

A Dynamic Perspective on the Resilience of Firms:

A Systematic Literature Review and a Framework for Future Research

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The present study aims to answer the following research question: *how is the resilience of firms defined in the business and management field?* In doing so we answer to recent calls for research in the field about a more thorough conceptualisation of the resilience of firms. We conduct a systematic literature review of 66 selected papers published between 2000 and 2017. By means of inductive content analysis, we analyse the definitions of ‘resilience’ and elaborate a novel conceptual framework that introduces a dynamic perspective on the resilience of firms. The proposed framework overcomes the existing definitional fragmentation and raises awareness on the temporal dimension in conceptualizing the resilience of firms through identifying four key categories, i.e.: resilience as a proactive attribute ($t-1$), resilience as absorptive and adaptive attribute (t); resilience as reactive attribute ($t+1$) and resilience as dynamic attribute. We contribute to extant business and management literature on the resilience of firms by clarifying the concept of resilience and providing a framework with a set of propositions as well as detailed avenues for future research.

Keywords: resilience, firm, systematic literature review, content analysis

1. Introduction

During the last decade, increased market uncertainty and environmental disasters have shifted the strategic goals of many organisations from a so-called ‘quest for profits’ to a ‘quest for resilience’ (Hamel and Välikangas 2003), focusing the attention of both management scholars and practitioners on the topic of the *resilience of firms* (Baggio, Brown, and Hellebrandt 2015; Carmeli and Markman 2011; Woods 2015; Mamouni Linnios et al. 2014).

In common-sense, resilience is an attribute that defines individuals able to thrive with difficulties and uncertainties and to feel better after something unpleasant happens. In the academic literature, resilience refers to a rather abstract concept, characterised by a

great variety of interpretations and definitions. A search for the keyword “resilience” in the Scopus library service (data-range 2000-2017) registers more than 60 thousand documents, among which 2615 published in the business and management field, distributed according to an exponential growth starting from 2010. Nonetheless, despite the blooming of publications on resilience-related issues in management and business disciplines (Bhamra, Dani, and Burnard 2011; Linnenluecke 2017), the conceptualisation of the term is still fragmented. Apart a few studies - (Baggio, Brown, and Hellebrandt 2015; Conz 2016; Gilly, Kechidi, and Talbot 2014; Mamouni Limnios et al. 2014) that aimed at identifying the diversity of interpretations in different research areas - a systematisation of the literature of resilience in the management and business area is still missing. Moreover, the greater amount of studies has focused on the resilience of *systems* (Norris et al. 2007) and supply chains (Ambulkar, Blackhurst, and Grawe 2015; Brandon-Jones et al. 2014; Pettit, Fiksel, and Croxton 2010; Rice and Sheffi 2005), while the resilience of firms is still underinvestigated.

With the aim of - at least partially - fill the above-mentioned gaps, the present study addresses the following research question: *how is the resilience of firms defined and conceptualised in the business and management field?* Starting from the most recent contributions in business and management (Gilly, Kechidi, and Talbot 2014; Mamouni Limnios et al. 2014), we conducted a systematic literature review of articles published between 2000 and 2017 about resilience at the firm level, aiming to contribute to the ongoing debate on resilience in the business and management area (Linnenluecke 2017). We critically analyse the definitions of 66 selected publications by means of inductive content analysis and elaborate a conceptual framework to categorise resilience for future research in this field. Doing so, we advance a dynamic perspective of the resilience of

firms, overcoming the existing definitional fragmentation and raising awareness on the temporal dimension when conceptualising the resilience of firms.

In the paper, we refer to “events” meaning the changes, shocks, traumas, altering the firm’s equilibrium being the trigger of resilience. The paper is structured as follows. First, we illustrate the research methodology (Section 2) describing our literature selection criteria and data analysis protocol. Then, we present the main findings (Section 3) and discuss the conceptual framework with a set of propositions (Section 4). Finally, based on a critical analysis of existing research, we offer future research avenues to advance the understanding of the resilience of firms (Section 5).

2. Method

2.1 Data sources and literature selection

Following the example of extant studies based on the same procedure (Dorn, Schweiger, and Albers 2016; Skrzek-Lubasińska and Szaban 2018); we performed a systematic literature review of relevant publications within the business and management field, carrying out a computerised search of the literature inquiring Scopus and Web of Knowledge library services. We adopted library services instead of publishers to have two comprehensive datasets of academic publications on peer-reviewed journals and to cross check the findings of our inquiry. We also followed the systematic literature review approach proposed by Bergström, van Winsen, and Henriqson (2015), to systematically select papers using Scopus.

Moreover, the interdisciplinary nature of the concept of resilience and its application across several management fields, justified the choice to rely on a library service rather than publishers or journals to search for relevant articles. The web-based bibliography program RefWorks helped in managing references.

In conducting our systematic search for papers, we coupled the term ‘Resilience’ through the Boolean operator AND respectively with the keywords: ‘Firm*’, ‘Organisation*’, ‘SME*’ and ‘Enterprise*’. We set the data range in the interval 2000-2017 (cut-off: 26 July 2017): the year 2000 records a substantial increase of publications, as per our inquire of the library services with the keyword ‘Resilience’. The search for keywords was run twice to increase the reliability of the study. Thanks to the above-mentioned search, we could identify 775 potentially relevant articles. We then proceed with a preliminary screening to a title/keyword and summary check, excluding 595 articles and retrieving 180 articles (including 33 duplicates). The remaining 147 articles have been analysed by each of the two authors and reviewed according to specific inclusion and exclusion criteria in order to assess the relevance of the document for the subsequent steps of analysis (see Section 2.2). To be included in our review a study had to:

- (1) be published in English within the the management, business research, or accounting fields. Studies dealing with resilience in other social sciences areas or in medicine, engineering and physics where excluded (N = 15).
- (2) Be published between 2000 and 2017 in a peer-reviewed academic journal. Other publication types (*i.e.* conference proceedings, books, book chapters, newspaper articles, unpublished works, etc.) were excluded (N = 4).
- (3) Consider resilience at the firm level (both large and small firms). Thus, we excluded articles dedicated to resilience at the individual level (*i.e.* individuals, teams, communities) and macro level (*i.e.* cities, regions, nations) of analysis. We also did not considered articles dedicated to the resilience of no-profit, no-governmental organisations and public institutions (N = 36).

- (4) Explicitly adopt a definition of resilience (at the firm level) – either referring to previous studies’ definitions, or by framing a new one. Consequently, articles, - both empirical than conceptual - which provided a list of definitions from different field from that of business and management (*e.g.* engineering, ecological science, economics, finance) but not stated a univocally definition of resilience were excluded (N = 35).

At this stage, we included 57 articles and excluded 90 articles. We examined the bibliographical references of included papers to check the validity of the enquiry and to avoid any potential omission. Accordingly, we manually added to the dataset (N = 9) works consistent with our research question and inclusion criteria. We considered these contributions relevant for the review because highly cited in the selected papers. Considering the above-mentioned inclusion and exclusion criteria and the manual addition, our final dataset consists of 66 studies. Figure 1 illustrates the systematic review flow.

Figure 1 about here

2.2 Descriptive analysis

The distribution of the selected literature in the time frame 2000-2017 (cut-off: 26 July 2017, including online-first articles published up to this point), shows that 58 papers have been published starting from the year 2009 (see Figure 2). The significant increase of documents over last eight years signals a growing interest in the topic.

