and much inferior if compared to other service firms (Blanco et al., 2016);

Figure 3.2 Productivity Index Comparison between Construction and Other Industries

Source: Blanco et al. (2016)

- The sector is suffering from a skill shortage that partially explains the low productivity (European Commission, 2018);
- Globally, very few firms adopted innovative ways to deliver their projects or to employ cutting-edge technology, which would not only improve productivity but provide the opportunity for a real technological disruption which may greatly improve industry margins (Armstrong & Cilge, 2016);
- Green construction is becoming the main demand trend in the sector, though not all the firms are ready to tackle this challenge (Mandyck & Jones, 2016). This requires investments in R&D; however, in Italy, between 2012 and 2014, only

30.5% of the construction companies with more than ten employees engaged in innovation activities (European Commission, 2018), showing yet again a vulnerability that afflicts the industry.

These are just some examples of the current, dire situation the Construction sector is facing worldwide, but they help in providing an overall picture that confirms the presence of risks and vulnerabilities, both old and new, that apply sector-wide in Italy. Moreover, the connection with the Furniture sector and the fact that both have suffered from the recent economic crisis the country had to face provide an excellent field where to look for resilient companies, which despite these challenges might have been able to achieve above-average performance or to recover from crises.

Additional details on the risks and vulnerabilities, as well as the active trends in the sectors, will be detailed during the case studies reports where necessary.

3.4 The Selected Firms

After having identified two sectors that experienced a similar untoward event, though their risk factors differ, the desired firm profiles are described, showing the process that narrowed the choice.

First, a medium sized firm definition was adopted as a research parameter: the European Commission (2009) notation was deemed the most suitable, establishing three requirements. The chosen organizations had to feature a staff headcount between 50 and 250 units, a turnover between 10 and 50 million euros and a balance sheet ceiling of 43 million euros (in assets).

To obtain a list of the companies that met these requirements, while being part of the sectors mentioned above, the AIDA database (Analisi Informatizzata delle Aziende Italiane) was employed. The search was issued using the following NACE Rev. 2 (economic activity identifier) codes, C31 (Manufacturing Activities – Manufacture of Furniture) and F41-F42-F43 (Construction Activities – Construction of buildings, Civil engineering, Specialized construction activities) and the medium-sized firm constraints described above. Moreover, to facilitate the collection of data and the field research, the limited area of the Veneto region was adopted as a constraint. This geographical limitation doesn't hinder the validity of the study as it's both a part of Italy bustling with economic activities pertaining to both sectors and it has suffered the untoward events and

witnessed the sector dynamics highlighted above just like many other regions both in Italy and Western Europe.

The two lists comprised 144 organizations for the Construction sector and 105 for the Furniture one. Data on the total assets, Return on Equity and net profits or losses over a 10-year period (2008-2017) were also collected for the sampled organizations to evaluate their performance during the crises. For the purpose of this dissertation, within the sample, only firms with complete data entries on these three dimensions were considered in order to avoid picking firms that might have defaulted in the period, as the objective is to capture two resilient firms per sectors which managed to maintain function notwithstanding the untoward situation.

3.5 Detailed Expected Cases

Yin (2009) suggested a method to aid the analysis of case studies' propositions and to help validating them: the researcher should identify which are the likely patterns that would appear across the cases beforehand, both while envisioning the hypotheses and their rival explanations. If these prefigured patterns are confirmed during the data collection phase, they constitute further evidence for the analytic confirmation of the proposed theses, as pattern matching is a solid technique to verify compelling theories, but other methods will also be employed to ensure the validity of the findings.

Consequently, the following expected case results are discussed. Starting from the RoE and net profits performance for each analyzed organization, two types of cases may emerge: firms that have continued growing and obtaining good results despite the negative conjuncture of their sectors, with stable RoE and net profits paths, and companies that suffered the hit but managed to recover earlier compared to the sector.

In the first case, theory leads to think that, just like for General Hospital in Meyer (1982), the organization would have maintained a business-as-usual behavior, addressing the crisis without measures that felt extraordinary to the staff. This would hint to the presence of a higher inherent resilience compared to other cases: the interview questions should, thus, focus on this aspect, highlighting whether generic factors were also employed to face the predicament or not and whether the context-specific factors are described by interviewees as mere declinations of the generic ones.

Moreover, the risk factors that may have emerged during the industry downturn, such as increased pressure from competition or a reduction in sales, would be clearly matched by

this kind of "unflinching" firm. Even though they manifested, the existing, ordinary protective factors would be described by the interviewees as the means through which the risks were mitigated and coped with.

To verify Q3, in this situation, the case would expectedly verify that some already built factors were the key through which the organization managed to perform well under duress, yet if R3 was a better explanation of reality, any other protective factor could've been used to protect the organization's performance. Lastly, the case should confirm that given such a resilient response, more protective factors wouldn't have led to an increase in performance during the economic downturn for the industry, providing the company with the ability to perform well, but not any better compared to what it was able to do in the business-as-usual period. To confirm whether all the protective factors were "active", the interviewees should confirm that any reduction in a protective factor (f.e. less readily available cash, less loyal customers etc.) would've led to a direct reduction in either the firm's performance or its ability to answer this well to the untoward event.

In the latter case, where the firm undergoes a decline and a recovery phase, the following elements are expected. The recovery would be quicker than the trend in the industry only if some generic protective factors helped in speeding up the process. Extraordinary measures should appear in these cases, but they would be enough to enable a static and resilient answer from the examined firm. If, however, context specific factors played a role in recovering from the crisis, Q1 should be disconfirmed in favor of R1.1.

Another expected behavior would be seeing risk factors overcoming the typical response mechanisms the firm had in place, with managers commenting on how, for example, they were surprised by the situation or couldn't foresee such a strong effect. The organization though still featured resilience through recovery, thus, to confirm Q2, the interviewees should shed light on how more protective factors were developed or deployed during the crisis to restore the normal functioning of the firm. On the other hand, R2 would be confirmed if the company was thoroughly prepared but still suffered from the economic downturn.

If resilience factors do have a different importance in the recovery case, some of them would result as being vital for the restoration of the firm performance. The interviewees could provide a negative answer to this question by stating that any other factor could've been developed to overcome the situation. Finally, to verify the presence of an efficient

point for resilience factors, comments on how performance during the crisis would have decreased if any protective factor (f.e. business continuity plans) was less effective would be expected. To check whether the protective factors "activated" during the predicament, the questions should prove how some protective factors turned out to be insufficient or ill-suited for the situation, a fact that would explain how the crisis ensued.

These are some patterns that are expected to appear across the cases to address the questions or confirm their rival explanations, but some other structures of the events are foreseeable when taking in consideration cross-case comparisons, which are employed primarily to test how the hypotheses (Q1a, Q3a) can extend beyond a single firm or sector. If the differences between context-specific and generic protective factors exist, then only the latter would be replicable across industries (and perhaps across firms). Consequently, the cases would be similar only when comparing their generic protective factors. Their importance could also be akin for different firms; thus, the interviews need to confirm that some factors are perceived as being vital in all four cases to verify that these resemblances apply notwithstanding the organization's situation or context.

3.6 Adopted Field Procedures

After identifying which are the most interesting cases for the analysis and the expected outcomes, the method through which the data will be collected are to be explained.

Following the advice from Yin (2009) and Lee et al. (2013), senior management and owners, in the case they are involved in the day-by-day business of the firm, will be contacted for the selected organization. This is primarily done because key people are more knowledgeable about the events that are going to be examined: possibly, the owners of the decision-making processes that were activated during the economic downturn in the sector will be the ones to whom the questions will be addressed. Their access to resources, documentation and the events that occurred during this period will provide evidence on what happened across the organizations.

After their availability is confirmed, a survey, retrievable in appendix 6.1, will be issued. The goal is to build a resilience profile for the analyzed firm, using questions with statistically relevant loading factors found in Lee et al. (2013) and in the Resilience Benchmarking Tool from "Resilient Organisations" (2014), used in the research from Vargo, Seville, McManus and Stephenson. Some more inquiries will be included in the

survey to provide a starting point for further discussion with the key people that will fill in the survey.

Afterwards, once the resilience score has been evaluated and the situation of the firm assessed externally through publicly available information, interviews with the responders will take place to directly test the propositions devised throughout this chapter. Where possible, such inquiries will be made directly at the firm's premises, in order to allow direct observation from the researcher which could provide additional clues to verify the hypotheses.

The interviews will follow a semi-structured path, with the backbone retrievable in appendix 6.3. The results of the survey will be discussed immediately to verify that it was thoroughly understood, and that the responder confirms the situation photographed by the benchmarking questions.

Afterwards, the concepts of protective and risk factors, vulnerabilities and coping range will be introduced to the interviewee, in order to maintain technical language throughout the data collection process. Due to how multifaceted protective factors are, they have been bundled according to the most relevant and recurring themes in the literature: the first step involved using the factors proposed in the Organizations Resilience Index from BSI (2017) and checking the similarities with other elements discussed in chapter 2 (from McManus, 2008; Stephenson, 2010; Lee et al., 2013; Somers, 2009; Battisti & Deakins, 2017; Patriarca et al., 2017). Then, the similarities with adaptive systems found in Masten (2014) and the other elements of resilience reviewed in chapter 1 were analyzed to create the following aggregating labels, which will facilitate the interpretation of the empirical data and the discussion with interviewees. The questions used in the survey have been matched to these labels, showing the relationship between these categories and the resilience factors (Adaptive Capacity, Management of Keystone Vulnerabilities, Situation Awareness) developed by the "Resilient Organisations" stream of research, which also helped in identifying which of these categories were the most useful in developing each factor.

Table 3.2 Recurring Resilience Themes and Underlying Constructs

Recurring Themes Labels	Underlying Theoretic Elements and Constructs	Associated Resilience Factors
Innovation Oriented Leadership	Leadership, Innovation and Creativity	Adaptive Capacity, these elements all favor adaptation to new situations
External Stakeholders	Supply Chain management, Network elements, Reputation management	Primarily Management of Keystone Vulnerabilities, fitting the concept that a medium-sized firm has a limited impact on its economic environment and can't easily shape it to achieve adaptation
HR Protective Factors	Staff Engagement, Alignment, Unity of Purpose, Culture and other soft internal resources	Adaptive Capacity and Management of Keystone Vulnerabilities: these elements enable adaptation and allow staff members to actively keep risks in check
Business Continuity	Business continuity Planning, Recovery Priorities, Participation in Exercises, Training and Plan Stress Testing	Management of Keystone Vulnerabilities, as business continuity plans primarily attempt to allow the firm to maintain function in spite of foreseeable risks and vulnerabilities
Hard Internal Resources	Financial Aspects, Premises and Backup Systems, Resource Management and processes that accumulate them	Management of Keystone Vulnerabilities
Mindfulness	Virtual Role System, Devolved and Responsive decision-making, Goal Directed Solution Seeking	A mix of Adaptive Capacity and Situation Awareness which enables the former
Situation Awareness	Horizon Scanning and Situation Understanding	Situation Awareness measure

This division allows to better frame the discussion with the interviewee, and is meant primarily to facilitate communication, with no pretension of creating new, valid construct or factors, although their theoretic backing is solid and could provide the ground for further investigation. Table 3.2 will be shown during the interview.

The next step will involve asking the responder an account of the crisis in the sector, how it affected the firm and what allowed the organization to thrive despite the difficulties or to recover successfully. This will allow to identify through the narration which protective and risk factors involved the organization, and to compare the previous situation with the current resilience score of the firm.

Afterwards, the questions will begin directly addressing the propositions of this thesis: the first concern relates to the difference between contextual and generic protective factors. The interviewee will be asked his or her perspective on how the untoward situation was perceived by the organization: was it considered as business-as-usual or as something out of the ordinary? In the first case, were the resources and capabilities that are usually deployed in a day-by-day situation sufficient to address the problem? Or was something different required to solve the predicament? Then, focusing on the specific risk and protective factors identified in the previous step, the researcher will inquiry whether

the resilience elements were specifically built to address extraordinary situations or not, and whether factors that are closer to the generic definition, thus being less firm or process specific, were what helped in sheltering from the impact.

The main concern is studying whether there is a difference between factors that cope with typical variability (and the firm will provide a definition of what they believe is normal) and other factors that are atypical, meant to be used for the static response. The interviewee will be asked to agree or disagree with this statement and with another question regarding whether factors that appear to be more firm-specific are just declinations of their generic version.

Then the second proposition must be tested. The key question is: did the present risks overcome the typical response mechanisms? Did the firm have the perception that they would've failed if their generic protective factors weren't available or in place? Or even though they were thoroughly prepared, nothing they could do could possibly forestall the untoward event?

The third question is less tricky to formalize, as the interviewee will be asked to identify the most important protective factors that helped the organization during the period and whether there could've been any substitutes to them. Table 3.2 and a review of the resilience score will be used to facilitate the process, and the researcher will ask to rank three of these elements and to verify why some were perceived as being more important and why one would be more important than another. Finally, the researcher will propose some different protective factors and ask whether they would've been as useful as the ones listed by the responder, given the situation, as another attempt to check the substitutability of protective factors, particularly generic ones.

The discussion will continue on the three factors identified by the interviewee, focusing on whether the improvement of each of them would have resulted in better outcomes during the economic downturn period or not in his opinion. Moreover, the researcher will ask whether all protective factors were useful and activated during that period or whether some felt unnecessary, and whether they actively matched risks that emerged during this phase. Lastly, a question will check whether the protective factors were or not designed to cover some specific risks.

Other questions posed during the interview will be accounted for in the case study reports, as they will primarily derive from the flow of the conversation and cannot be foreseen.

4. CHAPTER 4

CASE STUDIES AND ANALYSIS

4.1 Introduction

Chapter 4 reaches the core of the dissertation, focusing on studying four cases of medium-sized Italian firms from suffering sectors that likely displayed resilient behaviours, in an attempt to address the theoretical questions proposed in Chapter 3.

The first part of the chapter will feature the reports of the four cases, discussing their behaviour during the period in which their industry witnessed a crisis and how the firms are currently dealing with variability. Afterwards, the limitations of the studies and the overall conclusions will be explained. Due to the delicate subjects the researcher touched through the resilience benchmark survey and the interview with key people in the companies, the names of the firms will be substituted by placeholders that mirror the underlying expected structure of the case, as described in table 4.1.

Table 4.1 Placeholder Names adopted for the Case Study Reports

Expected Case Structure	**Furniture Sector**	**Construction Sector**
Economic variables suggested there was no crisis	**High-Res Fixtures**	**High-Res Structures**
Economic variables suggested the presence of a crisis and a recovery phase	**Cri-Rec Fixtures**	**Cri-Rec Structures**

This measure is adopted to comply with the privacy agreement under which the information pertaining to each firm was disclosed.

4.1.1 Data Collection

Although the research setting and the adopted methods were discussed in Chapter 3, the thesis should report which data was effectively collected, and how it was analysed, hence the two following paragraphs.

The field work was performed between September and October 2018. The firms that showed financial performances that were close to the desired ones were contacted through e-mails, phone calls or social network interactions with key people within the organizations. As the goal of this approach was to foresee the presence or absence of crises starting from the hypotheses from Markman & Venzin (2014), newspapers weren't checked immediately for information on crises for these companies, though other publicly available information on their website was carefully reviewed. After the organizations showed their interest and availability to participate in the project, limited to one firm per type of case study as reported in table 4.1, the survey (retrievable in the attachments, 7.1) was sent to an available key person in the organization in order to get a first grasp of the resilience profile of his or her firm. After the reports (retrievable in the attachments, 7.2) were issued as a preliminary description of the capability in the organization, each responder was approached for a follow-up in-depth interview, which backbone can be found in attachment 7.3.

The interviews usually lasted for 1 hour and 10 minutes, albeit the conversation continued for up to 2 hours and a half with Cri-Rec Fixtures' interviewee. Although these interviews weren't digitally recorded nor transcribed, the researcher was allowed to take extensive notes and to ask confirmation and advice on both his perspective and the interpretation of the case study that he was proposing. The interviews also allowed to verify the reliability of the survey.

Finally, after examining the case studies, news articles were sought to confirm the information reported during the interviews, to further solidify the findings.

Table 4.2 summarizes the data that was collected and used in the analysis.

Table 4.2 Collected Data and Use in the Analysis

Data Type	Amount and sources	Use in the analysis	List of the interviewees
RoE, Net Profits and Assets of the firms (2008-2017)	AIDA database (consulted on September 2018). 144 entries for the Construction Sector 105 entries for the Furniture Sector	Understanding pre-emptively which firms witnessed crises during the sectorial downturn and recovered before their own industry, and which firms did not face performance drops during the untoward event	Cri-Rec Fixtures (*) Managing Director and Entrepreneur, one of the three siblings currently owning the company (2h and a half interview) High-Res Structures (*) Managing Director, son of the founder Founder and current owner of the company (1h and 10 minutes interview) High-Res Fixtures (*) HR Manager, works for the company since 2002 HR Specialist, works for the company since 2015 (1h and 10 minutes interview) Cri-Rec Structures (*) Managing Director, son of the founder (1h and 10 minutes interview)
Survey (Attachment 7.1)	4 – One per case (submitted to the interviewees with a * before their role)	Creating the resilience profile of the organization, accruing information to understand what enabled the response to the sectorial crisis	
In-Depth Semi-Structured Interviews (Attachment 7.3)	4 – One per case Total duration: 6 hours.	Testing the proposed constructs, understanding the reliability of the collected data, comparing the interpretation of the researcher and the inputs from the theory with the empirical case	
Direct Observations	Each interview was performed at the firm's premises	The goal was to see and feel if the described current situation matched the interviewees' account on the facts and to identify possible artifacts (such as formalized culture manifests) that explained high values in the resilience profile	
Local and Online Newspaper Articles	5 Total 2 confirming the 2008 crisis for Cri-Rec Fixtures and its recovery (VicenzaPiù, 2015; Zibaldone Economico, 2017) 2 confirming the changes in Cri-Rec Structures (Mattino di Padova, 2012; 2013) 1 confirming the innovative approach from High-Res Fixtures (ThisMarketersLife, 2015)	Confirmation from external sources of the findings occurred during the case studies, where possible	

4.1.2 Data Analysis

The analysis of the data followed a three-step procedure for each case. At first, the financial information collected through the AIDA database was skimmed to check for the most suitable cases in the sample, as using the VOLARE methodology to create a benchmark proved difficult given the excessive volatility of RoE in the selected firms (deriving mostly from the fact that equity values differ greatly from firm to firm, compared to the banks studied in Markman & Venzin (2014)).

After the firms were manually selected due to their performance between 2008 and 2017, their results were compared with the sample's average, with High-Res cases being

selected if their yearly RoE and net profits were always above the sector's average and Cri-Rec cases being selected if the RoE and net profits had a dip way below the average and a quick recovery afterwards. The dynamics of the owned assets were also checked to see if the sectorial downturn and the profits decrease damaged (or didn't damage, in High-Res cases) this dimension.

As suggested by Yin (2009), the information was recorded in a database after the firms answered to the questionnaire, which results were elaborated according to the evaluation in the Resilient Organisations Benchmarking Tool (2014) with only slight modifications. To provide a score following the themes from table 3.2, the same methodology was applied, though the questions were grouped differently according to how fitting they were with the according theme.

The information was then collected in a report that included a brief preliminary analysis (attachment 7.2), starting from the data that was retrieved before the interviews (survey, websites, AIDA financial information) which attempted to provide an evaluation on the resilience profile of the firm according to the theory reviewed in Chapter 1 and 2.

This information and the report were later checked with the interviewees during the conversations, before the research questions were tested: the purpose was twofold. First, this allowed to check that the researcher had a proper idea of the firm's resilience and that the employed tools and analysis were fitting with the real state of things, which allowed to use this information in the case study analysis, and second it posed the basis for the discussion with the interviewees, meanwhile helping the maintenance of the chain of evidence through the use of technical language and definitions that were included in tables 3.1 and 3.2, and in the attachment 7.2.1.

This approach ensured that the constructs that were being discussed were understood by the responders, avoiding misinterpretations and biases which would have compromised the evidence from the cases. In all 4 interviews, the inquired personnel thoroughly understood the theme, agreed with the definitions and confirmed the validity of the survey and the preliminary report analysis, which suggested there was no need to modify the questionnaire or the overall approach.

The notes taken during the interview were immediately added to the case study database after each discussion: each contribution was matched with the proposition it was providing clues about (from paragraph 3.2), with the researcher always relying on the

reviewed literature to ensure that this framing was correct. Furthermore, the stories narrated by the interviewees were compared to the expected case studies from paragraph 3.5, and again the findings were recorded in the database for an effective comparison. The closeness to the foreseen cases was often astonishing: the following paragraphs will report how what was expected often predicted the real outcome for the firm, providing even more evidence of a proper theoretical interpretation.

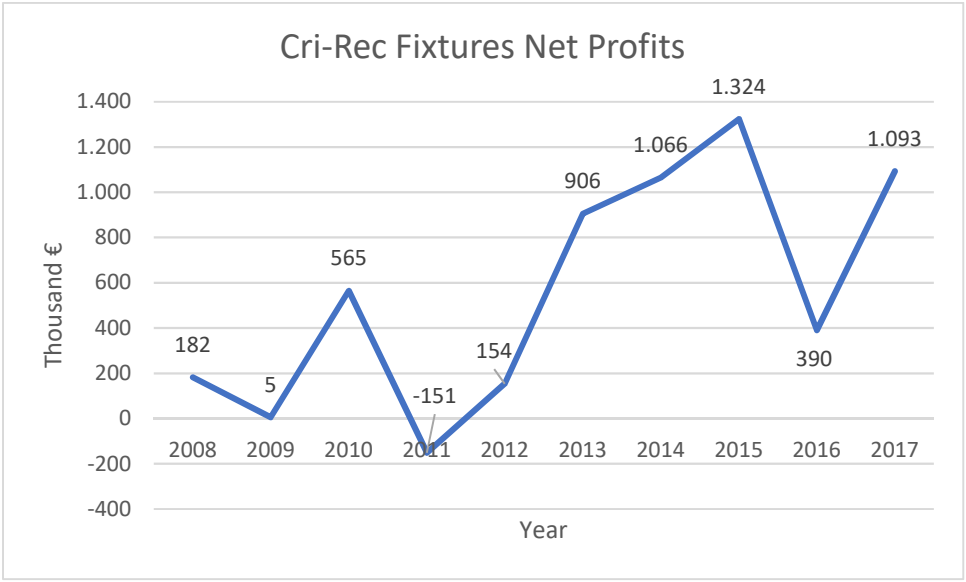
Lastly, once the case database was complete, the cases were compared and cross-checked according to Yin's (2009) suggestions, in particular to verify findings that were common through multiple organizations and industries. Furthermore, the researcher looked for more confirmatory evidence through newspaper articles reporting additional information on the studied companies and the crises that invested them, when they were retrievable.

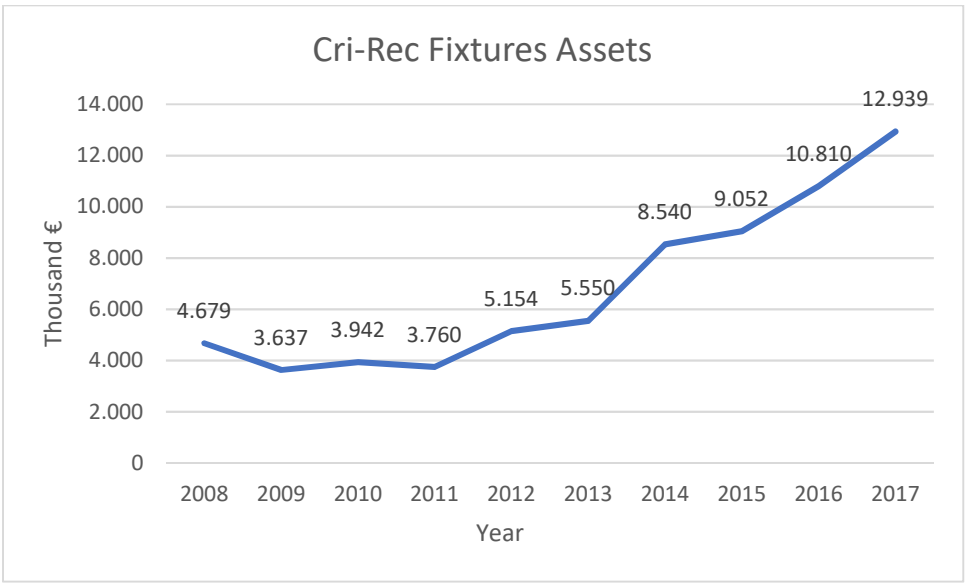
The constant reference to the reviewed literature, the multiple research instruments (surveys, interviews and review of the interpretation from the interviewees), the careful maintenance of the case of evidence and the pattern matching technique were deemed suitable to provide a proper triangulation of the data and the evidence, as suggested by Yin (2009).

4.2 Case 1 – Cri-Rec Fixtures

Cri-Rec Fixtures was selected as a suitable case study after an analysis of its performance during the years 2009-2014, during which the identified sample in the Furniture Sector witnessed the most intense dip in performance. The firm displayed a strong reduction in its assets between 2008 and 2011, as well as low or negative net profit values up to 2012. Afterwards, the results showed a sharp improvement both on the net profits and assets dimensions; this suggests both a crisis and a recovery phase which wasn't dictated by sectorial trends.

Figure 4.1 Cri-Rec Fixtures Net Profits and Assets (2008-2017)





Source: adapted from AIDA database, data retrieved on September 2018

The entrepreneur of the company was immediately available to participate in the research project. Consequently, the survey was issued directly to him, providing insightful answers that highlighted some characteristics of the current resilience profile of the firm even before the interview.

The results of the questionnaire implied that the organization relied primarily on its adaptive capacity to address variability and overcome threats to its functioning, with lower scores in pre-emptive and formal planning and in the management of keystone vulnerabilities. Nevertheless, the overall evaluation was positive.

The interview began with the verification of the information retrieved through the survey and the AIDA database; the entrepreneur confirmed that the results were reflecting correctly the current situation of the firm, a fact that facilitated comparisons between the elements of resilience through the remainder of the conversation.

Due to how the questionnaire was discussed, the first research inquiry that was addressed was Q3, concerning the importance of some elements to build resilience over others. Without any doubt, the interviewee replied that financial safety and stability, captured through the management of internal resources dimension, was the foremost enabling factor for resilience in his opinion. He mentioned how for medium-sized firms based in the North East of Italy, which are primarily entrepreneur driven, financial uncertainty leads to a strong psychological stress which severely hinders decision-making processes, just like a diver whose oxygen tanks are about to run out.

All the other categories identified by the survey were deemed useful to build resilience, with an emphasis on leadership and internal stakeholders. The entrepreneur also underlined how the firm was trying not to undertake excessive risks, favouring a steadier but more sustainable growth.

Before moving on the topic of the 2008 crisis which was witnessed by the company, the interviewee mentioned an untoward event the firm had to face during the current fiscal year: the owners of the organization feel that their reputation toward costumers can be maintained by showing them a positive firm performance, but due to unforeseeable order cuts from some clients their EBITDA goals were at risk.

This required some non-ordinary actions to obtain the desired outcome, a clear signal of the enterprise's adaptive capacity: the entrepreneurs and the managers decided to willingly cut their wages, some suppliers were asked whether they could provide additional discounts (not through hard bargains, but rather through a comfortable agreement due to the volume of business Cri-Rec Fixtures brought to them), the production department underwent some additional stress due to the need to achieve excess production in a limited time frame and some costs which the firm sustained for an owned subsidiary were transferred to the controlled organization.

This event allowed to frame the response as an example of static resilience, and the entrepreneur agreed with the researcher on the matter. Furthermore, the story stressed how different aspects are necessary to properly build resilience: the commitment of the

owners wouldn't have been enough to address this unforeseen event. The engagement of other stakeholders, internal and external, was crucial to resolve the predicament, and all these factors contributed to a flexible and adaptive response.

The researcher noted how, even though the EBITDA goals were deemed fundamental by the firm, there was no formal plan to confront such a situation nor the sudden reduction in orders from the most prominent customers, confirming the lower scores in the planning capacity of the firm. Additionally, the interviewee said that the firm didn't have formal plans to address issues with suppliers, which sometimes led to untoward variability on commissions, yet it wasn't considered as an important factor for resilience. The same applied to credit insurances, as given the niche in which the firm operates, dealing primarily with larger customers pertaining to the luxury industry, the probability of credit default is almost non-existent.

4.2.1 Cri-Rec Fixtures Crisis

The thread of the discussion then moved on to the real crisis period the firm withstood: the years 2008 and 2009. The financial data pointed in the right direction, as the enterprise was already suffering before the economic downturn which affected the sector due to a fragmented leadership that didn't have a clear unity of purpose and an unambiguous strategic goal. The fact that the net worth of the owning families was intertwined with the firm's assets also complicated matters, constituting another vulnerability. As the financial crisis and the sectorial downturn began to expand, the risk factors for the firm became unbearable and it became evident that a change was necessary.

Resources which were beyond the perimeter of the firm were employed to solve the situation: a portion of the family decided to perform a sort of "hostile takeover" of the firm, offering to devaluate the assets of the organization and purchase everything but the premises. These became property of the remainder of the family and were rented to the organization.

Even though the company was still suffering, the governance and leadership issues were dealt with, strengthening the resilience profile of Cri-Rec Fixtures. The entrepreneur and now main owner of the organization also recognized the need for improved managerial skills within the firm, and in 2011 he completed an MBA to learn new competences and to guide the firm with more heed. This investment paid dividends, as the firm started

obtaining better results in 2012 and continued to do so during the next years, while contemporarily accruing more assets and developing a more refined vision and identity.
This close call compelled the new ownership to formalize a clear succession plan and a division between the family and firm assets, improving the coping range of the organization on this subject through a written and binding agreement, identifiable as a pre-emptive plan. Furthermore, it heightened the awareness of the entrepreneur on the need to allow the firm not to rely on few key people: this will be the next objective for the organization which will study new organizational models to cope with the issue.
The conversation ended with a discussion on the resilience project, with the interviewee underlining how excessive formalization could hinder the qualitative insight provided by the research. Furthermore, he mentioned how the environment of North East Italy implies some specific contextual characteristics which aren't properly captured by the survey and that the research tools could be improved through instruments that are more suited to include information on the economic background.

4.2.2 Analysis of Case 1

This case study was rich with information that can answer to the inquiries posed in Chapter 3.
Proceeding in order, Q1 was concerned with exploring whether protective factors can be divided between generic and context-specific. The case doesn't suggest a clear-cut distinction, yet formal plans and more standardized response methods, such as the production load planning the company put in place to balance and manage order fulfilments or the rules that separate the assets of the ownership from the organization's properties, appear to be close to the definition of contextual protective factors.
The survey identified a lack of these elements in the firm, particularly through the analysis based on Stephenson's two factor model: the questions addressed to the interviewee seemed to confirm that planning capacity captures more contextual protective factors in this case study and that these contribute to the coping range, as more situations are treated in a business-as-usual fashion rather than as unforeseen and untoward events. On the other hand, adaptive capacity, which captured more generic factors through its measure, allowed the firm to address unexpected variability in creative ways, just like through the methods that were employed to improve the EBITDA performance. The entrepreneur confirmed that this reaction matched with the definition of static resilience: even though

the situation wasn't a crisis, it surely wasn't a desired event for the organization, and a more standardized response would have allowed to treat it with less pressure.

The interview also leads to agreeing with the concept that some specific plans like the ones formalized by the organization aren't replicable or useful outside of their context, whereas more generic factors (such as leadership, employee engagement, availability of internal resources) are enablers of resilience which can be developed similarly in other companies.

Moreover, contextual protective factors do not appear as mere operative declinations of generic factors: they are fixed plans and protocols with completely different underlying assumptions, and they can be developed without the need of an associated generic factor, according to this case.

Regarding Q2, which implies that risk factors which overwhelm the coping range require static resilience to enable responses and that only when even this is insufficient real crises ensue, the interview provided some stark examples of how this hypothesis can be explanatory: the EBITDA downturn hasn't been perceived as a crisis, whereas the various risks witnessed in 2008-2009, coupled with the lower resilience elements of the firm, felt like they were beyond the resilience threshold, as extra resources were needed to ensure a positive outcome from the predicament. Furthermore, there was no evidence in the case pointing toward R2 being a more fitting perspective.

The degree to which different protective factors contribute to resilience was also confirmed, addressing Q3. Financial aspects were deemed crucial, just like in the BSI Group (2017) analysis. However, all generic protective factors played important roles according to the entrepreneur and a need for a balanced resilience structure was confirmed, as relying only on a few elements might constitute a risk. Contextual factors on the other hand could be irrelevant for the firm, as the credit insurance example verified. Thus, the case (and the discussion with the interviewee) point toward context-specific differences in how elements of resilience can contribute to the overall resilience capability of the firm. Quantifying these differences though could be counter-productive, given how tied to the context these values would be. Consequently, assigning relative measures rather than strict weights appears to be a better solution in ranking protective factors according to Cri-Rec Fixtures' case study.

Finally, considering the perspective raised through Q4, there appears to be an efficient point in the contextual protective factors. Credit insurance, for example, would be excessive given the very low risk the firm faces on this field; furthermore, the methods described by the entrepreneur to evaluate suppliers, based on a rough due diligence that considered the ownership structure and the overall performance of the business partner, didn't feel like they would have provided more value if they were more refined.

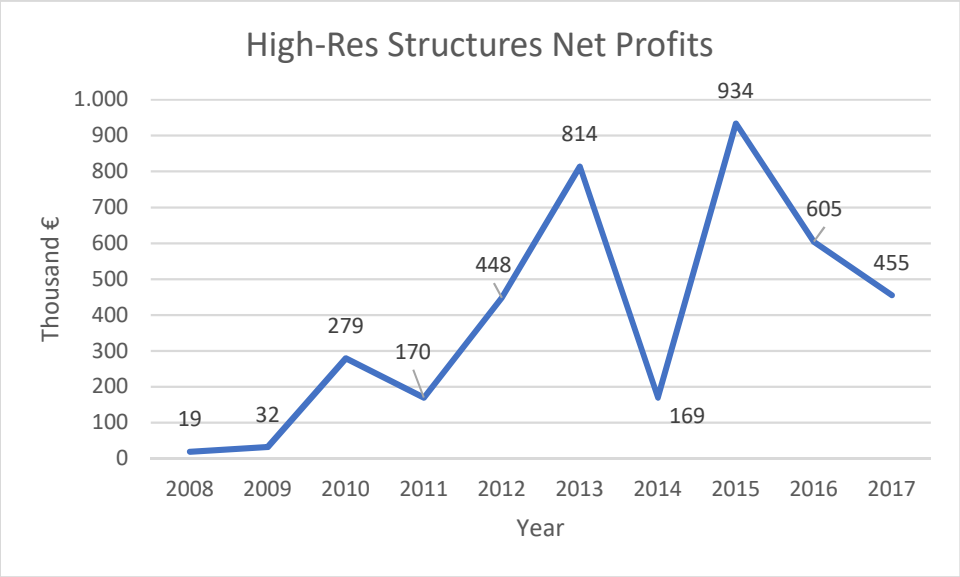
On the other hand, improving generic factors was described as a sure way to enhance resilience, given their underlying elements: the company would actively invest to improve these protective factors. The questions weren't factoring costs in, thus a balance point between the expenses and the benefits of investing in these factors wasn't identified. Nevertheless, given the more dynamic nature of generic protective factors and seeing how all of them played significant roles in addressing untoward events for the firm, the contribution of these factors appears to have less diminishing returns compared to contextual protective factors, according to this case study.