The *International Journal of Production Research* is the most represented, showing a predominance of correlated contents, with 11 papers focused on the resilience of firms. Strategic Management Journal gives a contribution to the field with three articles. Disaster Prevention Management, International Journal of Production Economics, Journal of Contingencies and Crisis Management, Journal of Operations Management are represented

by two articles each. The remaining 44 papers have been published heterogeneously in 44 different management journals.

Figure 2 about here

2.3 Inductive content analysis

Following the guidelines for conducting valid content analysis (Elo and Kyngäs 2008; Seuring and Müller 2008; Bengtsson 2016), after reading several times the papers and becoming familiar with the topic and making sense of the data, we identified the definitions of resilience provided by the authors in the selected documents. Afterwards, we analysed them by means of qualitative content analysis, adopting the so-called “conventional approach” to the coding process, that is generally used in studies whose aim is to describe a phenomenon, when existing theory or research literature is limited (Hsieh and Shannon 2005).

The inductive coding approach is particularly suitable to the purpose of our study, because it is recommended when former knowledge about the phenomenon under investigation is fragmented (Elo and Kyngas 2008). We performed the content analysis individually and then discussed the results together, confronting emerging categories and sub-categories of descriptions (see Table 1). To validate the results, we presented our preliminary findings to expert researchers during conferences and research meetings to have feedbacks and suggestions. To ensure the reliability of our study, hereafter we provided some examples of the inductive content analysis process.

*** Table 1 about here***

In Pal, Torstensson, and Mattila (2014) resilience is defined as the capability to be ready in time of crises and to sustain superior organisational performance. In this definition, resilience is a capability developed within the firm at time ($t-1$) before an external event occurs. We coded the *readiness* of the firm in the case a crisis alters its equilibrium as a

subcategory of resilience at time $(t-1)$. Acquah, Amoako-Gyampah, and Jayaram (2011) state that resilience is the ability of a firm to persist in the face of substantial changes in the business and economic environment and/or the ability to withstand disruptions and catastrophic events. Accordingly, resilience is defined as an attribute that a firm owns meanwhile an external event - disruption, catastrophic event - occurs, helping the firm to withstand such unpredictable phenomenon. In this statement, we interpreted resilience as an attribute of the firm at time t , when the event occurs. We coded the *persistence* of the firm in *withstanding* an unpredictable event as subcategories of the main category 'resilience at time t '. McPhee (2014) refers to resilience as the capacity to survive to disruptions, identifying resilience as an attribute a firm possesses after a critical event has occurred. We then coded *survive* as subcategory of the main category 'resilience at time $(t+1)$ '.

Ambulkar, Blackhurst, and Grawe (2015) conceive resilience as the capability of a firm to be alert to, adapt to, and quickly respond to changes brought by a supply chain disruption. In this statement, three temporal units are set forth: *i.* resilience to be *alert* to changes $(t-1)$, *ii.* resilience to *adapt* while unexpected changes are under way (t) , and *iii.* resilience as to quickly *respond* to changes $(t+1)$. This definition focuses on the alertness, the adaptation and the responsiveness capabilities of the firm. We thus coded *alertness*, *adaptation* and *response* as sub-categories of resilience at time $(t-1)$, (t) and $(t+1)$. Finally, we revised each definition with the abovementioned coding process and we grouped them into to the following four main temporal phases:

- proactive (at time $t-1$ before an event occurs);
- absorptive and adaptive (at time t meanwhile an event occurs);
- reactive (at time $t+1$ after an event has occurred);
- dynamic (involving a continuum along the phases $t-1$, t and $t+1$ before, meanwhile, and after the event has occurred).

In inductively coding the definitions of resilience we recognised the sub-categories belonging to each of the above-mentioned main categories by open coding nouns, adjectives and verbs and grouping them according to their relationship with the main category. We thus identified ‘alertness’, ‘readiness’, ‘preparedness’ as sub-categories belonging to the category of resilience as *proactive attribute* (main category) of the firm at time ($t-1$), before an event occurs. ‘Persistence’ and ‘withstand*’ are sub-categories of the category of resilience as an *absorptive attribute* of the firm at time t and refer to the firm attempt of *absorbing* the event meanwhile it is occurring. In a similar fashion, ‘changing’, ‘sustaining’, and ‘adapting’ are sub-categories of the main category of resilience as an *adaptive attribute* the firm possesses in *adapting* to an event (time t , meanwhile the event is occurring). ‘Responding’, ‘surviving’, ‘returning’, ‘bouncing back’, are the sub-categories that define the category of resilience as *reactive attribute* of the firm at time ($t+1$), after the event occurred.

3. Findings

Thanks to a thorough content analysis of 66 definitions of resilience corresponding to 66 selected articles it emerged that resilience is conceived by the literature as an attribute the firm possesses along a continuum: before, meanwhile, and after an event (either external or internal). The reviewed papers could be ascribed to each of those temporal categories, which we illustrate hereafter.

Four categories, that refer to a conceptualisation of resilience related to time, inductively emerged from the analysis, viz. resilience as an attribute a firm possesses:

- before ($t-1$) an event¹ (*proactive phase*);

¹ From now on, we employ the term ‘event’ to include the variety of internal and external phenomena (e.g. shocks and changes) described in literature, that unexpectedly occur and alter the equilibrium

- meanwhile (t) an event (*absorptive and adaptive phases*);
- after ($t+1$) an event (*reactive phase*);
- before, meanwhile and after an event, dynamically (*dynamic phase*).

Table 2 illustrates the analysed papers, listed according to the above-mentioned categories, reporting authors, publication year and definitions.

Insert Table 2 about here

Out of the 66 papers, three contributions adopt a definition of resilience that refers to an attribute owned by the firm *before* an event occurs - viz. proactive attribute -, at time ($t-1$). 26 papers define resilience as an attribute owned at time t to *adapt*, or to *absorb* the shock resulting from the occurring event – viz. adaptive or absorptive attribute. 12 papers define resilience as an attribute owned at time ($t+1$) to *bounce back*, to *return to* a stable state after an event –viz. reactive attribute. Finally, 25 papers describe resilience as an attribute that *simultaneously* is:

- owned at time ($t-1$) to be *alert* to potential events;
- owned at time t to *respond* to an event;
- owned at time ($t+1$) to *bounce back* or *recover* from an event.

The following sections illustrate the four categories in detail.