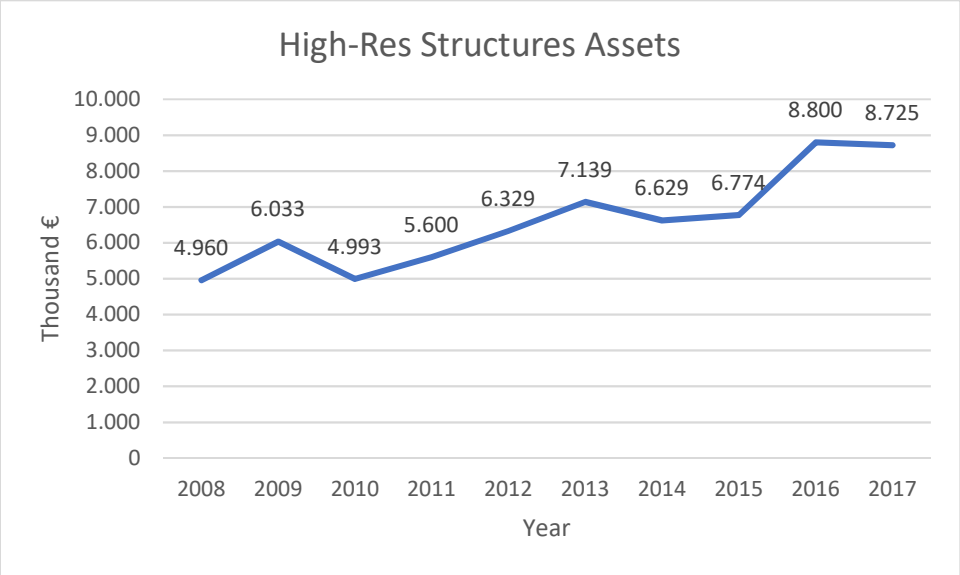
Lastly, taking into account the pattern matching methodology proposed by Yin (2006), this case closely follows the structure that was postulated in Chapter 3 for a firm that witnessed a crisis but managed to recover. This recovery was quickened through the improvement of protective factors after 2009: the development of more ownership competences and the clear separation of family and firms assets, as well as a better governance structure, were important tools to enable organizational resilience after the event. The case also highlighted how multiple risk factors weren't properly managed in 2008-2009, leading to the bypassing of the resilience threshold. Also, to prevent the crisis, the two protective factors mentioned above would have been crucial. Overall, the proposed pattern matched closely the real situation, providing additional confirmatory information for the hypotheses.

4.3 Case 2 – High-Res Structures

The case study involving High-Res Structures allowed to investigate a small, yet remarkably resilient organization. Despite the ongoing sectorial crisis, which began in 2009, this firm managed to achieve positive results throughout the last ten years. The net profit has improved gradually and steadily, and so did the owned assets, whereas similar firms went bankrupt or decided to leave the market.

Figure 4.2 High-Res Structures Net Profits and Assets (2008-2017)





Source: adapted from AIDA database, data retrieved on September 2018

After being directly contacted by the researcher, the managing director of High-Res Structures, son of the founder of the company, agreed to answer to the survey and to be available for the interview. During the latter, his father was also involved to provide a better account on the history of the organization and due to the decisional role he still has in the organization.

The resilience benchmarking survey displayed a very solid resilience profile, with high scores in almost all the studied categories. Slightly inferior values were assigned to the management of external stakeholders and the contribution of innovation and creativity to the protective factors, although this didn't strongly affect the overall evaluation.

The interview had to verify if the analysis provided by the survey was biased or accurately reflected the state of things. Consequently, the first step before moving on gathering information about the research questions required the checking of each recurring theme from table 3.2.

4.3.1 Organizational Resilience in High-Res Structures

The firm is led by family members who actively manage different aspect of the organization, and throughout its history there was a constant unity of purpose and devotion toward the success of High-Res Structures from all the involved relatives. Nevertheless, as a mean to improve inherent resilience, a pact between the owners regulates the passing of quotas and mandates that they cannot be assigned to non-family members.

Even though strategic decisions are only set by the owners, internal stakeholders are included in the decision processes where their know-how is essential to make an informed choice. Moreover, experienced workers who show their involvement in the firm and their capabilities are often rewarded with key positions, which grants them decision-making power in fields such as production and sales. These factors improve both internal resources and the organization's mindfulness.

The personnel are actively trained not only to renew competences and capabilities, but also to be able to interact professionally with clients, especially larger companies, and to achieve the necessary certifications to operate in certain contexts. The interviewees agreed on saying that their workers are the primary resource of the firm and their management and loyalty are thus vital, even to enable resilient answers. If, for example, there were issues with the workforce, the firm wouldn't be able to perform according to the agreements with its customers, therefore incurring in hefty contractual penalties.

The attention to the economic environment is also extremely relevant in this firm: even though it is a follower and not a technological leader, mostly due to its size, the owners showed a keen attention to weak signals and the rising of new trends, allowing the organization to capitalize from any opportunity it was presented during the recent years (such as the photovoltaic plant incentives), as long as the operational risk was deemed low and the required know-how adequate for the situation.

The financial aspects of the firm were described as another dimension which was managed carefully: the interviewees mentioned how without a solid financial position, or

with the presence of debt, resilient answers wouldn't be possible. They considered this to be the primary enabler of resilience, as it allowed them to heedfully choose clients instead of taking on projects just to meet cash requirements, to save slack resources for times of need and to be able to invest when necessary to capture burgeoning market opportunities. Considering more internal resources such as premises and insurances, the company features both a flexible structure, which allows it to relocate relatively quickly and inexpensively in case of disruption, and enough insurances to cover part of the expenses in case of disasters and address business-as-usual variability such as issues with customers, credits, incidents and more. This allows to improve horizon scanning as well given that the organization is notified whenever the credit risk of a customer increases, allowing to avoid continuing business with unreliable partners.

Lastly, to maintain operations continuity, clear plans were put in place to address peak loads of production, and employees aren't required to work overtime too often as the firm always relies on external suppliers in these periods and, where needed, on temporary employment. Long-term recruitment is carefully evaluated as, in order not to break the trust between the firm and its employees, the owners accurately avoid any layoff; the strategy is to avoid projects the organization cannot address with the owned resources rather than risking on the long run.

The owners were also able to explain why the score on the management of external stakeholders' theme was lower: High-Res Structures isn't a large company, thus they cannot always support their supply chain, even though they actively monitor performance both downstream and upstream.

On top of the plethora of protective factors the firm has in place, the niche in which it operates felt a reduced impact from the economic downturn, as it is also concerned with maintenance and the upgrading of already built systems, which provided safe streams of revenues during the period. However, various similar firms in this niche witnessed negative effects, thus the low exposure to risk described by the interviewees is more related to the organization's ability to prevent and avoid threats rather than to external factors only.

4.3.2 Analysis of Case 2

One of the first elements that stood out while envisioning this case was that a small size and a lack of large resource pools do not imply the absence of organizational resilience.

High-Res Structures managed to grow steadily during the sectorial crisis through its down-to-earth and methodical approach to possible risks and opportunities. The stance was similar to the one displayed by General Hospital in Meyer's (1982) case studies: focused, precise responses that allowed to bear the situation in a business-as-usual fashion, to the point where the untoward events weren't felt at all.

Such a reaction required a thorough verification of the protective factors the firm is endowed with to understand whether inherent or static resilience played more important roles. High-Res Structures employs semi-standardized plans to cope with daily variability, signalled for example by the diligent evaluation of customers, the approach to workload peaks and recruitment, the family pact; this however doesn't hinder the adaptive capacity of the organization as there is an active attempt to engage the workforce and train it to sustain performance, slack resources are accumulated to face possible threats and opportunities and all the family is consulted before decisions are made.

Even though the latter protective factors are closer to the generic factor definition, and they helped the firm in maintaining its poise over the last ten years, specific plans and procedures (i.e. contextual factors) were set up to cope with most of the relevant issues that could arise. Consequently, the coping range of the organization is rather wide, and the interviewees confirmed that they felt like the sectorial crisis was still within this range, being a disturbance they were prepared to deal with and confirming proposition Q1.

Furthermore, the case didn't provide any clear evidence toward R1.2: contextual factors didn't seem mere declinations of generic factors; the two categories are different and contribute to resilience in different manners. In fact, the examples provided by plans and mindfulness in Roberts' (1990) case study showed approaches that are similar to how High-Res Structures copes with variability.

Q2, which attempts to verify the existence of the coping range and the resilience threshold, was also confirmed: the enterprise never witnessed a crisis throughout its history, remaining within the threshold, and even when the disturbances in its environment increased, starting from 2009, risk factors were kept low while new opportunities were being captured, suggesting the existence of a coping range that was wide enough to address the newest threats in the market.

Regarding the differences in building organizational resilience through the enhancement of different protective factors, captured by Q3, this case underlined how financial stability

could be essential to enable any kind of resilience. The pressure deriving from a turbulent environment and a rickety debt structure would alter decision-making processes leading, if the need arises, to uneconomic choices taken simply to satisfy cash constraints. Regardless, this is just a starting point as numerous factors played a relevant role to shelter the organization from problems: awareness toward their customers, continuous training, diversification which allowed to mitigate operational risks, a strong leadership. The interviewees noted how some of these factors are specific to their industry, such as the requirement of certifications for their personnel and the need of insurances given the typical risks in the sector.

Still, the entrepreneurs ranked the importance of protective factors for their firm in the following order: financial safety, management of internal stakeholders and resources, leadership. There was the perception that these elements played a pivotal role for their resilience capacity, whereas no evidence pointed toward an equal weighing of all the factors which influence this capability.

Concerning Q4 and the identification of instances where factors are active or at an efficient point, the interview suggested that the company was being very cautious with its financial structure, more due to the careful approach to risks of the ownership than due to a process of financial engineering. Despite this, static resilience was perceived as being possible only with enough slack resources to back it up, thus the researcher cannot conclude that this was a sub-optimal approach. However, the availability of specialized workforce, comprised in the internal stakeholder management measure, was described as good, but constantly put under pressure: if there were better ways to temporarily employ people during peak load periods, the firm would achieve an even superior performance. The managing director mentioned how even after dispatching part of the orders to external suppliers and momentarily increasing the workforce, ten more operators would be necessary to tackle all the opportunities the organization was presented in this period. Still, due to the layoff avoidance initiative, High-Res Structures prefers to miss on some offers or projects rather than increasing long-term risks. Safety was more appreciated over risk-seeking growth.

This is a clear example of a factor that is below its efficient point, requiring further investments and attention to reach an improved performance of the element, both in its

contribution to organizational resilience and to the firm's results. Therefore, evidence points toward a confirmation of proposition Q4.

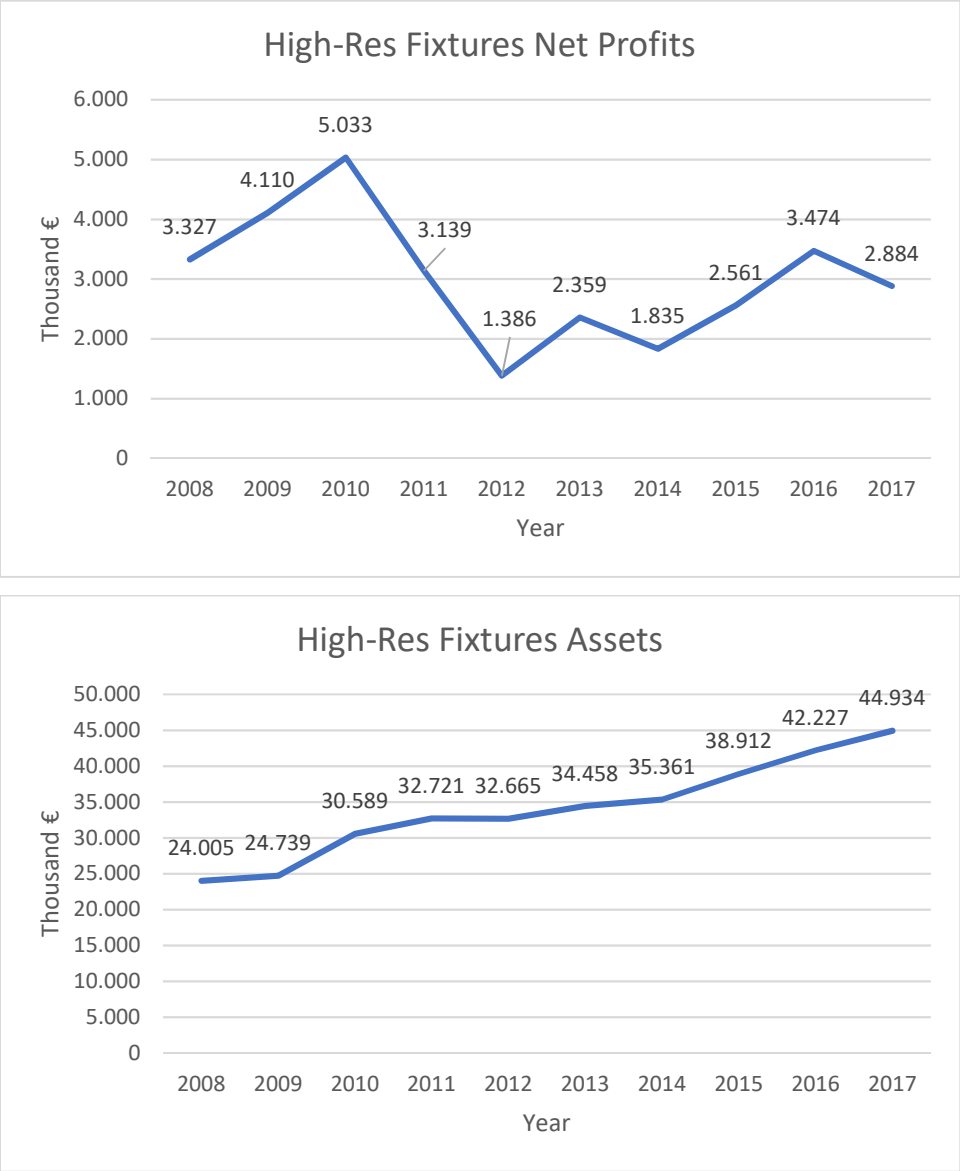
The analysis of this case provided solid clues to verify all the theoretical propositions, thus to accrue additional proofs that the envisioned theories are appropriate representations of reality, pattern matching will be checked. Paragraph 3.5 proposed the following expected outcome: a firm with a stable or growing RoE during the crisis should have been the signal for a firm that maintained a business-as-usual behaviour, with a balance between context-specific and generic protective factors that allowed the coping range to absorb the variability during the period. The description closely matches what happened do High-Res Structures.

The already present factors, which were further developed in the time being, had a chief importance during the downturn. Finally, although internal stakeholder management was consistently put to a test due to the steady, risk-free growth path the firm chose, improving this dimension would have assured only limited benefits from the organizational resilience standpoint, though the organization's results might have improved. Overall, the effective case closely resembles the prefigured path, giving even more credit to the proposed theory.

4.4 Case 3 – High-Res Fixtures

High-Res Fixtures was selected as a candidate for case studying because its RoE, profits and assets have been positive during the crisis years in the furniture sector, with a substantial over-performance compared to its peers.

Figure 4.3 High-Res Fixtures Net Profits and Assets (2008-2017)



Source: adapted from AIDA database, data retrieved on September 2018

The survey and interview were answered by the HR (Human Resources) manager of the company, who has been working in this firm for sixteen years and is thus deemed knowledgeable enough to provide an accurate account of the elements of resilience that were discussed.

The findings reported from the questionnaire were somewhat surprising: the current resilience profile of the firm showed a strong focus on adaptability and flexibility, which would suggest a noteworthy static resilience capability, yet the planning capacity and the management of keystone vulnerabilities measures hinted toward a poor performance in these dimensions. The first conclusions drawn from the survey suggested that High-Res Fixtures was employing some factors (such as mindfulness, good decision making and horizon scanning structures and a solid growth in its core business) to compensate lack of solid and formalized plans to guide the firm in business-as-usual times and the poor recognition to personnel for employing creativity and initiating innovation.

The interview had the purpose to clarify the state of things. It involved a tour of the facilities of the company which allowed to analyse some artefacts the researcher was able to notice. At the beginning of the discussion, the interviewee, who was being assisted by an HR specialist colleague, was asked to identify the limitations of the questionnaire. Although there weren't relevant issues, the responder focused on the definition of external stakeholders which was adopted by the survey: he argued that their customers couldn't be considered as part of the category and that this dimension wasn't relevant for High-Res Fixtures as the company is acting like a market leader.

He stressed how, instead of chasing the market trends, analysing the purchasing preferences of the clients and overall relying on formal information gathering, the firm was concentrating on creating high-end products which would be recognized by anyone as beautiful and visionary. This greatly reduced the need to interact with customers, in his opinion, letting instead the quality of their products talk by itself and providing higher returns to agents and distributors as long as they complied with the policies and showroom designs suggested by the company. The only aspect which was constantly checked was the financial stability and lawfulness of the customers, as they are primarily businesses and not consumers.

The relationship with suppliers was also deemed only slightly important, especially considering third-parties involved in the refinement of materials and production of semi-finished products. Due to how the products of the firm are designed, most of the added value happens during the assembly phase, which is entirely kept in-house: moreover, 80% of the products and their parts are crafted in-house, greatly reducing the ties with external suppliers in the eyes of the responder.

4.4.1 Organizational Resilience in High-Res Fixtures

This atypical stance allowed to discuss in detail how the firm succeeded in the last ten years. The HR manager promptly replied that this high performance is primarily tied to the design ability and acute entrepreneurial spirit of the managing director, who anticipated the market and solved any issue creatively beforehand, instead of relying on plans, numbers and forecasts. Jokingly, he mentioned how whenever the firm had to formalize its three-years projections, the managing director rolled his eyes saying that the firm could change course thrice during that period, in an attempt to outrun the market and set the trend of the whole sector, instead of following it.

Nevertheless, the firm features a high degree of formalization in the production department: the principles of lean production are not only applied, but fully embraced by the personnel, as signalled by the Kanban boards scattered through the premises. Peak loads are carefully managed and levelled, as well as logistics, but this planning capacity falls short when considering low-chance, high-impact events such as the possibilities of a fire or flood, the sudden inability of the products to meet the market desires or the disappearance of the managing director and his creativity.

The interviewee stated that if the last two situations were to materialize, the firm would cease to exist almost immediately: even though the employees embrace the firm culture which is oriented to innovation, out-of-the-box thinking, solving problems as they arise rather than planning beforehand and fostering the know-how related to products, the lack of the visionary lead of the director would greatly reduce the uniqueness of High-Res Fixtures, leading to a probable crisis. The same would apply if the creativity of the staff was reduced.

The discussion implied that the firm is striving to maintain its leadership in the market, but it had no backup plans to recover if such position was seriously threatened or surpassed by a cunning competitor. This aspect was compensated by a careful analysis of which risks the firm could take: the available cash was always kept at high levels to shelter from unexpected events and to invest in opportunities, and even though the three-year budget might not be met, the firm maintains a perspective oriented to the long term. Stretch goals are actively set and objectives are communicated and shared with the internal stakeholders: the unity of intent and the pervasiveness of this approach was felt even by the researcher during the interview, as the workers showed an authentic passion

and commitment to the vision of their leader. Even the brand of the firm focuses on the idea that their furniture should last long and trigger emotional rather than functional attachment, requiring their reputation to maintain high standards.

4.4.2 Analysis of Case 3

This case study seems to subvert all the propositions and theoretical insight accrued to this point of the dissertation, instead it provides a unique perspective which reinforces the idea of how resilience can be developed in multiple ways.

Proceeding in order, the first research question is analysed. Can protective factors be divided between contextual and generic categories, influencing respectively the coping range and resilience threshold of the firm? In previous cases and throughout the literature, contextual protective factors were often clear-cut plans that identified the typical threats an organization might have to face and the procedures to address them methodically. They resembled the planning capacity dimension analysed by Stephenson (2010), whereas generic factors were more concerned with elements of resilience that enabled flexible, unprecedented answers to unforeseen and atypical threats.

High-Res Fixtures turns this perspective around: for this organization, answering dynamically to threats as they manifest is the business-as-usual approach. Each situation is addressed uniquely, with a fresh, creative perspective which doesn't rely on pre-planned strategies. Consequently, the coping range isn't the usual set of protocols through which variability is confronted on a daily basis: in this case, it's the mindfulness and culture within the firm which requires employees to counteract volatility in a creative and contextual way, showing adaptive capacity even in case of common issues.

Plans and protocols, budgets and forecasts are considered by this company as a generic protective factor, something meant to be activated only if the typical adaptability that is employed isn't enough to face the rising threat. Still, very few plans were put in place to shelter from these untoward events: the interviewee stated that there hadn't been any formal planning for specific risks until a few days before the research began, when the company started to adopt procedures to use in case of a fire in the premises. Following this perspective, the static resilience of the company is rather thin, as confirmed during the discussion: if the creativity of the company was to falter, a crisis would be very probable; the same would apply with the loss of the market leader position or if internal stakeholders suddenly became less attached to the values and culture of the firm.

The interview and questionnaire identified this lack of backup and business-as-usual plans, signalling how the firm never witnessed a crisis as it always employed its creativity and ability to anticipate market trends as the main elements of inherent resilience, explaining why the firm never flinched during the sectorial downturn. The issues would arise only if these elements proved insufficient compared to the active risks: the interviewees confirmed that if the risk factors mentioned before were to manifest together, or if these capabilities were any less effective, the firm would be caught flat-footed.

This situation appears to be close to the cases of Nokia and Blackberry, market leaders who couldn't foresee threats and adapt in time and that hadn't backup plans in place to shelter their business in case of a drastic market shift.

After providing some interesting and atypical clues regarding Q1 and Q2, the case also points toward a confirmation of statement Q3. Even though protective factors are tightly related to the main characteristics of the firm and its "DNA", some aspects are chiefly important in developing resilience (such as mindfulness and adaptive capacity for High-Res Fixtures) while others are less relevant; a balanced resilience structure is still necessary to face both frequent and rare threats while maintaining the firm's functioning.

Lastly, the case provides the strongest evidence toward confirming Q4: the interviewee clearly identified creativity and innovation and HR related factors as the elements that are most often put to a test in the organization, showing how they are active protective factors. On the other hand, given the current situation, the management of financial aspects is an inactive factor which does require attention, but wasn't identified as the chief priority for the firm. The level of available cash, paired with the growth trajectory of the firm, is expected to be more than sufficient to deal with unforeseen threats.

After showing the theory confirmation provided by the case study, the pattern matching is explained to provide further evidence. The organization was expected to have maintained its poise throughout the last ten years, living through the industry downturn as if there wasn't any crisis. This has been confirmed during the discussion as the company never felt pressured by the new market conditions. It has also shown a high degree of inherent resilience, though in an unconventional way, which explains why this period has been managed in a business-as-usual fashion.

The division between contextual and generic factors is also verified, though to a lesser extent if compared to other cases: the plans the firm wishes to develop are aimed to

provide generic answers to unforeseeable threats that would bypass the adaptive capacity of the firm. Given the culture and typical approach to problem-solving the organization has, creating plans and procedures for business-as-usual management would prove much less effective than in other companies, yet the researcher recognizes that this is a speculation which might not describe the real state of things, although the interviewees agreed with this point of view.

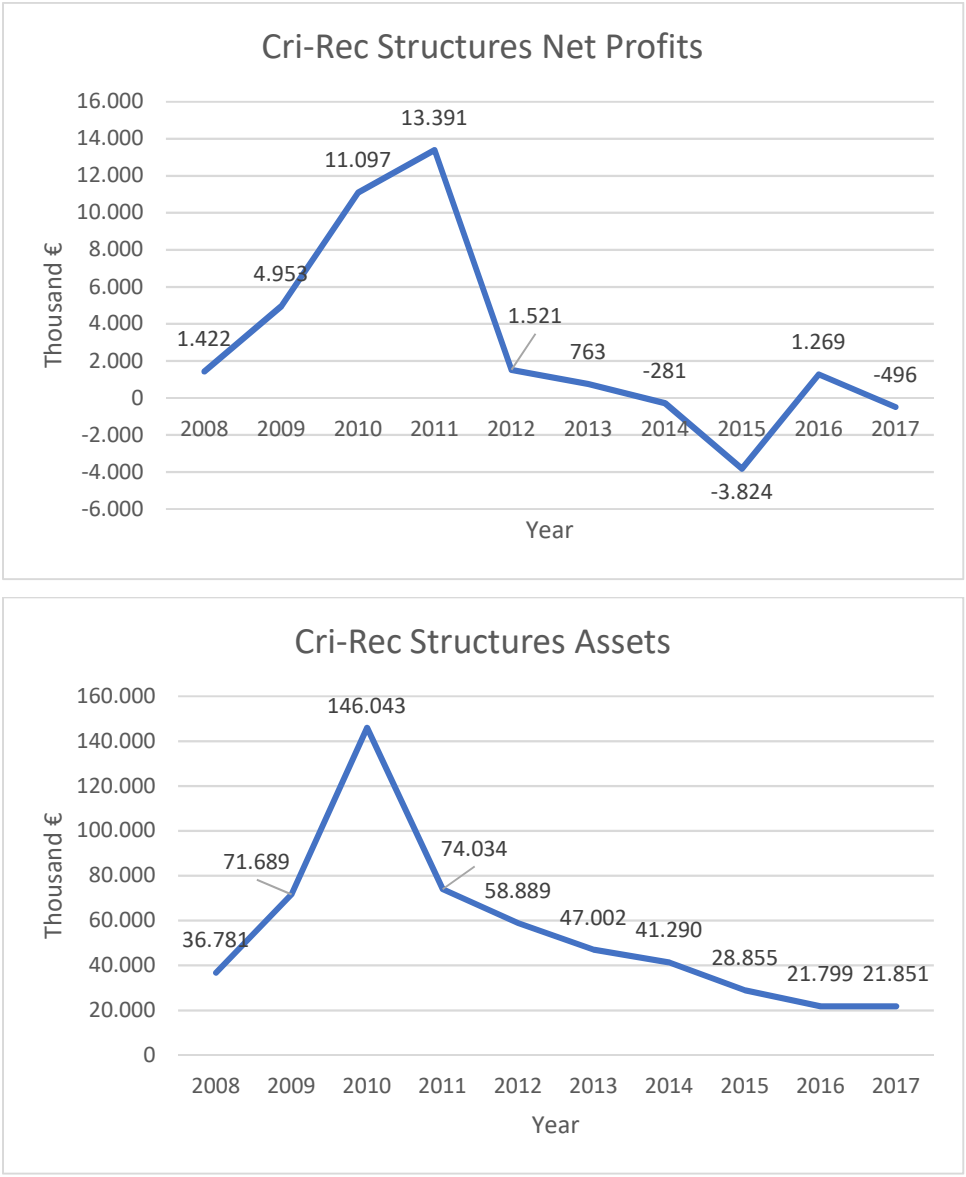
The case showed no evidence of how contextual factors were an operational declination of generic one, in fact the categories appeared well distinguished throughout the case. Still, as foreseen, the firm was able to withstand the sectorial downturn thanks to its market trend anticipation, its entrepreneurial attention and its careful approach to bearing new risks, pointing toward a confirmation of Q2.

The expected case required to identify some factors which allowed to address the rising of the threat level (the sectorial crisis) easily, and the creativity and horizon scanning capacity of the organization were indeed the chief elements which sheltered from the impact. The positive results were obtained through an erosion of the competitors' market share, which shrank in favour of High-Res Fixtures. Moreover, R3 is disconfirmed as other protective factors wouldn't have had the same effects in preventing the crisis. Lastly, as the whole period was managed like ordinary administration, a strengthening of any element of resilience wouldn't have led to improved results given the context.

4.5 Case 4 – Cri-Rec Structures

Cri-Rec Structures was selected as a case study candidate for its interesting RoE, profits and assets dynamics in the last ten years. Up to 2010, it was witnessing a bursting growth that doubled the owned assets every year and allowed to obtain a net profit which was several times higher than what was achieved by its peers. In 2011 however, even though the results were still impressive, the owned assets were halved, and they kept being reduced up to this year. From 2012, the performance of the company worsened severely (up to the point where it suffered losses instead of profits), though in 2016 it managed to bounce back returning to a positive trend. Considering that the construction sector is still experiencing an economic downturn, the situation suggested the possible presence of elements of resilience which quickened the recovery.

Figure 4.4 Cri-Rec Structures Net Profits and Assets (2008-2017)



Source: adapted from AIDA database, data retrieved on September 2018

Consequently, the managing director was contacted for more information and to submit the survey; the research met his interest and he agreed to participate in the project. The questionnaire revealed that the company had a balanced and fair resilience profile, showing some shortcomings only in the engagement of internal stakeholders, the capabilities and resources related with external stakeholders and the participation in exercises. This pattern of answers was to be expected, considering how the firm appeared to be once again in the path of organic growth and economic success.

4.5.1 Cri-Rec Structures Crisis

The interview shed light on what happened since 2008: before the year 2000, Cri-Rec Structures was a firm primarily focused on the installation and maintenance of industrial electric systems, yet it already recognized how this area was about to witness a crisis and a strong reduction in the market size. Strategically, the organization decided to invest in competences concerning renewable energy, shifting its core business in that direction. In 2005, the revenues amounted to 5 million €, and the construction sector in Italy was offered a great, yet risky, opportunity: the development of the photovoltaic plants market which was heavily subsidized by government incentives.

Cri-Rec Structures had the knowledge and the means to enter this market, a fact that pushed the growth of the firm which had a turnover of 150 million € in 2010, with almost all the business being concerned with photovoltaic plants installation (the average project at that time had a size of 3 million € per customer). The directors though knew that this type of business would come to a halt as soon as the government withdrew the incentives, and measures were already being taken to brace for the untoward event: even despite such an impressive growth, the firm relied on external third-party installers and increased its workforce gradually, instead of being overly optimistic. Financial resources were being accrued to invest vigorously in new technology based on other renewable sources (wind, biomass), and the R&D department was already working on creating novel products which hadn't any support from government incentives, in order to move away from the crutch offered by the State.

In 2011, as Italy began witnessing the full extent of the financial crisis, the incentives for the photovoltaic plants were withdrawn. 80% of the turnover of the firm was hit by this change, leading to the dip in performance. The impact was sudden and strong, but the organization was ready for the event, to the point where it became a "measured crisis", in the words of the managing director. It's possible to recognize an example of an autogenic crisis as theorized in Boin & Hart (2010), with the company moving in advance for extending the period of the crisis to have more time to react adaptively to it.

The firm began divesting in 2011 from the photovoltaic sector and moving to different products, with the objective of diversifying risk and shifting to smaller projects (averaging 300.000 € per order) to meet the new market conditions which entailed a severe credit crunch that reduced the customers' ability to commit to larger investments.

By 2013, the core business had moved almost completely (70-80% of the revenues) toward wind and biomass products that had no incentive from the government, requiring a complete economic viability on their own to achieve good results.

Moreover, Cri-Rec Structures actively monitored the environment for internationalization opportunities, entering new markets that were deemed stable enough and that featured strong entry barriers, both in terms of regulation and required know-how, despite the comments made from the hired consultants who were advising to downsize the firm or initiate a liquidation process.

In fact, the crisis became an opportunity to completely renew the organization, setting it on a more sustainable path that capitalized on the strong competences of the internal stakeholders and their creativity and development skills. Even from a strategic point of view, the firm adopted a keener entrepreneurial spirit and invested in improving its planning capacity, as it began tackling whole projects instead of just the installation part, which required a stronger industrial and production organization and a better knowledge of the product life cycle dynamics.

This passage though wasn't described as being completely smooth: the banks were closely monitoring the results of both the firm and its customers, gradually reducing the granted flexibility. Internal stakeholders were also nervous after such a strong reduction in revenues, thus the management had the primary goal to maintain the unity of intent of the company: if the creativity and innovation capability derived from the workforce was to be reduced, Cri-Rec Structures wouldn't have been able to complete the change process.

Still, the horizon scanning capability and the presence of a solid plan for the future of the company, as well as the absence of other noteworthy risk factors, allowed to maintain a cool head and to make proper decisions which led to a well-defined objective. Even though the untoward event was a major issue, this preparedness instilled hope in the firm, enabling the quicker recovery and the adaptation process, which is still in place as the firm is coping with the new market texture and the ongoing Italian crisis.

4.5.2 Analysis of Case 4

The review of the case allowed to immediately frame some answers to the various research inquiries. Concerning Q1, the account clearly identifies the elements improving the coping range (contextual protective factors), which are primarily tied to the planning

capacity and horizon scanning capability of the firm. Innovation and creativity also play an important role both during crises and business-as-usual times, as confirmed by the managing director, whereas factors as leadership, mindfulness and the management of internal resources seem to be closer to the generic protective factor definition for Cri-Rec Structures.

The description obtained through the interview didn't provide strong evidence that could confirm that these factors are replicable, yet there was a confirmation that contextual factors tend to be tied to the core competencies of the firm. Moreover, the effects of the two categories of protective factors seem to influence either the coping range or the resilience threshold, with little overlapping: even though all the elements were considered useful during both crises and normal administration, the typical approach to variability is related with careful planning based on the evidence gathered while studying the market. The "measured crisis" that the firm witnessed was beyond the usual coping range given its magnitude, and in this case the factors related to static resilience influenced the positive outcome: a strong leadership and governance, the previous good management of internal resources and adequate decision-making processes enabled resilience as the situation unfurled: the solid plan for recovering the business wouldn't have been sufficient without maintaining the involvement of internal stakeholders.

This also verifies the second proposition of this dissertation, as the dynamics of the autogenic crisis the company witnessed meet the definitions of coping range and resilience threshold that have been used throughout the cases. Even though the risk factor, (i.e. the sudden withdrawal of the incentives) affected 80% of the revenues of the firm, the absence of other relevant risks that had to be managed in concurrence allowed the situation to stay within the boundaries of static resilience. The case still confirms the idea that risk breeds risk, as the economic crisis and the credit crunch led to additional tensions among internal stakeholders and the future felt uncertain.

Protective factors also seem to play a different role in building resilience: the competences constituting the coping range were the most important for the firm, whereas some elements, albeit useful, played minor roles (such as mindfulness or the management of external stakeholders). Without the relevant horizon scanning capability and the innovation and creativity the firm possessed, the crisis would have been fatal, as pinpointed by the interviewee. This also signals how, given the contingency, these two

factors, as well as the elements related to internal stakeholders, were active for the firm both before and during the crisis, whereas the management of internal resources, chiefly important in other cases, wasn't put under excessive stress during the untoward event. In fact, the static resilience capability built by the firm was enough to face the threat of the situation, without requiring the employment of extra resources.

As for the other cases, to accrue more evidence, the researcher employed the pattern matching methodology. Considering the expected outcome, it is easy to notice how Cri-Rec Structures recovered earlier than its peers from the sectorial downturn thanks to the elements of resilience. In particular, the situation wasn't perceived as business as usual (which would imply that the coping range was sufficient to address the contingent variability), yet static resilience was sufficient to cope with the threat deriving from the market shift, leading to the definition used by the managing director of a "measured crisis".

This event depleted part of the slack resources accrued through the generic protective factors of the firm, but it didn't completely consume them, enabling the resilient answer. The case also shows how there was little overlapping in how contextual and generic factors played a role, with contextual factors sheltering primarily from operational risks (the need to redirect the strategy and the new market conditions) and generic factors adjuvating the firm through the management of atypical risks (possible personnel demotivation and detachment).

Concerning the expected outcome related to the second proposition, the typical response mechanisms had to change in the firm as the photovoltaic incentives weren't going to last forever, and they constituted a severe risk for the company, although they enabled its quick growth. When the crisis hit, and the subsidies were withdrawn, the protective factors began playing their role, requiring an atypical but well-structured response (change of strategy). Still, given the absence of other relevant risk factors, a single event of this magnitude wasn't overwhelming, showing that sheltering from risks breeds competence even in difficult periods.

Concerning the importance of some factors, the stress on creativity, innovation and horizon scanning provided by the managing director was more than enough to verify how the expected path is like the real outcome of the crisis. Other factors wouldn't have had a similar protective impact. The case however didn't provide strong evidence toward

confirming Q4, as even though some factors felt close to the "active" definition, only mindfulness was perceived as not being employed during the crisis, but due to its minor role during the interview the point wasn't properly elaborated.

4.6 Findings from Cross-Case Comparisons

Before moving to the formalization of conclusions deriving from these cases, the results deriving from cross-case comparisons will be explained, as the questions which required a broader overview (i.e. Q1a, Q3a) haven't been addressed yet.

The cases provided evidence of a clear distinction between contextual and generic protective factors, though the most interesting finding is that contextual ones are strongly tied with what a firm considers as its core competences. These are the means through which typical, day-by-day volatility is contained, and they are often employed even in crises. When the coping range is surpassed, however, the unexpected is coped with through the elements that build static resilience. These are unconventional instruments for the organizations, as they don't pertain to their typical response repertoire, though they are easily replicable: the request of discounts from engaged external stakeholders and the family pact in the Cri-Rec Fixtures case or the commitment of the management of Cri-Rec Structures in maintaining the unity of purpose aren't strictly connected to what these companies are about in business as usual times. Even the possibility of backup planning for High-Res Fixtures, which would be a generic protective factor in the case, isn't part of the essence of this company, yet it would play a relevant role during a crisis. These means of adaptation are peripheral resources which do not pertain to the core endowments of the organization, thus they are much less idiosyncratic if compared to the visionary culture of High-Res Fixtures, the balance between plans and adaptation in High-Res Structures, the attention to the economic environment and the creativity capability in Cri-Rec Structures and the careful production load planning and know-how preservation methodologies in Cri-Rec Fixtures. Generic protective factors are enablers of adaptation that are less related to the DNA of a firm, such as the financial stability (given by the absence of debt) in all the cases apart for Cri-Rec Structures, good relationships with internal stakeholders (High-Res Structures, Cri-Rec Fixtures), the due diligence on customers. Consequently, they are much easier to replicate as they are close to typical by-the-book best practices than to distinctive capabilities.