3.1 Resilience as proactive attribute at time ($t-1$)

The group of papers, that falls in this category, conceptualises resilience as an attribute owned by the firm before an event occurs (4,54% out of total papers analysed). Authors within this category look at the set of resources and capabilities a firm needs to possess or

of the firm. Furthermore, in defining resilience, we employ the term ‘attribute’ to broadly include the different definitions of the term - *i.e.* capacity, ability, capability - found in the business and management literature when defying resilience.

develop in order to respond to unexpected events. Two papers (Brewton et al. 2010; Danes et al. 2009) define the resilience of family firms as the reservoir of individual and family resources that cushions the family firm against disruptions and is characterised by individual and collective creativity used to solve problems and get work done. In particular, Brewton et al. (2010) analyse the contribution of human, social, financial, capital resources, normative and non-normative disruptions (i.e. foreseeable and unforeseeable changes in the family's structure) and the impact of natural disasters on the resilience of family firms. Similarly, Danes et al. (2009) investigate firm sustainability in consequence of natural disasters and define the resilience of family firms as a stored capacity to rely on when a disruptive event occurs. Both studies emphasise the fact that resilience is about accumulating resources to sustain the family business during times of struggle. In adopting this perspective, they measure the set of social, financial and capital resources owned by the firm. Interestingly these papers refer to "creativity" as an individual and collective capability, which brings the family to a higher level of interaction and development of new resources, resulting in greater responsiveness and resilience. Yet the authors do not provide further insights on this. How creativity emerges, and how it may enhance resilience is yet to be thoroughly investigated. Similarly, Pal, Torstensson, and Mattila (2014) define firm resilience as the capability to be ready and to sustain superior organisational performance during times of crisis. In their exploratory research, they investigate the enablers of resilience for small and medium sized enterprises, identifying three broad assets required to bolster and develop resilience - i.e. resourcefulness; dynamic competitiveness; learning and culture - though without providing an in-depth analysis of these determinants. To sum up, the papers falling within this category seem to have identified the three key following components of resilience: i) pro-activity: resilience is an active response to a crisis situation that involves taking proactive steps to be able to thrive during and after a crisis; ii) resourcefulness: in order to be resilient, a firm

needs to possess various assets and resources - material, social, financial, human, technological - to sustain the organisational performance during times of crisis; iii) collectiveness: the development of coordinative and interactive dynamics both inside the firm, promoting a shared and positive vision among employees, and outside the firm, participating in the community planning activities, leading to trust and creativity in problem solving.

3.2 Resilience as absorptive and adaptive attribute at time (t)

More than half of the analysed papers (59%) define resilience as an attribute the firm owns *meanwhile* an event occurs (time t). Among the 26 papers that fit into this category, seven describe resilience in relation to the *absorption* of the shock - that occurs as a consequence of a critical event - to maintain stability and preserve assets. Scholars that focus on the absorptive aspect of resilience, emphasise the robustness of the firm during the critical event and the stability of its organisational structure. The absorptive interpretation of resilience is rooted into the well-known notion of 'engineering resilience' (McGlade et al. 2006; Simmie and Martin 2010), that emphasises control and constancy. It is related to the resistance of the firm to disturbance, and the ability to quickly returning to a phase of equilibrium after the shock. In line with the engineering perspective, Acquah, Amoako-Gyampah, and Jayaram (2011), through comparing the competitive strategy of family and non-family firms, describe resilience as the ability to persist in the face of substantial changes, by remaining stable, withstanding disruptions and catastrophes. Jaaron and Backhouse (2014) also explain resilience as ability to sense and absorb a change. Dumitrascu and Dumitrascu (2016) as the capacity to absorb shocks and serious impacts. Bogodistov and Wohlgemuth (2017) and Sin, Musa, and Ng (2017) emphasise resilience as the ability of a firm to remain in a stable state, growing its income and number of employees. In a similar vein, Biggs, Hall, and Stoeckl (2012) refer to resilience as the capacity of the firm to remain in a stable state during a

disturbance, maintaining or increasing its income, despite external changes. In their definition, the authors refer to “robustness” as the capability to resist to disruption. Similarly, Ismail, Poolton, and Sharifi (2011) define resilience as the maintenance of a positive adjustment under challenging conditions and identify in “operational agility” - defined as the capability of a firm to be more and quickly responsive when dealing with turbulence - the necessary component to develop resilience. When absorbing shocks that alter the equilibrium of the organisation, agility, coupled with robustness, limit the effects of variables that can threaten stability and make the firm vulnerable. Organisational robustness is a key phase of operational agility, and an imperative element to achieve resilience by resisting disruption and trying to preserve the previous state of equilibrium.

The remaining 17 papers describe resilience in relation to the *adaptation* to a shock by which firms recombine extant or novel resources and prompt internal changes. These studies are influenced by the ecological sciences framework of resilience (Folke et al., 2002; Gunderson and Holling, 2001; Holling, 2001; Walker et al., 2004; McGlade et al. 2006), that - in contrast with the engineering view of returning to a pre-existing equilibrium point - implies the existence of multiple *equilibria* and the possibility to shift from one equilibrium to a new one. According to the ecological perspective, firms follow a process of ‘punctuated equilibrium’, a succession of stable forms, taking the chance of a disturbance as an opportunity to innovate and booster an internal change, sustaining business longevity and continuity in the long-term. In line with this perspective, 8 papers (Ahmed, Kristal, and Pagell 2014; Andres and Round 2015; Ates and Bititci 2011; Burnard and Bhamra 2011; Dahles and Susilowati 2015; Duarte Alonso and Bressan 2015; Moore and Manring 2009; Wedawatta and Ingirige 2012) define resilience as an ability or capacity to withstand, to adapt, and to cope with turbulent changes, environmental risks, perturbations or external shocks. In particular, three core competences are emphasised: adaptability, innovativeness

and flexibility. The more an organisation is adaptable, innovative and flexible, the more it will be able to quickly adapt routines and strategies and to build a resilient response to shocks.

Li et al. (2015) refer to resilience as an ability to reconfigure firm resources in a novel way, to change and adapt them as an unpredictable event occurs, to cope with hostile circumstances. The authors underline that adaptation implies the ability to orchestrate in a rapid, timely and easily way by redeploying and reconfiguring existing technical and organisational resources. Akgün and Keskin (2014) and Amann and Jaussaud (2012) define resilience as the ability or capacity to take actions, and to deploy specific behavioural and cognitive abilities. Lengnick-Hall and Beck (2005) and Scalera et al. (2014) describe resilience as a blend of cognitive, contextual and behavioural properties that increase the ability of a firm to overcome the uncertainty related to unexpected events, and to develop customised responses. Both studies thus introduce the cognitive aspect of resilience though without providing further explanation of how cognition related-mechanisms could support, determine, or enhance resilience. Starr, Newfrock, and Delurey (2003) and Huggins et al. (2014) describe resilience as the ability and capacity to withstand discontinuities and adapt to new environmental risks and systemic shocks. Furthermore, Huggins et al. (2014) link such adaptive ability to innovation and networking, arguing that the two are key competences of resilient entrepreneurial firms. Similarly, Penadés, Núñez, and Canós (2017) in analyzing resilience in relation to emergency plan, define resilience by four characteristics: diversity, efficiency, adaptability and cohesion. These four determinants are critical but would require further in-depth investigation in order to understand their nature and inner constituents in relation to resilience.

Finally, two studies do not specify whether resilience at time t is an absorptive or adaptive attribute, but provide only a broad definition that identifies resilience as an attribute

the firm possesses meanwhile an event is taking place. Richtnér and Löfsten (2014) define resilience as the capacity that allows companies to thrive in dynamic environments; Dai, Eden, and Beamish (2017) as the ability to withstand stressors related to the war.

3.3 Resilience as a reactive attribute at time (t+1)

The category of *reactive* resilience comprises 12 papers (18,18%) that define resilience as the attribute a firm owns to return to a stable equilibrium, to respond to change, maintaining or reconfiguring its structure after an event occurred at time ($t+1$).