On the other hand, their benefit is useful primarily in coping with manifest crises rather than with the variability the company has to manage daily. To improve the ability to treat more threats as business as usual, the resilience elements must become core competences for the firm, something it cannot part with without losing a portion of its identity. Otherwise, these protective factors will always be means that are used when the need arises, which implies that an unforeseen and untoward event already affected the organization. Consequently, these findings point toward a confirmation of Q1a and a refusal of statement R1a.

When moving to the importance of the elements of resilience for different firms and sectors, even for generic protective factors the relevance changes considerably among organizations. The cases never showed a unique pattern toward building resilience, or similar priorities even within the sector. The contingencies each company has to face shape the required protective factors, and the contextual protective factors and core competences of each firm affect which contingencies are considered as business-as-usual and which are high-impact events. Consequently, Q3a has a weak explanatory power compared to R3a: protective factors do have different importance given the context, and not only this difference doesn't apply within sectors, but also within firms in the same industry.

4.7 Conclusions

The first considerations on the case studies are concerned with the tools that were employed for the analysis. Studying RoE and net profits dynamics and the variations of the assets owned by the firm proved to be effective instruments to identify which firms witnessed crises and which had sufficient resilience to cope with the threat. A strong volatility in these elements or a sharp reduction are good signals that the firm might have weak protective factors, though a formal rule wouldn't be appropriate for studying groups of small or medium sized firms that aren't publicly traded: the results of such samples are too different among each other to be easily comparable through formulas; the interpretation of the trends compared to the sector averages provide a richer insight than, for example, the VOLARE method from Markman & Venzin (2014), which requires firms to be included in certain stable risk classes.

Considering the survey and the measurement methods proposed by McManus, Stephenson and the "Resilient Organisations" research group, they create proper

evaluations of the organizational resilience, which were appreciated by all interviewees for their accuracy. The interpretation of the profiles still requires an educated eye, as proven by the case of High-Res Fixtures: a sub-optimal profile in absolute terms doesn't imply that the firm is witnessing a crisis, as it could be controlling just enough risks to cope with the current situations while being prone to disruptions if these risks were to increase. Moreover, the data should be interpreted in a relative way when measuring the values for single firms, highlighting points of strength and of weakness rather than the numeric differences between the measures.

These instruments also do not consider the context and risk elements that the firm is confronted with or do so only partially. A tool that was able to measure risks and compare them with the protective factors the firm has in place would be a great improvement over the current models. Nevertheless, to measure overall relative resilience, weights shouldn't be assigned to the different elements, as a balanced resilience profile is always preferable to one that relies only on its most important factors: in this last case, the organization would become brittle and prone to disruptions if these factors were depleted.

Moving to the research topics proposed in chapter 3, the analysed cases suggest the confirmation of the following statements:

- Protective factors can be divided between the contextual and generic categories, with the first primarily contributing to the coping range of the organization and the latter improving the static resilience capability, following the definitions stated in table 3.1;
- Crises that can lead to a complete disruption of the organization ensue only when the resilience threshold is surpassed. This cannot happen due to a single untoward event, but due to the cumulation of multiple risks that aren't coupled by nuanced enough protective factors;
- Organizations should carefully monitor which factors are enhancing the coping range, meaning that they are employed to deal with vulnerabilities and risks that arise during business as usual situations, and which develop static resilience. The first should be core competences for the firm, while the latter are assets deployed when the typical response methods aren't enough to address the situation, usually after a critical environment change which requires flexible adaptation;

- Context shapes which resilience enabling factors are more important for a firm. All the analysed elements provide at least improvement to the static resilience, but the coping range is widened only through the improvement of the core competences that are essential for the organization;
- Even though the importance of different factors varies, the most resilient companies have a balanced resilience profile according to McManus' and Stephenson's models, signalling both a wide coping range and sufficiently nuanced resilience threshold. None of the elements of resilience is entirely irrelevant, though some (in particular contextual protective factors) are of capital importance for the firm;
- Competence begets competence and risks breed risk: lowering the measures of the various protective factors would constitute a vulnerability for an organization, and if more risks are active due to the environment, this could lead to a crisis. Carefully managing the dimensions that build resilience and monitoring that they aren't neglected or under excessive pressure is critical to avoid crises, and renewing them right after a crisis should be a priority as there is a direct improvement of resilience after these dimensions are restored;
- Resilience elements have an efficient point, where further investments would be costlier than the relative advantage they offer. Identifying this point precisely though requires an analysis that is too dependent on contextual factors: consequently, it is more appropriate to identify the opportunity costs of the reduction of some elements for each firm. If the opportunity cost is high, strengthening that factor should be a priority over the betterment of other dimensions;
- Organizational resilience is a necessary condition for positive economic results during untoward events, but not a sufficient one, as other unrelated factors like market power and environmental factors influence the results of a firm;
- Organizational resilience shelters from lower bound variability in performance but does not assure above average results compared to peers;
- Organizational resilience is a normal feature of well-functioning firms that invest in their core competences while maintaining enough flexibility to be able to cope with new, unexpected threats. The elements of resilience are developed through

the typical investments a firm would make in the categories highlighted in table 3.2, though knowing which factors are more important for ordinary variability and which should address low-probability, high-impact threats is relevant to properly engineer the resilience profile, rather than relying on the impression of being thoroughly prepared.

Overall, the cases provided satisfactory clues to confirm the proposed theoretic statements apart for Q4, which was difficult to capture given the high contextuality of the construct.

4.8 Limitations

The conducted case studies featured some limitations. First, only one or two key people from each company were asked to compile the survey and participate in the interview. To avoid any risk of bias in the results, more individuals within each organization could have been consulted to create an average of the results and reveal common themes. Still, given the scope of the research questions, the information and the confirmations that were retrieved were satisfactory, even if the individual resilience profiles identified by the surveys might have been skewed.

Furthermore, a sectorial resilience benchmark was unavailable and difficult to obtain: this meant that there wasn't a clear case that could be used as a reference for comparisons, though this limitation was foreseen given how the research tried to focus on extreme cases, rather than average outcomes.

Moreover, focusing on two sectors that witnessed a crisis helped capturing how a single event could tip the balance in the studied organizations: following researches could try to understand how resilience acts in industries that are flourishing, pinpointing whether overwhelming risks and the depletion of protective factors create crises even given good environmental situations.

If Masten's (2014) findings are applicable to organizations just like for growing children, there is a chance that a favourable environment is enough to shelter firms from untoward events, just like some companies in the Italian construction industry who suffered only once the government incentives in the photovoltaic sector were withdrawn, as found out during the interviews.

Very few considerations were also made on the context in which the firms operate, though according to the interviewees this might influence the outcome of the case studies: similar

researches in the future should provide a better account on the subject and attempt to draw theoretical conclusions on the point.

The choice of the North East of Italy as the field for this research might have unwillingly included cultural or geographic effects that could have impacted on the results, although the choice had the specific purpose to highlight the behaviour of similar firms right after a common untoward event.

More longitudinal studies or inquiries including different countries could provide even stronger evidence to generalize the findings displayed through the dissertation: its breadth was reduced in favour of the quality of the information that had to be retrieved. As there was no empirical study verifying the analysed constructs nor the interplay of risk and protective factors and how the latter manifested during crises, approaching the proposed questions through statistical methods or more formalized tools wouldn't have been the most appropriate methodology, as suggested by Yin (2009). Now that the definitions have been selected as possible means to understand reality, broader studies could provide additional insight.

As a last concern, Yin (2009) suggested that proper qualitative case studies used triangulation methods to deliver confirmatory evidence for the studied constructs. The maintenance of the chain of evidence, the strong theoretical background and the constant reference to proven methods as well as the adherence of the answers reported from the interviewees to the cases that were expected before the empirical study began were the means that aimed at solidifying the propositions throughout this chapter.

However, the only external confirmation for the findings came from the feedback provided by the interviewees, who agreed with the proposed analysis and provided their advice and insight. Other external sources which could verify the connection between the financial performance of the organizations and their resilience weren't available as, especially for the High-Res firms, few newspaper articles discussed these organizations. The ones that were retrieved were used to cross-check the facts reported during the studies, though if more sources were available the evidence would be even more solid.

4.9 What Lies Ahead? – Suggestions for Future Research

Although this study provided some important theoretical confirmations, organizational resilience is still a field of research that can be deepened, and this paragraph wants to suggest some means to improve the available knowledge on the subject.

First, looking at the cases, the elements of resilience that were deemed important are deeply connected to the structure and strategic scope of the analyzed organizations. Cri-Rec Structures and High-Res Fixtures were closer to the upper boundary of the medium firm size definition and gave the impression of being product-oriented firms, which wish to deliver to the market tangible objects first, and services as a complement.

These findings might explain why creativity and innovation were deemed the most important factors, whereas financial security was a relevant element, but it wasn't the primary enabler of resilience. The difference in what was considered as the second most important factor could also be tied to the cultural orientation of the firms: attention to the economic environment for Cri-Rec Structures, given their tendency to plan to anticipate market dynamics, and adaptive capacity for High-Res Fixtures, explained by the approach the organization exploits to address typical variability.

On the other hand, High-Res Structures and Cri-Rec Fixtures, being closer to the lower bound of the medium size firm definition, had a stronger concern toward financial security as it felt like the reputational basis through which these organizations could seek larger partners and aim at interacting with more structured firms. Moreover, they described themselves as primarily delivering a service, rather than a product, and they were closer to a follower strategy than to an innovator one.

Fantazy et al. (2009) brought evidence on how different strategies imply a varying importance in which flexibility dimensions are useful throughout a supply chain; furthermore, the authors underlined how developing this capability influenced results that weren't immediately measurable such as customer satisfaction. Could this apply to the findings of these case studies as well?

In particular, is the importance of the factors that enable resilience tied to the strategic scope of the organization and its product or service positioning in the life-cycle model? Understanding this would not only include part of the context in the analysis, but it could highlight which are the most relevant protective factors that improve the coping range in such situations. Moreover, it could help in identifying some cross-sector similarities starting from common elements which can apply to different organizations.

The concept can be better delivered through a metaphor. Consider when resilience could be necessary during hitchhiking. An excursionist who likes to stick to known paths, even if they include difficult climbs and steep slopes, relies on his map and well-exercised

routines to reach the goal. If a thunderstorm suddenly appeared, blocking some paths, this traveler initially would still rely on these methods to continue the ascent toward his destination. If, however, he lost his map or the tried routines he employs turned ineffective, to avoid giving up, he'd rely on his adaptability and knowledge to deal with the situation and keep on going.

A hiker who prefers finding his own path, exploring the nature and going where no one has been before relies primarily on his adaptability and tracking or pathfinding skills. If, however, the same thunderstorm muddled the traces or confused his sense of orientation, to pursue his objective he might rely on a map with possible backup routes and trails that could point a way toward the goal.

Similarly, firms with a different strategic orientation are expected to follow alternative means to develop their business and their organizational resilience, although the goal (which is economic success) and the possible untoward events remain the same.

Following a different trail of thought, future research might consider the findings highlighted by Masten (2014) and attempt to bring them to the organizational world. This study was focused on verifying resilient behaviors, but some inquiries on why this normal reaction wasn't found in some firms would provide further confirmation on the existence and dynamics of the resilience threshold. Moreover, understanding which environments can be considered "high risk" ones and which aren't could shed more light on how protective factors allow normal performance even under constant duress: an empirical analysis of this kind hasn't yet been performed, leading again to the concept that context in organizational resilience studies hasn't been included often due to how difficult it is to categorize.

Finally, a possible new stream of research could attempt to tie risks and protective factors through statistical analyses, verifying which of the elements identified in this dissertation are more useful to address which threats. This could allow the categorization of multiple resilience profiles that mirror how different types of firms interact with the environment and react to changes, showing what is comprised in the coping range or constitutes static resilience for different firm templates. However, this approach would require a great deal of effort, as the method would be similar to how famous psychological metrics and types were developed (f.e. the Myer-Briggs Indicator).

5. CHAPTER 5

FINAL THOUGHTS AND IMPLICATIONS

5.1 Theoretical and Managerial Implications

As the dissertation comes to an end, the strings must be pulled together to understand what can be inferred from the results.

The research conducted during this dissertation pointed toward more empirical confirmation of both Staw et al. (1981) and Meyer (1982) concepts. Organizational resilience is definitely a capability that can be developed at multiple levels in a firm, either in people, groups or complex systems such as the whole supply chain, as the cases evidenced. Moreover, it deals as much with variability perceived like business as usual as it does for real crises. However, it does so in different ways: organizations tend to develop ways through which issues are usually coped with. This "standard" approach constitutes the coping range of an organization, yet as shown in the cases not every situation can be classified as being within the range: this is the situation when being threat-rigid (Staw et al., 1981), meaning that the typical adaptation methods are employed when they aren't appropriate, leads to a crisis. There is a close match with the backup systems theorized by Perrow (1984) and the need to employ them flexibly when the need arises, maintaining a critical perspective (Roberts, 1990).

To shelter from these untoward events, the organization can rely on other atypical resources that it has developed beforehand: these elements constitute static resilience, they are the generic protective factors that are dormant during ordinary administration, as there are more suitable tools to address variability, but that allow to have a lesser degree of tight coupling during the crises, leading to flexible performance standards that are, however, the right choice when things get out of hand (Staw et al., 1981; Perrow, 1984).

This explains how organizational resilience is useful both in business as usual times and during untoward events, laying the foundation for long-term success; however, the most important confirmation is that this capability is normal. Companies automatically develop ways to deal with variability, it's a constant feature of complex systems (Masten, 2014), although what's relevant to really master resilience is a close monitoring of the interplay between risk and protective factors. If the former overcome the latter, the risk of collapse in the system suddenly becomes real: practitioners then need to focus their attention on restoring adaptive systems as soon as possible (as proven in the case of Cri-Rec Fixtures), as if enough of these factors work together, any predicament can be solved easily (as proven by High-Res Structures).
Moreover, the cases also verified that being competent in one period breeds competence in future periods (Cri-Rec Structures), and that risk breeds risk (Cri-Rec Fixtures).

The confirmatory evidence toward these patterns is strong, and it can help both researchers and practitioners in understanding organizational resilience and how it manifests in our world. Still, this research also highlighted some relevant limitations that must be considered before approaching the subject. First, there appears to be no clear pattern to develop this capability. This can also explain why it is difficult to formalize as a concept and to grasp all the underlying factors: they are heavily context-specific both in terms of importance and in how the various elements are employed to shelter from untoward events (as components of inherent or static resilience).
It is also difficult to infer how developed this capability is in an organization: the analysis of RoE dynamics and performance volatility is fitting as a lagging indicator, meaning that it can capture whether organizational resilience was sufficient only after an untoward event hit the firm. Only through methods such as the scales developed by McManus (2008) and Stephenson (2010), which are based on a measure of the protective factors and resources available for the firm, a metric of this capability can be obtained, and it's still a relative one that requires an expert's interpretation. Through these methodologies though, a practitioner could identify which elements pertain to the coping range for his firm and which are closer to being generic protective factors, understanding which are chiefly useful during a crisis and which should be employed in business as usual times (bearing in mind that context shapes which factors are most useful for each company).

Moreover, by keeping these dimensions closely monitored, an organization can understand if there is a chance for the present risks to burst into a crisis or if enough resources are in place to cope with the possible variability. Nevertheless, the cases highlighted how a balanced resilience profile is the optimal approach, if the firm desires to be thoroughly prepared for any untoward event, and that the construct is more tied with resources preservation and building rather than to performance.
Another relevant point is that size doesn't have an inherent effect on organizational resilience; larger firms simply tend to have more resources.

Consequently, both theory and empirical analyses point toward the existence of a pattern through which organizational resilience operates: in business as usual times, the firm has a set of protective factors that are employed to deal with daily variability (inherent resilience) which trace a perimeter of what can be defined as normal administration (coping range). In this period, resources can be accumulated and transformed in more protective factors: these are the generic factors that can be employed and depleted during a crisis to shelter from a complete loss of function (static resilience components). Crises are manageable until the elements of static resilience, which create the resilience threshold of an organization, are not nuanced enough to cope with the current risks both deriving from the environment and from within the organization. The chance for real disruption happens only when too many odds stack against the organization: in this case, the resilience threshold is surpassed and there is a need for extra resources that are not within the control of the organization (help from the State, additional capital from the shareholders, help from the community that wasn't pre-emptively organized). It is imperative to maintain a holistic perspective though to properly analyse this capability, due to its pervasiveness in an organization.

Given these theoretical findings, practitioners should try to understand how the different elements at their disposal interact with risks, and which do so daily. Particularly, core capabilities that enable competitive advantage (Teece, 2007) should be engineered so that they are the main tools through which typical variability is dealt with, whereas best practices or non-core capabilities should be kept as means to withstand crises. The studied cases and theory as well pointed toward this direction.