Linnenluecke and Griffiths (2010) broadly describe resilience as the capacity of survival of an organisation that encounters unexpected adverse conditions. McPhee (2014) defines resilience as the capacity to survive to disruptions, while Pal, Westerlind, and Torstensson (2013) and Smallbone et al. (2012) as the ability of firms to respond to times of crisis or to a change in order to maintain their competitive advantage. This set of papers does not specify whether surviving implies maintaining the previous equilibrium state or a reconfiguration of resources in order to reach new or multiple equilibria. For example, Su and Linderman (2016) generally define resilience as the ability to cope with and respond to such changes, but without stating *how* a firm might respond to change.

Bhamra, Dani, and Burnard (2011); Herbane (2015); Watanabe, Kishioka, and Nagamatsu (2004) and Edgeman and Williams (2014) point out that resilience is about recovering, rebounding, bouncing-back after shocks, returning to a pre-disturbance state. Linnenluecke, Griffiths, and Winn (2012) argue that resilience is an organisational capacity to absorb the impact of a shock and recover from the occurrence of an extreme weather event. Carmeli and Markman (2011) define resilience the capacity to bounce-back from a setback. This set of studies, which describe resilience using the idea of ‘bouncing-back’ or recover to a previous equilibrium state, roots the theoretical foundations in the engineering perspective of resilience. According to this school, a system, after experiencing a shock that alters its

equilibrium at time t , in the phase $(t+1)$ returns to its pre-existing organisational structure, i.e. as it was before being affected by the unexpected event.

Tracey and French (2017) explain resilience as an ability of firms to adapt when facing external difficulties, recovering after a drop in performance. They emphasise the adaptive aspects of being resilient, according to which a firm recombines its structure to adapt and to reach a new point of equilibrium, meaning a new organisational structure. This perspective is influenced by the ecological school of resilience, according to which a successful reconfiguration of the firm's resources in consequence to the new environmental conditions, permits to achieve a new state of equilibrium at time $(t+1)$.

3.4 Resilience as a dynamic attribute

25 papers (39,39%) define resilience as an attribute that characterizes a firm before, meanwhile the event is occurring, and after it has occurred. They thus emphasise the dynamic aspect of resilience.

A few papers within this category are consistent with the engineering school perspective and define resilience as a *dynamic* absorption of a shock. In this view, resilience is the ability of the firm to absorb, to develop situation-specific responses and to engage in transformative actions with the aim to capitalise on disruptive shocks (Lengnick-Hall, Beck, and Lengnick-Hall 2011; van Essen et al. 2015). Chrisman, Chua, and Steier (2011) explain resilience of family firms as the ability of an organisation to avoid, absorb, respond to and recover from threatening situations. They adapt the conceptualisation of the term proposed by Vogus and Sutcliffe (2007), and Trim and Lee (2008) that described resilience as the maintenance of a positive adjustment under challenging conditions. Herbane (2013) also adopts a view that emphasises a dynamic and engineering interpretation according to which resilience is the capacity to absorb the pressure of internal and external threats or crises and to recover to their pre-crisis state.

Conversely, the majority of the definitions of resilience found in the papers within this group (Blanco and Montes-Botella 2017; Ferreira and Saridakis 2017; Gray and Jones 2016; Morais-Storz and Nguyen 2017; Ortiz-de-Mandojana and Bansal 2016; Tognazzo, Gubitta, and Favaron 2016; Marwa and Milner 2013), are ascribable to the ecological perspective of resilience. Accordingly, resilience implies a *dynamic* adaptation to a shock, meaning the ability to anticipate, to withstand, to cope with, and to adjust to shocks by recombining existing resources with the consequence of emerging strengthened and more resourceful. For example, Ambulkar, Blackhurst, and Grawe (2015) define resilience of firms as the capability to be alert to, to adapt to, and to quickly respond to changes. Su et al. (2014); Sullivan-Taylor and Branicki (2011) define resilience as a capability to prepare for, adapt to, recover or respond to shocks, while Vargo and Seville (2011) define it as the ability not only to survive but also to thrive in both good and adverse times. Accordingly, Teixeira and Werther (2013) argue that resilience is a *superior resource configuration capability* displayed by firms to develop and sustain their competitive advantage. According to the authors, resilience is the capability to *continuously* renew the competitive advantage of the firm, through innovation. This dynamic perspective is consistent also with Reinmoeller and van Baardwijk (2005) and their conceptualisation of resilience as a capability of firms to self-renew overtime through a portfolio of innovation strategies. The latter are categorized by the authors according to the way through which (internal, external, new or existing) resources and capabilities are recombined during the self-renewal process of the firm. This definition is also adopted by Edgeman (2015) and Edgeman and Wu (2016). In this perspective, Hamel and Välikangas (2003) refer to resilience as the capacity for continuous reconstruction, to find novel responses through innovation but preserving organisational values, processes and behaviours. Lalonde (2007) refers to resilience as a process that induces positive outcomes like skills to bounce back and capacities for recovery and Demmer, Vickery, and Calantone

(2011) as the ability to *continually evolve* and thrive in the face of adverse and sometimes hostile circumstances. Gunasekaran, Rai, and Griffin (2011) conceive resilience as the capacity of adaptability, responsiveness, sustainability and competitiveness of small and medium sized enterprises in evolving markets.

4. Towards a conceptual framework for the resilience of firms

4.1 Conceptualising resilience

Management studies about the resilience of firms are growing in popularity, as demonstrated by the increasing number of publications. Nonetheless, our literature search and analysis confirms that the conceptualisation of resilience at the firm level within management disciplines (e.g. disaster management, organisational studies, strategy, entrepreneurship) is still fragmented (Bhamra, Dani, and Burnard 2011; Linnenluecke 2017). The term is used interchangeably in different disciplines, but without specific definition for each field. Therefore, there is no univocally accepted definition of resilience, instead, definitions from others research fields, especially economics and engineering, are adopted by referencing to the most cited writings, especially relying on the engineering and the ecological school. Overall, management scholars have paid little attention on *how* to define resilience and overcome this issue by adopting definitions from other authors. This has raised serious implications with respect to the level of analysis. The definitions adopted often come from the conceptualisation of resilience at the level of individuals, cities, regions or nations. In order to overcome the above-described weaknesses, we propose the following working definition of the resilience of firm:

Resilience is a dynamic attribute of the firm characterised by a) a proactive phase at time (t-1); an absorptive/adaptive phase at time t, and b) a reactive phase at time (t+1).

Our definition emphasises the temporal dimension of resilience being a dynamic process in

time, characterised by the interplay of a set of abilities such that:

1) resilience *proactive* abilities owned at time $(t-1)$, i.e. before an event, are the antecedents of the absorptive and adaptive abilities deployed at time (t) , when the event occurs;

2) resilience absorptive and adaptive abilities deployed at time (t) , contribute to the development of resilience *reactive* abilities needed at time $(t+1)$, after the event has occurred.

Departing from the definition of resilience, we advance a conceptual framework (see Figure

3) and a set of Propositions to be tested by future research. Our conceptual framework identifies two distinctive dynamic “resilience paths” - the absorptive and the adaptive - evolving along three temporal phases: time $(t-1)$; t , and $(t+1)$.