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ATTACHMENTS

7.1 Survey Questions

The questions in this section have been translated in Italian from the author of this dissertation starting from the inquiries made in the Resilient Organisations Benchmarking Tool (2014), and using the concepts and definitions articulated in McManus (2008) and Stephenson (2010). The scores assigned to each question were based on these cited researches. Where the type of answer is "range", a range between 1 (completely disagree) to 8 (completely agree) was used. The online survey is available at the following link: https://ucplbusiness.co1.qualtrics.com/jfe/form/SV_6D1UaDbshKiYafH

Question	Type of Answer	Category from Table 3.2	Contributes to which McManus (2008) factor?	Contributes to which Stephenson (2010) element? (*)
Qualora fossimo investiti da una crisi, I nostri ruoli dirigenziali mostrerebbero ottime capacità di leadership	Range	Innovation Oriented Leadership	Adaptive Capacity	Leadership
Il nostro organico accetterebbe le decisioni di responsabili e dirigenti nei momenti di crisi anche senza essere stato consultato direttamente	Range		Adaptive Capacity	Leadership
I nostri responsabili controllano abitualmente il carico di lavoro del personale e si prodigano per ridurlo o adeguarlo qualora fosse eccessivo	Range		Adaptive Capacity	Leadership
I nostri dirigenti pensano e agiscono strategicamente per far sì che l'azienda sia sempre un passo avanti rispetto ai concorrenti	Range		Adaptive Capacity	Leadership
I nostri dirigenti sono ottimi esempi di professionisti da cui vorremmo costantemente imparare qualcosa / I nostri dirigenti fungono da guida con il loro esempio	Range		Adaptive Capacity	Leadership

La nostra pianificazione strategica avviene con un orizzonte di medio-lungo termine	Range		Adaptive Capacity	
I nostri dirigenti pianificano con cura la strategia prima di assumere una decisione	Range		Adaptive Capacity	
Nella nostra organizzazione cerchiamo regolarmente di impiegare parte del nostro tempo di lavoro per rivalutare i nostri obiettivi e ciò che stiamo puntando ad ottenere	Range		Adaptive Capacity	Leadership
La nostra azienda incoraggia attivamente il personale a sfidarsi e sviluppare competenze attraverso il lavoro	Range		Adaptive Capacity	Innovation
Il nostro personale è rinomato per la sua capacità di utilizzare le conoscenze in modo creativo	Range		Adaptive Capacity	Innovation
Il nostro personale viene premiato quando trova soluzioni non convenzionali	Range		Adaptive Capacity	Innovation
Cerchiamo attivamente opportunità durante le situazioni di crisi vissute dalla nostra azienda	Range		Adaptive Capacity	
La nostra azienda è conscia di come una crisi possa impattare sugli stakeholder esterni (fornitori, clienti, comunità etc.)	Range	Management of External Stakeholders	Situation Awareness	Recovery Priorities
La nostra organizzazione ha degli accordi solidi con altre organizzazioni (altre aziende, partner governativi etc.) per ottenere risorse in caso d'emergenza o crisi	Range		Management of Keystone Vulnerabilities	Capacity of External Resources
La nostra organizzazione ha approntato dei piani per fornire supporto alla comunità o ad altri stakeholder in caso di crisi	Range		Management of Keystone Vulnerabilities	Capacity of External Resources
La nostra azienda mantiene contatti regolari con le organizzazioni con cui collaborerebbe solo in situazioni di crisi (ad esempio protezione civile, ma anche altri stakeholder poco influenti durante l'amministrazione ordinaria)	Range		Management of Keystone Vulnerabilities	Capacity of External Resources
La nostra azienda è consapevole delle interdipendenze con le altre organizzazioni del settore o dell'area geografica e cerca di mantenere attive e di curarsi di queste connessioni	Range		Management of Keystone Vulnerabilities	Capacity of External Resources
Siamo considerati membri attivi all'interno del settore o delle sue associazioni	Range		Adaptive Capacity	Proactive Posture
Abbiamo piani precisi su come gestire problematiche legate ai fornitori	Range		Management of Keystone Vulnerabilities	
Abbiamo piani precisi su come gestire problematiche legate ai clienti	Range		Management of Keystone Vulnerabilities	

Il nostro personale sa quanto e come eventi inaspettati e potenzialmente negativi potrebbero influenzare la nostra azienda	Range	HR Protective Factors	Management of Keystone Vulnerabilities	
Il nostro personale si assume la responsabilità dell'efficacia ed efficienza dell'azienda	Range		Management of Keystone Vulnerabilities	Staff Engagement
Il nostro personale si fa attivamente e responsabilmente carico di un problema qualora lo identifichi fino alla sua risoluzione	Range		Management of Keystone Vulnerabilities	Staff Engagement
Vi è un forte senso di collaborazione e cameratismo nella nostra organizzazione	Range		Adaptive Capacity	Minimization of Silo Mentality
Nella nostra organizzazione è reputato importante che non vi siano barriere che ci ostacolino dal lavorare al meglio sia tra colleghi che con altre organizzazioni collegate	Range		Adaptive Capacity	Minimization of Silo Mentality
Il nostro organico è incoraggiato a ricoprire mansioni differenti nell'organizzazione e a muoversi tra i reparti per acquisire maggiore esperienza	Range		Adaptive Capacity	Minimization of Silo Mentality
La nostra cultura aziendale considera fondamentale l'essere di supporto per i colleghi	Range		Management of Keystone Vulnerabilities	
Il morale del nostro organico è molto alto / Siamo ottimisti di fronte a quasi tutte le situazioni	Range		Adaptive Capacity	
Il nostro organico saprebbe come reagire di fronte ad una crisi aziendale	Range		Adaptive Capacity	
Il nostro organico dimostra sempre di comprendere, rispettare e applicare i valori della nostra azienda	Range		Adaptive Capacity	
La sua azienda ha utilizzato strumenti di valutazione della soddisfazione del personale negli ultimi due anni?	Yes / No		Management of Keystone Vulnerabilities	
I risultati di tale valutazione sono stati...	Poor, Sufficient, Average, Good, Excellent, Don't know/Non Applicable		Management of Keystone Vulnerabilities	
La nostra organizzazione ha identificato chiaramente delle priorità rispetto a cosa è importante ripristinare durante e dopo una crisi	Range	Business Continuity	Situation Awareness	Recovery Priorities
Le priorità su cosa si debba ripristinare in seguito ad una crisi sono sufficienti per dare una direzione chiara al nostro personale	Range		Situation Awareness	Recovery Priorities

La nostra azienda è consapevole del livello minimo di risorse necessario per il suo corretto funzionamento (in termini di personale, materiali, macchinari, clienti…)	Range		Situation Awareness	Recovery Priorities
La nostra azienda è consapevole che avere piani per far fronte alle emergenze non è sufficiente e che il piano deve essere praticato e testato per essere efficace	Range		Management of Keystone Vulnerabilities	Participation in Exercises
Il nostro personale solitamente può sospendere le proprie mansioni ordinarie per esercitarsi a far fronte ad un'emergenza	Range		Management of Keystone Vulnerabilities	Participation in Exercises
La nostra organizzazione investe risorse sufficienti per essere pronta ad affrontare emergenze di qualsiasi genere	Range		Management of Keystone Vulnerabilities	Participation in Exercises
Data l'importanza che ricopriamo per i nostri stakeholder, riteniamo che la maniera in cui ci prepariamo preventivamente ad eventi inaspettati sia adeguata	Range		Management of Keystone Vulnerabilities	Planning Strategies
La nostra organizzazione al momento impiega personale nelle seguenti funzioni aziendali o possiede piani formali per la gestione dei seguenti elementi (selezioni tutte le caselle rilevanti)	Multiple Choice (types of risk management)		Management of Keystone Vulnerabilities	Planning Strategies
Quanto spesso vengono ripetute le esercitazioni dei piani d'emergenza?	Twice per year, yearly, every two years, almost never, don't know/not applicable		Management of Keystone Vulnerabilities	Planning Strategies
L'azienda possiede un piano formale e scritto di continuità delle operazioni, consultabile in una situazione di crisi?	Yes / No		Management of Keystone Vulnerabilities	Planning Strategies
Ritiene che questo piano preveda degli standard operativi tali da essere adeguati durante un'emergenza?	Yes / No / Don't know		Management of Keystone Vulnerabilities	Planning Strategies
La vostra azienda ha effettuato alcuna pianificazione preventiva nei confronti di un rischio o pericolo specifici (ad es. incendio, perdita di clienti/fornitori, dissesto finanziario etc.)?	Yes / No		Management of Keystone Vulnerabilities	Planning Strategies
Per quali tra questi rischi l'azienda ha effettuato una pianificazione preventiva? Selezioni tutte le caselle rilevanti	Multiple choice (list of risks)		Management of Keystone Vulnerabilities	Planning Strategies
Prendendo come esempio un piano specifico per uno dei rischi sopra citati, la vostra azienda ha effettuato le seguenti operazioni? (selezioni tutte le caselle rilevanti)	Multiple choice (list of actions)		Management of Keystone Vulnerabilities	Planning Strategies

Quali sono i rischi più importanti che potrebbero portare ad una crisi della sua azienda? Trascini a destra e ordini i tre rischi principali.	Drag & Drop with ranking, starting from a list of risks		Management of Keystone Vulnerabilities	
Qualora venissero a mancare i seguenti servizi infrastrutturali, quanto tempo potrebbe operare in condizioni normali l'azienda? Risponda solo dove ritiene che l'opzione sia rilevante per la sua azienda.	List of infrastructures, immediate disruption, some hours, some days, some months		Management of Keystone Vulnerabilities	
La nostra azienda tipicamente non riscontra problemi riguardanti i flussi di cassa	Range	Hard Internal Resources	Management of Keystone Vulnerabilities	
Abbiamo un livello di debito sano che stimola gli investimenti senza pesare negativamente sulla situazione finanziaria	Range		Management of Keystone Vulnerabilities	
La nostra organizzazione possiede risorse sufficienti per poter operare con successo in periodi di ordinaria amministrazione	Range		Management of Keystone Vulnerabilities	Capacity of Internal Resources
La nostra azienda ha un'ottima traiettoria di crescita	Range		Management of Keystone Vulnerabilities	
In periodi di ordinaria amministrazione le risorse sono gestite in modo da poter far fronte a cambiamenti imprevisti di piccola entità (ad esempio, incremento della produzione, mancanza di approvvigionamenti etc.)	Range		Management of Keystone Vulnerabilities	Capacity of Internal Resources
Qualora un problema si presentasse nella nostra organizzazione, le risorse interne sarebbero maggiormente accessibili a tutto il personale con breve preavviso e meno burocrazia rispetto all'ordinaria amministrazione	Range		Management of Keystone Vulnerabilities	Capacity of Internal Resources
L'azienda possiede infrastrutture tecnologiche (IT) di backup?	Yes / No / Don't know or not applicable		Management of Keystone Vulnerabilities	
Quanto sarebbe fattibile rilocalizzare le attività svolte dall'azienda? Selezioni tutte le caselle che riflettono la condizione attuale dell'azienda.	Multiple choice (list of options)		Management of Keystone Vulnerabilities	
La nostra organizzazione è capace di passare velocemente da un orientamento di ordinaria amministrazione ad un orientamento volto a risolvere crisi contingenti	Range	Mindfulness	Situation Awareness	Proactive Posture
Qualora delle persone chiave per la nostra organizzazione non fossero disponibili o reperibili, altri membri del personale potrebbero assumere il loro ruolo	Range		Situation Awareness	Information and Knowledge Management

Nella nostra organizzazione, i dipendenti sono consapevoli di quanto il successo di una funzione aziendale dipenda dalla performance delle altre	Range		Situation Awareness	Monitoring
Nella nostra azienda in generale è semplice ottenere l'assistenza di un esperto quando si presenta un problema che un dipendente non sa affrontare	Range		Situation Awareness	Information and Knowledge Management
Se qualcosa non funziona come dovrebbe, qualsiasi membro del personale si sentirebbe libero di comunicarlo ai responsabili, ai quadri o ai dirigenti	Range		Situation Awareness	Monitoring
Il nostro organico lavora con chiunque sia necessario per completare al meglio un processo, un progetto o un'operazione senza considerare vincoli di funzione, di mansione o organizzativi	Range		Adaptive Capacity	Minimization of Silo Mentality
Per noi è una priorità che il nostro organico abbia le informazioni e le conoscenze necessarie per rispondere a problemi inaspettati, qualora si presentassero, prima di agire	Range		Adaptive Capacity	Information and Knowledge Management
Qualora accadesse qualcosa di fuori dall'ordinario, il nostro organico saprebbe chi possiede le conoscenze e l'esperienza per risolverlo, o potrebbe accedere facilmente all'aiuto di esperti	Range		Adaptive Capacity	Information and Knowledge Management
Ci sforziamo attivamente perché le informazioni critiche (come i contatti dei membri del personale) siano disponibili e accessibili contemporaneamente in più formati e in più luoghi possibile	Range		Adaptive Capacity	Information and Knowledge Management
In caso di problemi, i responsabili o altre figure con l'autorità necessaria sono sempre disponibili per il resto dell'organico	Range		Adaptive Capacity	Decision Making
La nostra organizzazione sa prendere velocemente decisioni difficili	Range		Adaptive Capacity	Decision Making
Nella nostra azienda le decisioni sono effettuate dal personale più competente o qualificato, non tenendo conto dell'anzianità o del ruolo organizzativo ricoperto	Range		Adaptive Capacity	Decision Making
La nostra organizzazione si preoccupa di saper rispondere ad eventi inattesi	Range		Situation Awareness	Proactive Posture
La nostra organizzazione sa rispondere velocemente a cambiamenti repentini del nostro ambiente economico (ad esempio, cambiamenti nelle preferenze dei clienti, nelle disponibiità dei fornitori etc)	Range		Adaptive Capacity	

Di norma il nostro personale interagisce con una frequenza sufficiente per consentire a tutti di comprendere la situazione corrente in cui versa l'organizzazione	Range	Situation Awareness	Situation Awareness	Monitoring
I nostri responsabili ascoltano attivamente quando viene riportato un problema in quanto ritengono che possa aiutarli a rispondere al meglio	Range		Situation Awareness	Monitoring
Quando la nostra organizzazione ha appena rischiato di dover affrontare un evento negativo ad esempio (perdita di un cliente, compromissione dei macchinari o dello stabilimento, attriti con il personale), sfruttiamo il fatto per auto-valutarci criticamente piuttosto che confermare e celebrare il nostro successo	Range		Situation Awareness	Proactive Posture
La nostra azienda osserva attentamente i trend del settore per ottenere in anticipo informazioni su possibili rischi od opportunità emergenti	Range		Situation Awareness	Monitoring
La nostra azienda è capace di imparare lezioni dai progetti passati e di assicurarsi che queste lezioni servano ad affrontare al meglio i progetti futuri	Range		Situation Awareness	Monitoring
Siamo consapevoli di come un evento che può impattare sulla comunità che ci circonda abbia ripercussioni anche sulla nostra azienda	Range		Situation Awareness	
Nella seguente lista sono raccolti i principali elementi che migliorano la resilienza organizzativa. Selezioni quelli che durante la recente crisi del vostro settore NON sono stati utili nè per la ripresa nè per affrontare la situazione contingente.	Multiple choice: categories from table 3.2	Questions for the interview		
Selezioni quelli che sono stati utili per gestire eventi negativi SOLAMENTE nel periodo di crisi	Multiple choice: categories from table 3.2			
Selezioni quelli che sono stati utili per gestire eventi negativi SOLAMENTE durante l'amministrazione ordinaria	Multiple choice: categories from table 3.2			

(*) Underlined if part of the Planning Capacity measure, otherwise explains Adaptive Capacity

Lists used:

- Types of risk management or pre-emptive planning: gestione della continuità delle operazioni / del business, gestione dei rischi operativi, gestione delle crisi aziendali, gestione delle emergenze, altri tipi di pianificazione preventiva

- List of risks: disastro naturale, crisi finanziaria, incendio, epidemia (ad esempio d'influenza), mancanza di servizi critici (elettricità, acqua, telecomunicazioni), danno all'immagine aziendale, frode, problemi legali o di regolamentazione del settore, crisi nei rapporti con il personale o scioperi, bancarotta di clienti o fornitori chiave, altro
- List of actions: discutere il piano con membri chiave del personale, realizzare un piano formale e scritto per affrontare la situazione qualora si presentasse, organizzarsi con altre aziende, associazioni o enti per assorbire l'impatto di questo rischio sul settore
- List of infrastructures: approvvigionamento d'acqua, fognature, elettricità, servizi di telefonia (fissa e mobile), infrastrutture IT (banche dati, software gestionali), strade e autostrade, trasporti su rotaia, disponibilità di carburante
- List of options: la maggior parte del personale può lavorare da casa, sarebbe facile trovare nuovi uffici o impianti, possiamo svolgere le nostre attività in più luoghi / impianti, ci sono notevoli limiti regolatori o di sicurezza che concernono i luoghi in cui operiamo impedendone il cambiamento, i macchinari e l'equipaggiamento sono difficili da ottenere, spostare o rimpiazzare, la nostra impresa è vincolata ad operare nei luoghi prestabiliti, potenzialmente potremmo condividere impianti o uffici con altre aziende

7.2 Firm Reports

This attachment includes the firm reports submitted to the participating organizations.

The values reported on the graphics are calculated according to McManus (2008) and Stephenson (2010) methods: the values from the survey were aggregated according to the theoretical suggestions, then an average value was found. Afterwards, the scale was changed to match an easier to understand 1 to 10 scale.

7.2.1 Common Parts

Introduzione

La resilienza organizzativa può essere definita come la capacità di un sistema dinamico, come un'azienda, di adattarsi con successo alle turbolenze dell'ambiente che possono minarne il funzionamento, lo sviluppo o la sostenibilità.

Essa è composta da più elementi che normalmente concorrono al buon funzionamento di un'impresa, e in letteratura è stato appurato il nesso tra questi elementi e il vantaggio competitivo che un'azienda ottiene dopo averli sviluppati.

Il questionario che avete compilato ha permesso di identificare quanto questi diversi elementi contribuiscono alla resilienza della vostra azienda, segnalando i punti di forza e di debolezza. I valori sono riportati in una scala indicativa da 1 (pessimo) a 10 (eccellente) che valuta esclusivamente il loro contributo alla capacità di resilienza aziendale, senza considerare se essi portino ad un vantaggio competitivo o abbiano altre implicazioni per l'organizzazione. La letteratura tuttavia riporta come vi sia una correlazione tra gli elementi che costituiscono la resilienza e il successo dell'impresa, anche se questo nesso non è ancora stato quantificato.

L'intervista personale successiva all'invio di questo rapporto servirà a dipanare alcuni dubbi su questo legame e a chiarire se vi siano elementi più rilevanti per rendere resiliente un'azienda, se la loro efficacia differisca durante la normale amministrazione e i momenti di crisi, se investire in questi elementi abbia sempre ritorni positivi o una quota per cui i costi superano i benefici e se esiste una soglia oltre cui i rischi corsi dall'azienda superano i fattori protettivi, portando ad una crisi.