*** Figure 3 about here***

Our dynamic perspective on resilience is consistent with Hollnagel (2011, xxxvi) who defines engineering resilience in safety research as “an intrinsic ability of a system to adjust its functioning prior to, during, or following changes and disturbances”. Nonetheless we add a significant contribution to such conceptualisation by: i) making explicit the temporal dimension of resilience within management studies and ii) underlining two distinctive paths that describe resilience within the context of firms, viz. the absorptive and the adaptive. Furthermore, our framework distinguishes two types of “resilience responses”: according to the two paths, firms can be resilient by either absorbing or adapting to the shock (or both).

A firm could follow either one or both paths to successfully achieve a positive adjustment in consequence of a shock. Furthermore, the two paths, adaptive and absorptive, are equally effective in achieving a positive adjustment, but vary according to the abilities that are developed during each temporal phase (see section 4.2).

Proposition 1: *The resilience of firms is characterised by two dynamic paths: the absorptive and the adaptive that are both equally effective for the achievement of a positive adjustment after a shock.*

4.2 Core abilities for being resilient

Figure 1 details the core abilities to build resilience during each phase of the dynamic path. The conceptualisation of resilience as a dynamic cycle implies a continuous adjustment and implementation of such abilities.

Redundancy, agility and robustness are the essential abilities that characterise the absorptive path of a firm when facing disturbance. The ability of accumulating resources (redundancy) is needed before the shock, in turn, robustness is needed to resist the shock and to reduce the vulnerabilities of the firm. Building resilience through redundancy and robustness must balance the cost of multiple stocks and reservoirs with the generation of long term benefits (Pal, Torstensson, and Mattila 2014). Redundant and robust firms need then to quickly and actively respond to the shock through an agile response - agility (Ismail, Poolton, and Sharifi 2011). In the absorptive path of resilience, the accumulation of resources is essential for a resilient response and needs to be planned at $(t-1)$. It should be a proactive strategy, not a 'just in time' or 'just in case' responsive solution developed at time t (Sheffi and Rice Jr 2005).

Resourcefulness, adaptability, and flexibility are the essential abilities that characterise the adaptive path of a firm when facing disturbance. The availability of different and heterogeneous resources (resourcefulness) is essential to bolster resilience and sustaining the competitiveness of the firm in a resilient adaptive path. In particular, the adaptation of routines and strategies to a shock at time t , through the reconfiguration of extant resources available at $(t-1)$ - combined with new resources - leads to a quick change of strategy $(t+1)$ i.e. flexibility. According to the mainstream perspective about

adaptive resilience, the dynamic adaptation through actions such as adjusting, the recombination of resources, self-renovation, and continuous reconstruction, implies a 'flexible response' and a positive adjustment. By developing an adaptive ability at t , firms are able to withstand the shock and respond to unexpected situations. In turn, a flexible response may depend on creativity, innovative capacities of the firms, and entrepreneurial capabilities (Simmie and Martin 2010). In smaller firms, entrepreneurial capabilities refer to the ability to initiate and to sustain entrepreneurial dynamism throughout the organisation and to stimulate the learning process (Zucchella and Magnani 2018). Such capabilities are often linked to particular individuals, i.e. entrepreneur/s. In larger or established companies, these capabilities could be referred to routines and processes combined and managed by individuals and groups within the firm (ibid).

The following propositions highlight the key relationships among the variables and phases of the dynamic cycle of resilience proposed in our framework:

Proposition 2a: There is a positive relationship between the accumulation of resources (redundancy) at time $(t-1)$ and the ability of a firm to resist to change (robustness) at time t .

Proposition 2b: There is a positive relationship between the ability of a firm to resist to change (robustness) at time t and the ability to provide an agile response (agility) at time $(t+1)$.

Proposition 3a: There is a positive relationship between the availability of different resources (resourcefulness) at time $(t-1)$ and the ability of a firm to adapt to change (adaptability) at time t .

Proposition 3b: *There is a positive relationship between the ability of a firm to adapt to change at time t and the ability of a firm to provide a flexible response (flexibility) at time $(t+1)$.*

5. Conclusions and future research directions

Recently, increasing attention has been posed to the resilience of firms but management studies still miss a solid conceptualisation of the term. For instance, many studies often employ a definition of resilience borrowed from different contextual settings or levels of analysis, driven by a priori assumptions and overlapping resilience-related concepts.

The present systematic review has aimed to address this gap by advancing a conceptual framework for the resilience of firms that could represent the basis for further theoretical and empirical developments in the field. The relevant and original contribution to the ongoing debate on resilience in the management literature consists in having proposed a dynamic perspective on the resilience of firms by taking into due account its temporal dimension. Hereafter we advance a set of avenues for future research that we believe can help developing a more solid understanding of the resilience of firms.

5.1 Take time into due account

First, from both a theoretical and methodological point of view, we believe that the temporal dimension has always to be considered in the design of future studies. Researchers will have to design their research questions according to the time frame they wish to investigate. For instance, studies that aims to explore resilience at time $(t-1)$ will explain the accumulation (and the types) of resources/capabilities that are deployed at $(t-1)$ by a firm to build a resilient response in consequence to an event alters their equilibrium. Studies exploring the resilience of firms at time t , will explore the absorptive and adaptive features in terms of robustness and

adaptability of firms withstanding a shock and their relationship with an agile/flexible response at time $(t+1)$.

Future studies might explore how, and the extent to which, knowledge and competences accumulated by the firm after recovering from a shock can contribute to the implementation of novel abilities useful for preparing to potential new critical events.

Future longitudinal studies on resilience might explore how the abilities related to each of the three temporal dimensions of resilience interweave in the process of building resilience (see section 5.2). In addition, future process studies will have to explore the temporal linkages between the different phases of the resilience paths, collecting data through multiple approaches such as for instance in-depth observations, single and multiple case studies, archival analysis, surveys. In all the above-mentioned research opportunities, retrospective and real-time data will need to be coherently triangulated.

5.2 Explore the abilities to be a resilient firm

First, future studies based on qualitative and quantitative design could explore more in depth the distinction between the adaptive and the absorptive path, by gaining more insights about how the core abilities can be measured and tested, and especially *how* they are developed and deployed by firms to achieve resilience in each temporal phase along each path. Furthermore, research questions might be raised on how those abilities contribute to sustain the competitive advantage of firms during each phase of the resilience paths.

In particular, empirical studies investigating the absorptive path of resilience might collect qualitative and quantitative data - according to each temporal phase - about the abilities needed by firms to attain stability, control, optimisation and resistance to shocks, while scholars focusing on the adaptive path of resilience might analysed abilities as reorganisation, flexibility, knowledge production capacity and learning, the ability to cope with and manage uncertainty. The latter is a particularly relevant issue since in the literature

it is not clear whether in order to build resilience firms will also need to implement specific “strategic postures”. This issue needs further in-depth investigation. We foresee an intriguing opportunity of integrating the body knowledge about the resilience of firms with that developed in entrepreneurship, organisation studies, and strategy literature to better understand the linkages and potential interconnections between developing resilience and strategizing under conditions of uncertainty. This opens up opportunities to address the following research questions: are resilience paths complementary to strategic decision making under conditions of uncertainty? Do the resilience and uncertainty-coping feed each other? Under which circumstances and through which specific mechanisms?