I quesiti posti verranno interpretati secondo due modelli che separano in maniera differente gli elementi di resilienza, entrambi collegati alle ricerche dell'associazione "Resilient Organisations". Dati i modelli utilizzati, si consiglia una lettura dei risultati in chiave relativa per comprendere quali elementi gioverebbero maggiormente da eventuali investimenti.

Colgo l'occasione per ringraziarvi sentitamente per il vostro contributo, con l'auspicio che la ricerca possa fornire spunti interessanti per la vostra azienda.

Modello a 3 fattori – McManus

L'interpretazione dei dati basata sul modello di McManus postula che la resilienza organizzativa si sviluppi a partire da tre fattori di eguale importanza:

- **Capacità di adattamento**, intesa come l'insieme di elementi che favoriscono sia processi decisionali rapidi ed appropriati durante le crisi che la capacità di cogliere le opportunità e sfruttarle al meglio;
- **Gestione delle vulnerabilità**, ovvero la capacità di conoscere e controllare i componenti dell'azienda che potenzialmente possono generare eventi negativi (sia in maniera catastrofica, come in caso d'incendio, sia in maniera insidiosa, come in caso di mancata percezione di un cambiamento tecnologico radicale nel settore);
- **Attenzione situazionale**, cioè il grado di consapevolezza per l'ambiente operativo, includendo rischi, opportunità e le connessioni tra stakeholder interni ed esterni.

Un profilo di resilienza eccellente non può prescindere da valori elevati in tutti e tre i fattori. Gli elementi che influenzano i fattori afferiscono alle otto categorie riportate in tabella.

Categoria	Elementi Sottesi	Fattore di Resilienza Associato
Leadership	Leadership e governance	**Capacità di adattamento**, una buona leadership consente ad un'organizzazione di adeguarsi a situazioni impreviste più velocemente
Innovazione e creatività	Stimoli ad un approccio creativo nell'organizzazione	**Capacità di adattamento**, la creatività consente di modificare l'impostazione attuale dell'azienda per conformarla alla situazione contingente
Relazioni con stakeholder esterni	Gestione della catena del valore, rete relazionale, gestione dell'immagine aziendale	Principalmente **gestione delle vulnerabilità**, in quanto tipicamente un'azienda di medie dimensioni ha un impatto limitato sul tessuto economico che la circonda e non può modificarlo eccessivamente per adattarsi a nuove situazioni
Personale e stakeholder interni	Partecipazione del personale, allineamento alla cultura aziendale, unità d'intenti, altre risorse interne intangibili	**Capacità di adattamento e gestione delle vulnerabilità**: questi elementi favoriscono l'adattamento e consentono al personale di mantenere monitorati i rischi corsi dall'azienda
Pianificazione per la continuità operativa	Pianificazione per la continuità, priorità di ripristino, partecipazione alle esercitazioni, formazione, stress-test dei piani d'emergenza	**Gestione delle vulnerabilità**, in quanto i piani di continuità consentono all'azienda di mantenersi operativa a fronte di rischi e vulnerabilità prevedibili
Gestione delle risorse aziendali	Aspetti finanziari, sistemi di backup, impianti e uffici, gestione delle risorse e processi volti ad accumularle	**Gestione delle vulnerabilità**, questi elementi costituiscono delle risorse addizionali a cui attingere per consentire l'adattamento

Consapevolezza (mindfulness)	Comprensione dei ruoli aziendali, ruoli flessibili, capacità decisionale rapida e delegata agli esperti, ricerca delle soluzioni orientata agli obiettivi	Sia **capacità di adattamento che attenzione situazionale**, questi elementi favoriscono l'identificazione di problemi e la ricerca di soluzioni tramite la flessibilità
Attenzione all'ambiente economico	Comprensione delle situazioni, monitoraggio del tessuto economico	**Attenzione situazionale**, questi elementi misurano quanto l'azienda è in grado di cogliere i trend di mercato ed anticipare gli eventi

Modello a 2 fattori – Stephenson

L'interpretazione dei dati basata sul modello di Stephenson postula che la resilienza organizzativa si sviluppi a partire da due fattori di eguale importanza:

- **Capacità di adattamento**, ovvero l'insieme di elementi che consente di adattarsi alla situazione contingente in maniera flessibile, qualsiasi essa sia;
- **Capacità di pianificazione**, ovvero l'insieme di elementi che consente di identificare soluzioni a problemi e situazioni identificate preventivamente.

Questo modello raggruppa gli elementi che favoriscono la resilienza come segue.

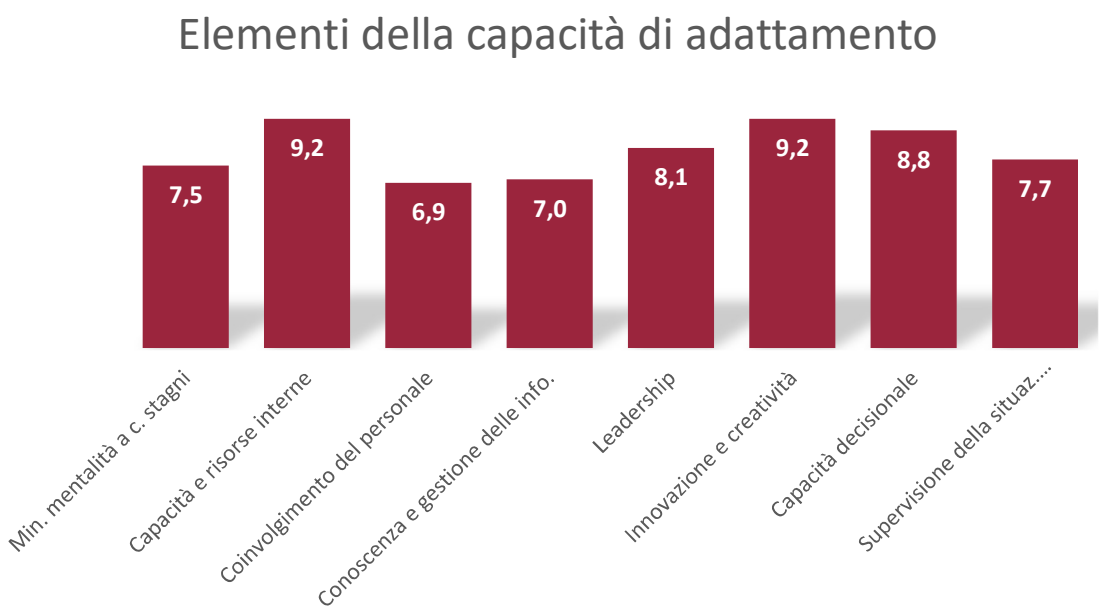
Capacità di adattamento	
Elemento	**Contributo**
Minimizzazione della mentalità a compartimenti stagni	Favorisce lo scambio di informazioni tra funzioni, garantisce una visione d'insieme
Capacità e risorse interne	Assorbono parte dell'impatto negativo dovuto ad una crisi
Coinvolgimento del personale	Un personale coinvolto favorisce la flessibilità rispetto alle situazioni in quanto durante una crisi i collaboratori si sentono responsabili per il successo futuro dell'organizzazione
Conoscenza e gestione delle informazioni	Un ottimo controllo dei flussi infomativi accelera la capacità di adattamento in situazioni di crisi e consente l'accesso immediato ad informazioni critiche
Leadership	Consente ad un'organizzazione di adeguarsi a situazioni impreviste più velocemente
Innovazione e creatività	Consente di modificare l'impostazione attuale dell'azienda per conformarla alla situazione contingente
Capacità decisionale	Buoni processi decisionali consentono agli esperti di partecipare e fornire un contributo informato
Supervisione della situazione contingente	Consente la raccolta di dati utili per fronteggiare le crisi
Capacità di pianificazione	
Elemento	**Contributo**
Strategie di pianificazione	Indica quanto opportuni e informati sono i processi di pianificazione preventiva dell'azienda
Partecipazione alle esercitazioni	Indica quanto vengono praticati i piani d'emergenza, in quanto senza esercitazioni tali piani difficilmente trovano un'attuazione efficace
Proattività	È il rapporto con cui l'azienda si interfaccia agli eventi inattesi; un rapporto proattivo consente di identificarli anticipatamente e non farsi cogliere impreparati
Capacità e risorse legate a stakeholder esterni	Potere e saper come implementare risorse dall'ambiente esterno in momenti di crisi favorisce la resilienza
Priorità di ripristino	Identificare chiaramente quali elementi siano indispensabili per il funzionamento dell'azienda facilita il recupero in seguito ad una crisi

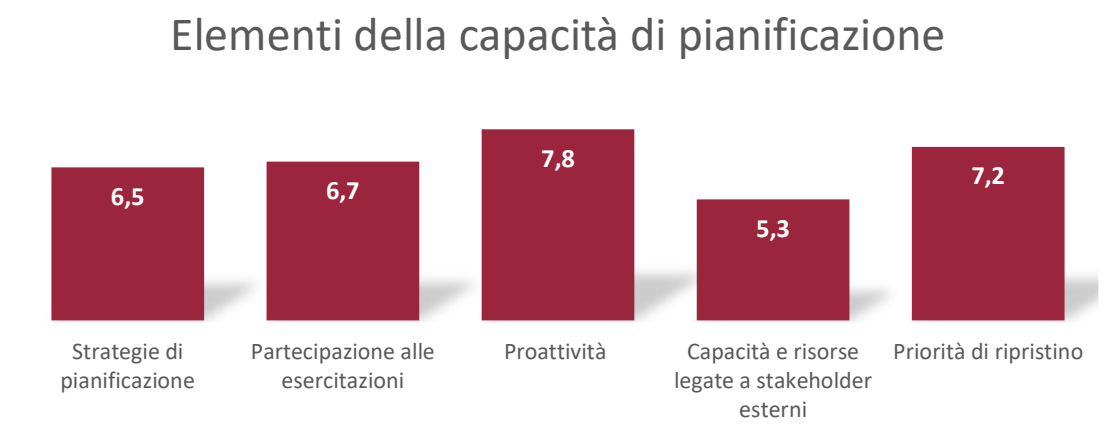
7.2.2 Results – Cri-Rec Fixtures

McManus

Fattori di Resilienza		
Capacità di Adattamento	Gestione delle Vulnerabilità	Attenzione Situazionale
7,96	7,26	7,42
Resilienza Aziendale		
7,55	Più che Discreta	

Stephenson





Fattori di Resilienza	
Capacità di Adattamento	Capacità di Pianificazione
7,97	6,54
Resilienza Aziendale	
7,25	Discreta

Valutazione

Cri-Rec Fixtures presenta un profilo di resilienza più che discreto tramite l'applicazione di entrambi i modelli. Secondo i dati disponibili, la buona disponibilità di risorse e la loro accessibilità per il personale in caso di necessità conferiscono una solida sicurezza in caso di crisi. Questo elemento è coadiuvato da una capacità dell'organico di affrontare situazioni impreviste con creatività, fattore che viene attivamente incentivato.

La presenza di buoni processi decisionali e di un adeguato monitoraggio dell'ambiente economico stimolano a propria volta la capacità di adattamento dell'azienda, fornendo uno strumento prezioso per affrontare la variabilità quotidiana a cui essa è sottoposta.

Vi sono però alcuni elementi che inficiano la capacità di resilienza organizzativa: l'azienda ha approntato solo parzialmente piani per affrontare rischi prevedibili legati sia all'ambiente che a stakeholder esterni, e la mancanza di una loro formalizzazione fa sì che il personale si basi sulla propria capacità di adattamento piuttosto che su linee guida condivise.

La gestione delle vulnerabilità e la pianificazione preventiva sono infatti i punti principali tramite cui si potrebbe migliorare il profilo di resilienza aziendale: la formalizzazione di piani specifici per far fronte ai rischi principali corsi dall'impresa andrebbe infatti a migliorare l'approccio dell'organizzazione nei confronti di eventi dalla bassa probabilità ma dall'alto impatto negativo, in quanto la capacità di adattamento, pur necessaria per interpretare la situazione contingente, potrebbe non essere sufficiente per una risposta tempestiva ed efficace all'evento.

In particolare non andrebbero sottovalutati i rischi connessi ai fornitori chiave e le opportunità derivanti da una buona gestione dei rapporti con altre organizzazioni appartenenti alla catena del valore e al tessuto economico in cui l'impresa è situata. Questi attori possono avere un ruolo fondamentale sia nell'affrontare le crisi che nel generarle, e l'azienda potrebbe valutare delle strategie per aumentare il loro coinvolgimento nelle attività dell'organizzazione.

Secondariamente, per potenziare la capacità di adattamento, si potrebbero facilitare i flussi informativi inter-aziendali e incentivare il personale a farsi attivamente carico di eventuali problemi riscontrati; una connessione con gli incentivi per la creatività dimostrata produrrebbe gli effetti desiderati.

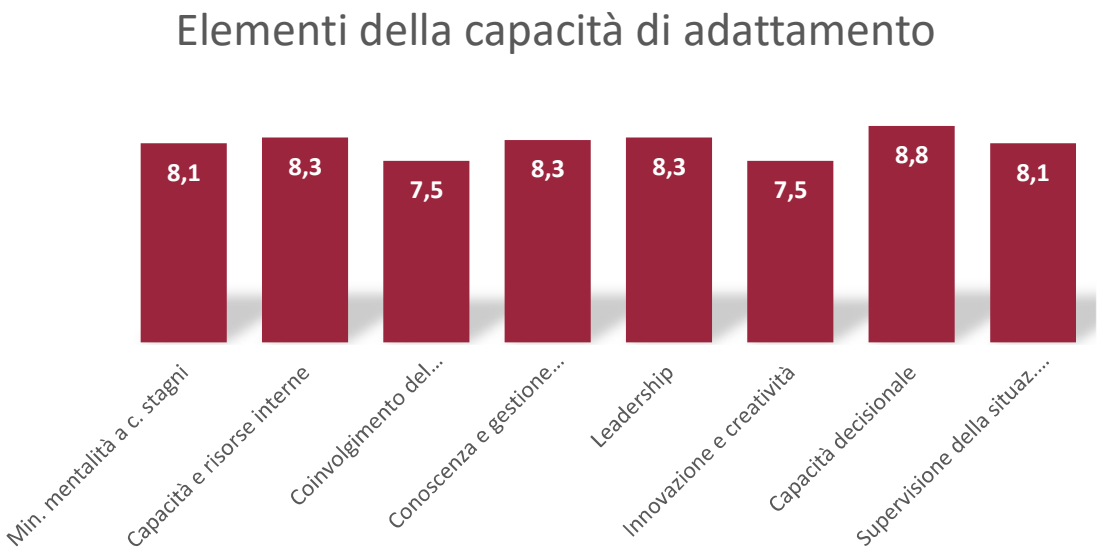
L'azienda comunque presenta un profilo in grado di farsi carico di ulteriori rischi operativi, che potrebbero costituire ottime opportunità per potenziare il vantaggio competitivo o migliorare la performance, pur mantenendo un approccio che richieda l'uso della capacità di adattamento piuttosto che una redazione di piani precisi per affrontare le nuove situazioni.

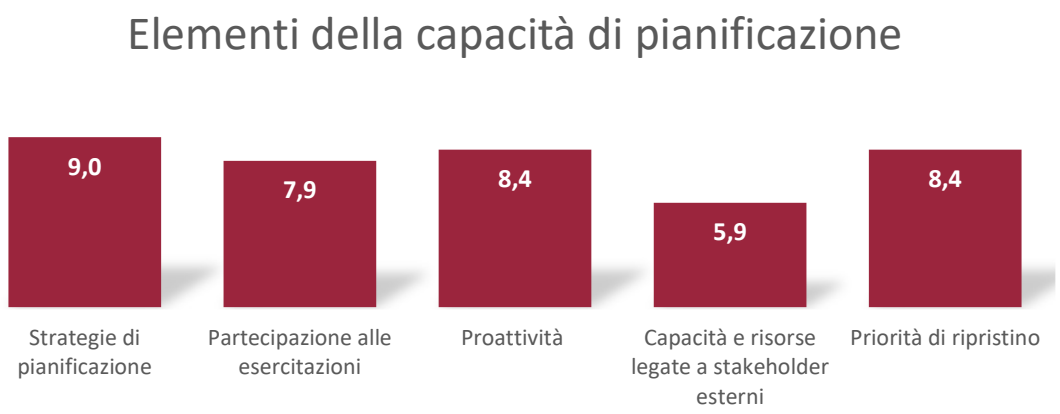
7.2.3 Results – High-Res Structures

McManus

Fattori di Resilienza		
Capacità di Adattamento	Gestione delle Vulnerabilità	Attenzione Situazionale
8,24	8,21	8,33
Resilienza Aziendale		
8,26	Molto Buona	

Stephenson





Fattori di Resilienza	
Capacità di Adattamento	Capacità di Pianificazione
8,16	7,74
Resilienza Aziendale	
7,95	Buona

Valutazione

High-Res Structures presenta un profilo di resilienza molto buono tramite l'applicazione di entrambi i modelli. L'azienda ha un orientamento che le consente di identificare i problemi e pianificare anticipatamente la loro risoluzione. La presenza di una leadership solida e di una gestione dei processi decisionali ottimale garantisce flessibilità di fronte ad eventuali crisi.

I piani preventivi per la gestione dei rischi risultano più che adeguati, con un buon livello di preparazione che non tracima in una rigidità eccessiva che inficierebbe la capacità di adattamento dell'azienda. La consapevolezza di come tali piani possano essere fallibili e di come sia richiesta flessibilità in base alla situazioni è alta.

Possibili punti di miglioramento, segnalati da entrambi i modelli, si trovano nella gestione della rete di stakeholder esterni dell'azienda e nella capacità di approcciarsi ai problemi creativamente e con uno spirito d'innovazione.

Benchè l'azienda conosca i rischi legati a clienti fornitori e sia attrezzata per arginarli, essa è solo parzialmente consapevole di come altri stakeholder (comunità, aziende nelle zone limitrofe, etc.) possano giocare ruoli fondamentali per la ripresa durante una crisi. Un'interazione più frequente con questi attori del tessuto economico aumenterebbe il loro coinvolgimento nell'azienda, consentendo l'accesso ad altre forme di supporto in momenti di crisi.

Un sistema che premi e stimoli maggiormente la creatività da parte dei collaboratori andrebbe a propria volta ad aumentare la capacità di adattamento dell'azienda, in quanto consentirebbe di sfruttare questa risorsa per fronteggiare in maniere innovative eventuali problemi legati ad attività che coinvolgono direttamente gli operatori.
Ciò potrebbe essere ottenuto puntando maggiormente su una cultura aziendale inclusiva che possa anche migliorare la sensazione di coinvolgimento e partecipazione da parte del personale.