Second, at current, there have been few insights about how cognitive, entrepreneurial, innovative (although the three are sometimes mentioned in the literature as connected with the resilience of firms) abilities are related to resilience and how their combinations may lead to a more effective resilience response. Such abilities and their impact on the resilience of firms might be explored and tested, integrating findings, theories and insights from other disciplines, particularly entrepreneurship, behavioural studies and innovation management.

5.3 Explore the outcomes of being resilient

First, a more thorough analysis and systematisation of the different types of outcomes, stemming from the firm’s resilience building paths, needs to be developed. This entails the collection of primary, longitudinal data from sets of firms belonging to different industries, offering different products/services, and with different business models.

At current, papers have often and almost interchangeably used outcomes stemming from resilience referring for instance to sustainability or competitiveness. Future empirical studies might test which resilience path - absorptive or adaptive - is more suitable to sustain firm competitiveness during critical crises. In general, external variables as the geographical

context and the industry impact on the resilience paths and needs to be taken into account when investigating the outcomes of being resilient (e.g. competitiveness).

Second, we need to understand whether resilient firms are, in turn, more performant than “non-resilient” firms. This can be done building longitudinal databases to then compare resilient firms (or, better, firms that were previously identified as acting in a resilient way) with non-resilient firms. This step involves monitoring firms for long spans of times and identifying critical shocks. This set of research might be then able to provide a more practical-oriented protocol to identify “resilient firms” and “non-resilient firms” in a context-specific manner.

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7. Tables and Figures

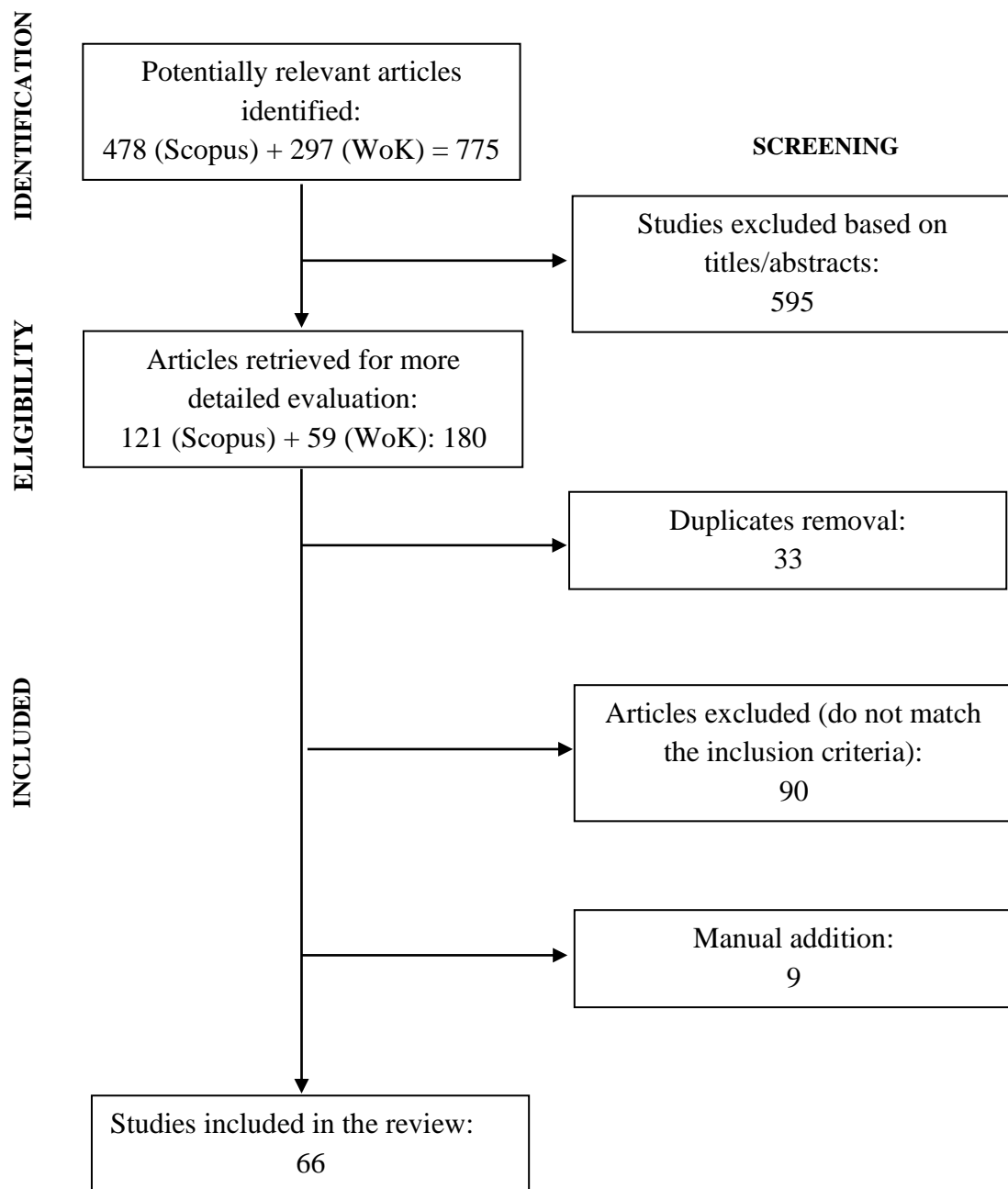


Figure 1. Systematic review flow diagram. (WoK: Web of Knowledge).

Reference	Definition of resilience	Temporal dimension	Sub-categories	Main-category
Pal et al. (2014)	Capability to be ready in time of crisis and to sustain superior organisational performance.	t-1	Readiness	Proactive attribute
Acquaah et al. (2011)	Ability of a firm to persist in the face of substantial changes in the business and economic environment and/or the ability to withstand disruptions and catastrophic events.	t	Persistence Withstanding	Absorptive attribute
McPhee (2014)	Capacity to survive to disruptions	t+1	Surviving	Reactive attribute
Ambulkar et al. (2015)	The capability of a firm to be alert to, adapt to, and quickly respond to changes brought by a supply chain disruption.	t-1 t t+1	Alertness Adaptation Response	Proactive attribute Adaptive attribute Reactive attribute

Table 1. An example of the inductive content analysis.

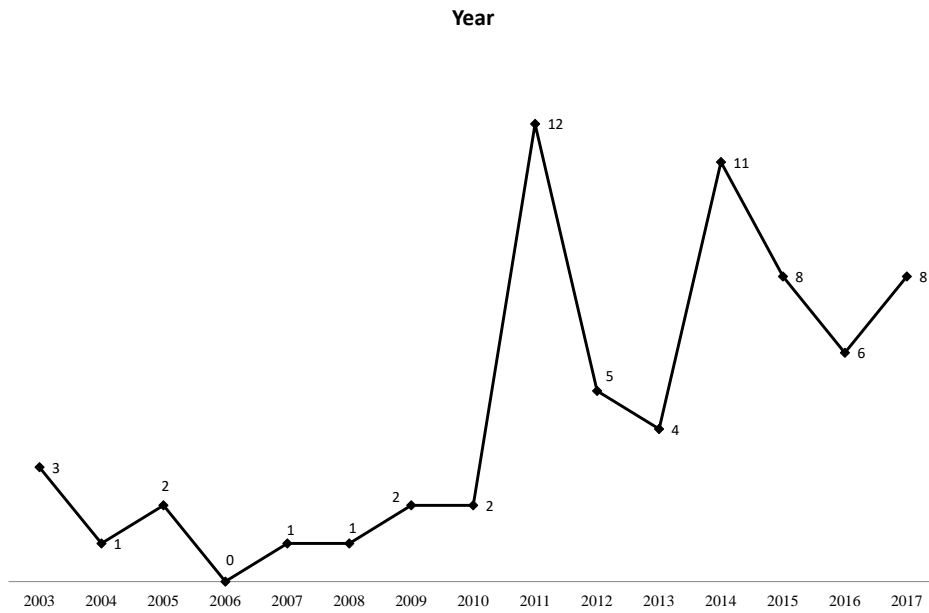


Figure 2. Publication trend across the period 2000-2017.

Category	Authors	Year	Definition
t-1	Danes S.M. et al.	2009	Family firm resilience capacity refers to a “stock” or “a reservoir” of individual and family resources that cushions the family firm against disruptions and is characterized by individual and collective creativity used to solve problems and get work done.
t-1	Brewton K.E. et al.	2010	Family firm resilience conceptually refers to the reservoir of individual and family resources that cushions the family firm against disruptions and is characterized by individual and collective creativity used to solve problems and get work done.
t-1	Pal R., Torstensson H., and Mattila H.	2014	Capability to be ready in time of crisis and to sustain superior organizational performance.
t	Starr, R., Newfrock, J., and Delurey, M.	2003	Ability and capacity to withstand systematic discontinuities and adapt to new risk environments.
t	Lengnick-Hall C.A., Beck T.E.	2005	Resilience capacity is defined as a unique blend of cognitive, behavioural, and contextual properties that increase a firm’s ability to understand its current situation and to develop customized responses that reflect that understanding.
t	Moore, S. B. and Manring, S. L.	2009	Capacity of an enterprise to survive, adapt, and grow in face of turbulent change.
t	Acquaah M., Amoako-Gyampah K. and Jayaram J.	2011	Ability of a firm to persist in the face of substantial changes in the business and economic environment and/or the ability to withstand disruptions and catastrophic events.
t	Ates A. and Bititci U.	2011	Capacity/Ability of an organization to change concerning the future development, to survive, adapt and sustain the business in the face of turbulent change.
t	Burnard K. and Bhamra R.	2011	Ability to withstand systematic discontinuities and capability to adapt to new risk environments.
t	Ismail, H. S., Poolton, J., and Sharifi, H.	2011	Maintenance of positive adjustment under challenging conditions.
t	Amann B. and Jaussaud J.	2012	Firm’s ability to take situation-specific, robust and transformative actions when it confronts unexpected and powerful events that have the potential to jeopardize its long-term survival.
t	Wedawatta G. and Ingirige B.	2012	Adaptation to risk.

Category	Authors	Year	Definition
t	Biggs D., Hall C.M. and Stoeckl N.	2012	Ability of a system to maintain and adapt its essential structure and function in the face of disturbance while maintaining its identity.
t	Ahmed M.U., Kristal M.M. and Pagell M.	2014	Ability to adapt to diversity.
t	Akgün A.E. and Keskin H.	2014	Capacity to compose specific cognitive abilities, behavioural characteristics and contextual conditions-related variables in the product innovation context.
t	Gilly J.-P., Kechidi M., and Talbot D.	2014	Double capacity of resistance and adaptation opening the way for new pathways. These pathways indicate the capacity of an organisation to find novel responses to new questions and not simply to reproduce previously-used organisational responses.
t	Jaaron A. and Backhouse C.J.	2014	Ability to sense and absorb variability, surprises, and disruptions of the environment.
t	Huggins R. et al.	2014	Capability of organizations to adapt to systemic shocks.
t	Richtnéř A. and Löfsten H.	2014	Capacity that allows individuals, groups, and companies to thrive in a dynamic environment.
t	Scalera V.G. et al.	2014	Firm-specific characteristic in the face of a turbulent environment
t	Andres L. and Round J.	2015	Cope with and adapt to external shocks, such as the current economic downturn. Micro resilience can be taken to mean the nimble taking advantage of opportunities.
t	Duarte-Alonso A. and Bressan A.	2015	As a measure of competitive level of firms, a capacity to adapt. As a way to cope with the constantly changing business environment.
t	Dahles H., Susilowati T.P.	2015	Capacity for an enterprise to survive, adapt, and grow in the face of turbulent change.
t	Li, C. et al.	2015	Ability to configure firm resources in novel ways to address the exigencies of the flood event.
t	Dumitraşcu V. and Dumitraşcu R.A.	2016	Resilience is the capacity of the organization to absorb shocks and serious impacts without losing the ability to accomplish a specific mission (Bell, 2012)
t	Bogodistov Y. and Wohlgemuth V.	2017	A resilient enterprise is one that is able to remain in a stable state, maintaining or growing its income and employee numbers despite disturbance.

Category	Authors	Year	Definition
t	Dai L., Eden L. and Beamish P.W.	2017	Ability to withstand stressors related to the war
t	Penadés M.C., Núñez A.G. and Canós J.H.	2017	Characteristic of organizations defined by four characteristics: diversity, efficiency, adaptability and cohesion.
t	Sin I.S.M., Musa N.A. and Ng K.Y.N.	2017	Enterprise's strategic capability to maintain positive causatum under challenging conditions in today's uncertain and complex business environment.
t+1	Watanabe C., Kishioka M. and Nagamatsu A.	2004	Capability of strained body to recover from or adjust smoothly to external changes, shocks or crises.
t+1	Linnenluecke M. and Griffiths A.	2010	Organizational survival when encountering unexpected, adverse conditions that result either from large-scale disturbances or the accumulation of several minor disruptions.
t+1	Bhamra, R., Dani, S. and Burnard, K.	2011	Capability and ability of an element to return to a stable state after disruption.
t+1	Carmeli, A. and Markman, G. D.	2011	Capacity of an organization to sustain and bounce-back from a setback.
t+1	Linnenluecke M.K., Griffiths A. and Winn M.	2012	Organizational capacity to absorb the impact and recover from the actual occurrence of an extreme weather event.
t+1	Smallbone, D. et al.	2012	Firm ability to respond to changes in the external environment in order to retain competitive advantage.
t+1	Pal et al.	2013	Response to a time of crisis.
t+1	McPhee	2014	Capacity to survive to disruptions.
t+1	Edgeman R. and Williams J.A.	2014	Enterprise capacity to recover or rebound from shocks or extreme challenges to its ecosystem (Contu, 2002).
t+1	Herbane B.	2015	rebuild quickly and bouncing-back
t+1	Su H.-C. and Linderman K.	2016	Ability to cope with and respond to such changes
t+1	Tracey N. and French E.	2017	Enhanced ability to adapt when faced with external difficulties as well as allowing the firm to rebound following a performance decline.