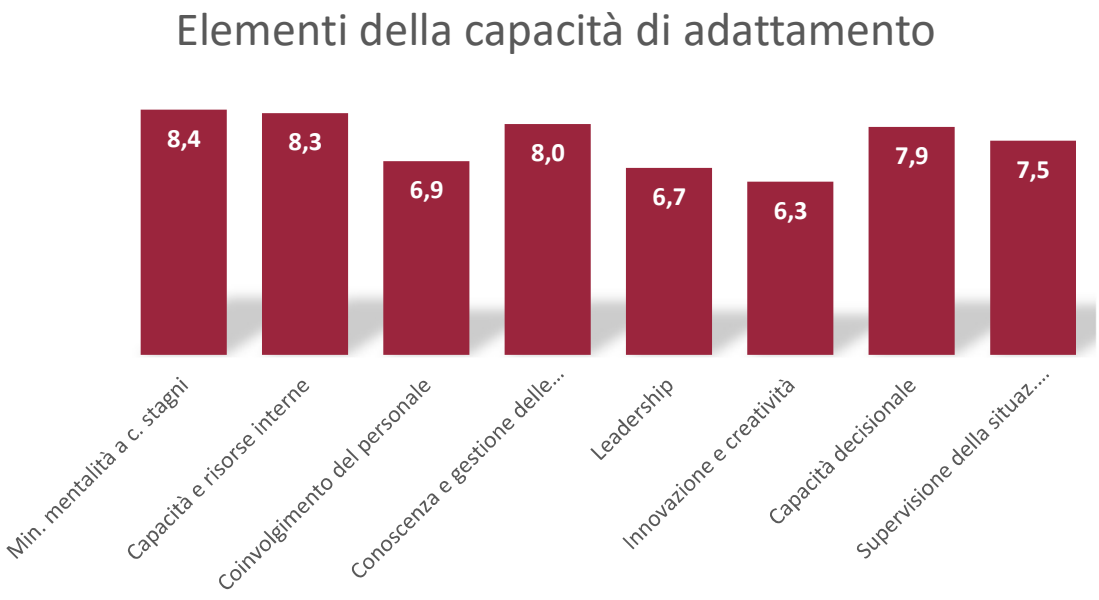
Il profilo di resilienza risulta comunque molto equilibrato, come segnalato dai 3 fattori di McManus, segnalando come l'azienda sia pronta a far fronte sia alla variabilità incontrata nelle attività quotidiane sia a eventi imprevisti e potenzialmente catastrofici. La capacità di attenzione situazionale dell'organizzazione permette, a fronte anche di risorse limitate, di saper captare eventuali rischi e vulnerabilità anche da segnali deboli (provenienti sia dall'interno che dall'esterno).

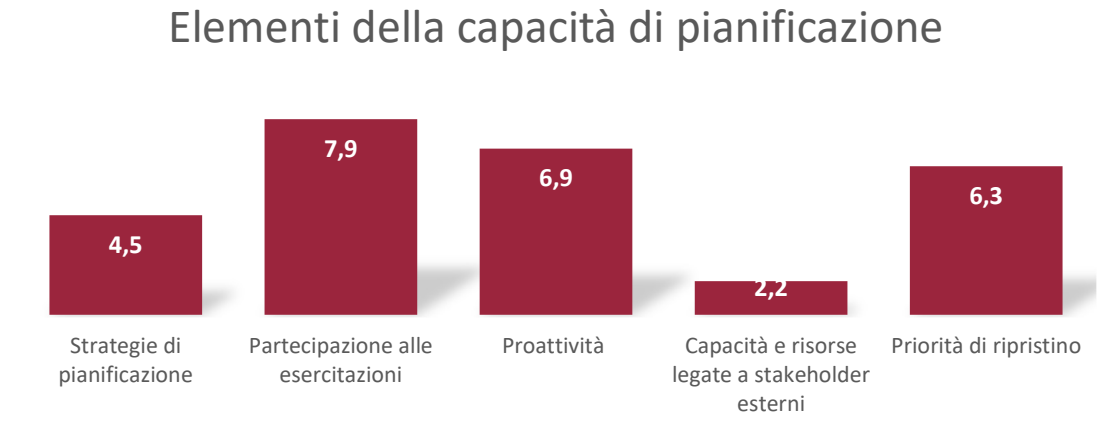
7.2.4 Results – High-Res Fixtures

McManus

Fattori di Resilienza		
Capacità di Adattamento	Gestione delle Vulnerabilità	Attenzione Situazionale
7,13	6,42	7,25
Resilienza Aziendale		
6,93	Discreta	

Stephenson





Fattori di Resilienza	
Capacità di Adattamento	Capacità di Pianificazione
7,50	5,35
Resilienza Aziendale	
6,42	Sufficiente - Discreta

Valutazione

High-Res Fixtures presenta un profilo di resilienza tra il discreto e il sufficiente tramite l'applicazione di entrambi i modelli. L'ottima disponibilità di risorse interne dovuta alla traiettoria di crescita e ai risultati ottenuti negli ultimi anni dall'organizzazione, coadiuvata da una buona attenzione all'ambiente economico e da processi decisionali efficaci e consapevoli, bilancia alcune debolezze in altri elementi della resilienza.

La capacità di adattamento e di comprensione dei trend del settore risulta infatti positiva, a fronte di punteggi nettamente inferiori nella capacità di pianificazione preventiva e nella gestione di rischi e opportunità derivanti da stakeholder esterni. Date le informazioni note sull'azienda, questo è probabilmente dovuto al fatto che essa non si è trovata di fronte a nessuna vera e propria crisi: non vi sono mai state molteplici vulnerabilità attive in contemporanea. I rischi corsi dall'azienda sono sempre rientrati nella sua capacità previsionale e nella capacità di gestire la variabilità quotidiana, ma qualora queste venissero a mancare (come nel caso di una catastrofe improvvisa o di un rallentamento consistente della crescita) i piani per far fronte alle emergenze potrebbero non essere sufficienti a garantire una risposta resiliente.

Alcuni elementi da potenziare sono l'identificazione del livello minimo di risorse necessario per mantenere l'operatività, la creazione di piani formali per far fronte a rischi prevedibili (pur con la consapevolezza che le istruzioni non andrebbero seguite pedissequamente, ma con flessibilità adattativa) e un potenziamento delle relazioni con gli stakeholder esterni, attori indispensabili per il ripristino dell'operatività in seguito ad una crisi.

Secondariamente, stimoli tangibili alla creatività del personale, una preoccupazione superiore per il coinvolgimento e la soddisfazione dell'organico e una diffusione di informazioni su possibili crisi e la situazione contingente dell'azienda costituirebbero altri metodi per incrementare la resilienza dell'organizzazione tramite un potenziamento della capacità d'adattamento e un miglioramento dell'allineamento del personale alla strategia.

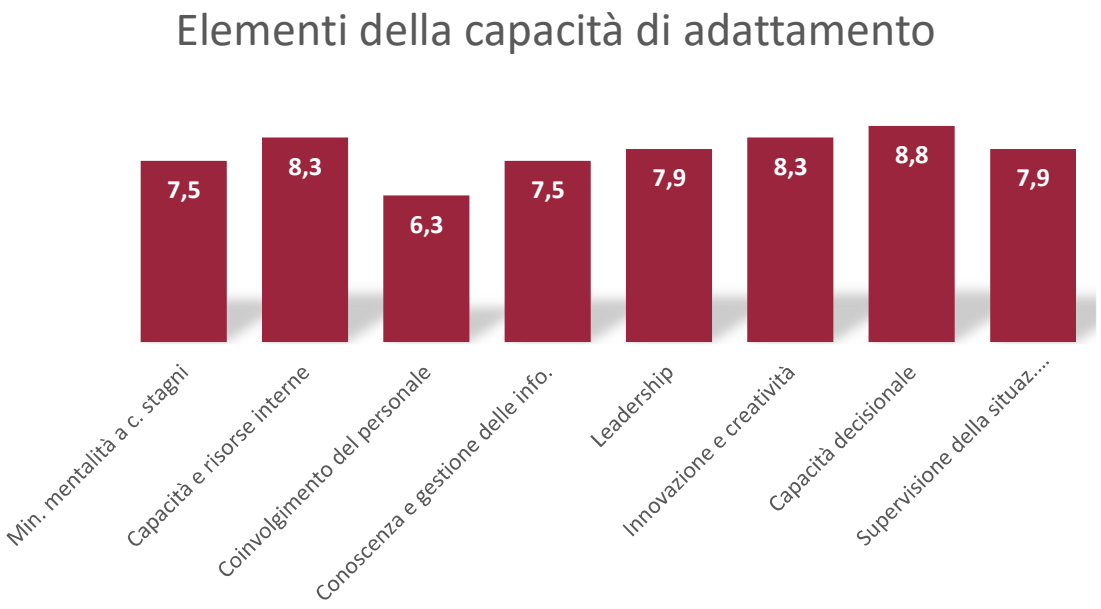
Il profilo di resilienza evidenzia come l'impresa abbia tutti gli strumenti per affrontare la situazione corrente, ma suggerisce cautela prima di incorrere in ulteriori rischi operativi e non (ad es. acquisizioni, indebitamento, diversificazione orizzontale atipica). Come quando un'azienda decide la propria strategia, High-Res Fixtures prima di incorrere in nuovi rischi potrebbe puntare su un potenziamento delle competenze sottese alla resilienza che già possiede (capacità decisionale e attenzione all'ambiente economico) o lavorare sulle debolezze per portarle ad un livello di performance più elevato.

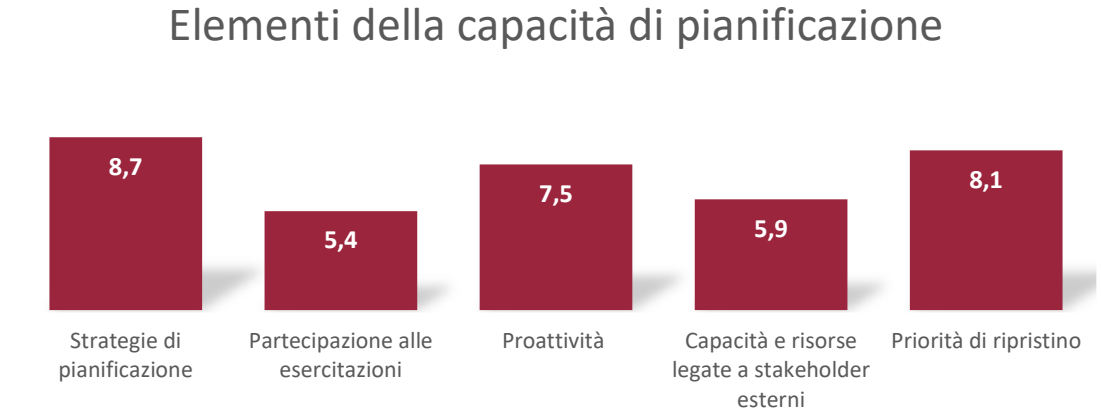
7.2.5 Results – Cri-Rec Structures

McManus

Fattori di Resilienza		
Capacità di Adattamento	Gestione delle Vulnerabilità	Attenzione Situazionale
7,92	7,41	7,83
Resilienza Aziendale		
7,72	Più che Discreta	

Stephenson





Fattori di Resilienza	
Capacità di Adattamento	Capacità di Pianificazione
7,85	7,04
Resilienza Aziendale	
7,44	Più che Discreta

Valutazione

Cri-Rec Structures presenta un profilo di resilienza più che discreto tramite l'applicazione di entrambi i modelli. Spiccano diverse caratteristiche che favoriscono sia la capacità di adattamento che la pianificazione preventiva: buoni processi decisionali, un'adeguata attenzione alle risorse interne e alla loro disponibilità, strategie di pianificazione preventiva strutturate per affrontare i rischi più importanti per l'azienda.

Il valore relativo alla gestione delle vulnerabilità è principalmente inficiato dalla mancanza di formalizzazione dei piani preventivi, fattore che riduce la conoscibilità da parte del personale di come vengano gestiti possibili rischi ed emergenze. Questo elemento può essere potenziato rendendo più accessibili questi piani ai collaboratori e istituendo dei processi che consentano delle esercitazioni che simulino questi rischi e verifichino la capacità di risposta dei piani (ad esempio verificando i comportamenti e le soluzioni adottate a seguito di una crisi finanziaria o di controversie dovute alla regolamentazione di settore).

Inoltre, la gestione degli stakeholder esterni e un'attiva ricerca di un loro coinvolgimento nell'azienda potrebbero costituire ulteriori strumenti per favorire una gestione delle vulnerabilità ottimale, in quanto questi attori spesso risultano cruciali durante la fase di ripresa di un'azienda in seguito ad una crisi.

Si porta l'attenzione anche sul coinvolgimento del personale: in caso di situazioni critiche, avere stakeholder interni motivati e desiderosi di contribuire al successo dell'azienda evita l'esacerbarsi dei rischi contingenti e stimola la capacità di adattamento. Numerosi esempi in letteratura (come Southwest Airlines) confermano il contributo dato dal coinvolgimento e dalla responsabilizzazione dell'organico; Cri-Rec Structures potrebbe potenziare questo elemento per migliorare ulteriormente il profilo di resilienza.

Pur potendo beneficiare da interventi su questi elementi, il profilo dell'azienda suggerisce un'ottima capacità di far fronte alla variabilità a cui è sottoposta quotidianaente e misure adeguate per la gestione di eventi a bassa probabilità ed alto impatto. Di conseguenza, qualora l'impresa si assumesse ulteriori rischi operativi, pur con moderazione, questi non porterebbero ad una crisi, bensì costituirebbero opportunità che l'azienda potrebbe catturare.

Nonostante questo, si consiglia di mantenere monitorati gli elementi di resilienza evidenziati in quanto la congiuntura negativa nel settore richiede una forte capacità di adattamento e pianificazione, e in quanto l'assunzione di nuovi rischi spesso impatta negativamente sulle dimensioni analizzate. Un deterioramento su più fronti di questi elementi aumenterebbe la probabilità e gli effetti di eventi indesiderati sull'azienda.

7.3 Interview Backbone

The interviews only partially followed the proposed scheme, as the flow of the conversation was what led most of the discussion. Nevertheless, they constituted the base of the various inquiries that were made. The list includes only the questions that the researcher thought he would always ask to the interviewees.

Question (in Italian)	Aim of the Question
La valutazione emersa dal modello è utile e veritiera per l'azienda?	Verifying that the conclusions of the reports were truthful and useable for the final considerations and theory testing
Che limiti ha riscontrato nel questionario?	Understanding if all the parts of the questionnaire were interpreted correctly
Dopo la crisi economica del 2009, il suo settore ha subito fasi alterne di turbolenze e cali di profittabilità. Come ha vissuto questo periodo l'azienda? E' stato un periodo che ha sottoposto l'azienda a più rischi o ad una crisi?	Understanding whether the firm lived the situation as business-as-usual or not, and the general feeling regarding the period
Negli anni precedenti reputa che l'azienda avesse lo stesso livello di resilienza o sono stati presi dei provvedimenti in riferimento alle otto categorie evidenziate?	Understanding if new factors were developed to balance the new risks and threats. Very important for Cri-Rec case studies (to understand the dynamics between risk and protective factors)
In questo periodo vi sono fattori che sono stati più importanti per il funzionamento dell'azienda? Altri che non lo sono stati? Sarebbero egualmente importanti in caso di ulteriori crisi?	Test of Q3: differences in the importance of protective factors (starting from the case studies reports)
I fattori più importanti erano tali perché eravate in un ambiente turbolento o in crisi o perché effettivamente sarebbe sempre opportuno per un'azienda investire in questi elementi?	A different test of Q3, also addressed Q1 and Q2 as it tried to understand whether a factor improved the coping range or the overall resilience threshold
La letteratura suggerisce un'intercambiabilità degli elementi di resilienza, segnalata dal contributo ai fattori. Ritiene che sfruttare alternativamente un elemento o un altro per far fronte ad una crisi sia possibile?	Test for R3, R1.1
Ritiene che ci siano dei fattori utili per gestire la variabilità che l'azienda affronta quotidianamente e fattori più indicati per gestire crisi vere e proprie? (Spiegare soglie di resilienza) O i fattori sono intercambiabili e migliorare un qualsiasi elemento contribuisce in entrambi i casi?	Test for R1.1
I fattori generici e contestuali: i contestuali sono solo una declinazione dei generici? (Verificare dai commenti dell'intervistato se ciò avviene)	Reminder to check for Q1 and R1.2: contextual and generic factors can be split from a theoretical standpoint?
Come per l'indebitamento, un profilo ottimo di resilienza può essere dettato più da una cautela eccessiva verso gli investimenti e i rischi che da un buon bilanciamento tra questi e i fattori protettivi. E' d'accordo con questa affermazione?	Approach to discuss Q4
Secondo lei i fattori protettivi dell'azienda potrebbero consentire di farsi carico di rischi maggiori, data la situazione corrente?	Approach to discuss Q4
Una diminuzione di questi fattori renderebbe subito più vulnerabile l'azienda? Essi sono posti costantemente sotto stress? O solo in momenti critici?	Discussion of Q4
Quali si attivano quotidianamente, quali durante le crisi?	Understanding which factors were contextual, which generic for the firm (and discussing the coping range and resilience threshold with the interviewee)
Ci sono stati dei momenti in cui siete dovuti ricorrere a fattori di resilienza che non usate nell'amministrazione ordinaria? Cos'è successo?	Test for R1.1
Quali fattori hanno avuto un ruolo più importante durante la crisi?	Reminder to test for Q3
Tutto vissuto come business as usual? Oppure i risultati sono tornati ai livelli precenti senza seguire i trend di settore?	Discussion on H2, understanding whether factors in the coping range or constituting static resilience were employed in the different situations (business as usual or crisis).

Fattori generici hanno gestito la variabilità quotidiana e fattori specifici gli eventi inattesi?	Another reminder to check for R1.1
La vostra performance sarebbe stata superiore / inferiore in questo periodo con / senza questi fattori?	Alternative questions to test Q4
Tutti i fattori prottetivi sono stati utili nel periodo o solo alcuni?	Alternative questions to test Q4