Category	Authors	Year	Definition
Process	Hamel, G. and Välikangas, L.	2003	Double capacity of resistance and adaptation opening the way for new pathways. These pathways indicate the capacity of an organisation to find novel responses to new questions and not simply to reproduce previously-used organisational responses.
Process	Vogus, T. J. and Sutcliffe K. M.	2003	Maintenance of positive adjustment under challenging conditions such that the organization emerges from those conditions strengthened and more resourceful.
Process	Reinmoeller, P. and van Baardwijk, N.	2005	Process capability to overcome barriers to change and develop multiple sources of competitive advantage.
Process	Lalonde C.	2007	Process that induces positive outcomes like skills to bounce back and capacities for recovery
Process	Trim P.R.J. and Lee Y.-I.	2008	Maintenance of positive adjustment under challenging conditions.
Process	Chrisman, J. J., Chua, J. H., & Steier, L. P.	2011	Ability of an organization to avoid, absorb, respond to, and recover from situations that could threaten their existence.
Process	Gunasekaran A., Rai B.K. and Griffin M.	2011	Adaptability, responsiveness, sustainability and competitiveness in evolving markets.
Process	Lengnick-Hall C.A., Beck T.E., Lengnick-Hall M.L.	2011	Ability to effectively absorb, develop situation-specific responses to, and ultimately engage in transformative activities to capitalize on disruptive surprises that potentially threaten organization survival.
Process	Demmer W.A., Vickery S.K. and Calantone R.	2011	Ability to continually evolve and thrive over time in the face of adverse, and sometimes hostile, circumstances which naturally arise in dynamic environments.
Process	Sullivan-Taylor B. and Branicki L.	2011	Capability that enables an organisation to prepare for, and respond to, extreme events.
Process	Vargo J. and Seville E.	2011	Ability of an organisation to not only survive but to thrive, both in good times and in the face of adversity.
Process	Herbane B.	2013	Capacity of organizations to build resilience against internally and externally derived threats to their activities so that they are able to absorb the pressures of the crisis and recover to their pre-crisis state.
Process	Marwa S.M. and Milner C.D.	2013	Continuously anticipating and adjusting to deep secular trends that can permanently impair the earning power of a core business. It is having the capability to change before the case for change becomes painfully clear.
Process	Teixeira E.D.O. and Werther W.B.	2013	Superior resource configuration capability displayed by firms which enables the development and sustainability of competitive advantages.

Category	Authors	Year	Definition
Process	Su et al.	2014	Capability to adapt and recover from quality disruptions when they do occur.
Process	van Essen et al.	2015	Firm's capacity to perceive, avoid, absorb, adapt to, and recover from environmental conditions that could threaten their survival, is subject to similar contentions (Lengnick-Hall & Beck, 2005).
Process	Edgeman R.	2015	Enterprise ability to self-renew through innovation, changing and reinventing itself by adapting its responses to political, social, economic and other competitive shocks or challenges.
Process	Ambulkar, S.; Blackhurst, J. and Grawe, S.	2015	Capability of the firm to be alert to, adapt to, and quickly respond to changes brought by a supply chain disruption.
Process	Tognazzo A., Gubitta P. and Favaron S.D.	2016	Organization's capacity to adjust to challenging conditions like environmental shocks and emerge from them strengthened and more resourceful.
Process	Edgeman R. and Wu Z.	2016	Resilience is an enterprise's capacity to self-renew through innovation and to adapt its responses over time to negative shocks or extreme challenges.
Process	Gray, D. and Jones, K. F.	2016	Ability to adapt/survive and flourish, or learn lessons and start again.
Process	Ortiz-de-Mandojana N. and Bansal P.	2016	Ability of organizations to anticipate, avoid, and adjust to shocks in their environment. Resiliency is a latent, path-dependent capability that cannot be measured directly, so its benefits take a long time to manifest.
Process	Blanco J.M.M. and Montes-Botella J.L.	2017	Ability to recover quickly, to withstand shocks, to avoid shocks.
Process	Ferreira P. and Saridakis G.	2017	Capability to cope with challenging and prolonged environmental shocks.
Process	Morais-Storz M. and Nguyen N.	2017	Ability to dynamically reinvent business models and strategies as circumstances change, to continuously anticipate and adjust to changes that threaten their core earning power - and to change before the need becomes desperately obvious.

Table 2. Categories of resilience, selected references and definitions.

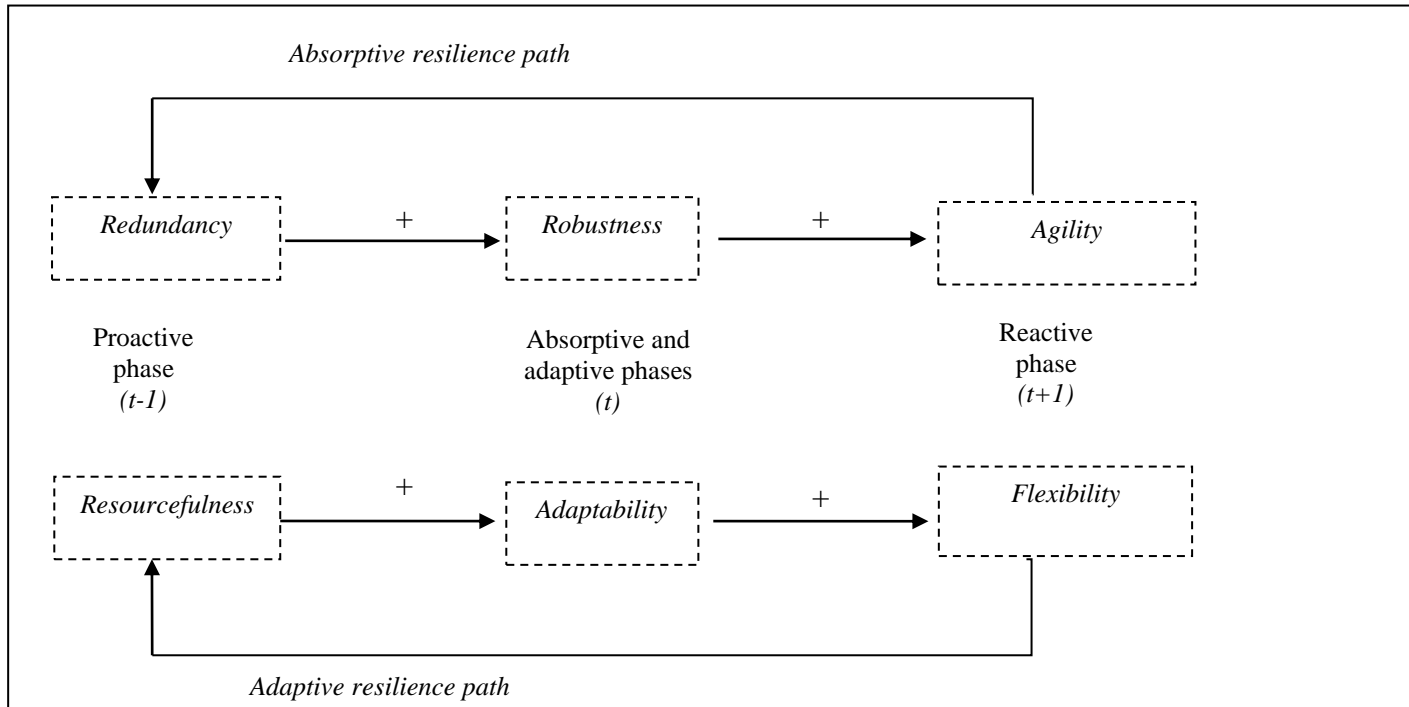


Figure 3. The resilience of firms. A conceptual framework.