Redefining the Organizational Resilience Construct using a Frame Based Methodology: A New Perspective from the Ecology Based Approach

Abstract

While scholars have been elaborating on the nature and scope of the resilience for some time, the contemporary era of monumental disruptions have elevated this topic to the top of scholarly and practical attention. Yet, there is much confusion and ambiguity about how it should be defined and measured. In addition, definitions of resilience appear to vary greatly across disciplines. Given these shortcomings, this study first presents a framing of resilience definition using categorization of attributes under process, structure and strategic move/action, emanating from cross-disciplinary foundation. Second, the study offers conjectures and propositions for multinational enterprises (MNEs) under process, structure and strategic move/action drawing ideas from social, mechanical, and ecological literature regarding this construct. Third, we present a new frame-based methodological approach in presenting the attributes and subordinate concepts of resilience.

Keywords: *organizational resilience; ecological resilience, mechanical resilience, social resilience, frame-based methodology.*

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1. Introduction

In the era of growing risks and disruptions (Choksy, Ayaz, Al-Tabbaa, & Parast, 2022), the importance of organizational resilience intensifies under exacerbating impetus from the Covid-19 pandemic, global imbalances, inflationary environment, etc. (Kaufman & Leigh, 2020; McKinsey, 2022). Yet, there is widespread confusion and lack of clarity about the definition of the resilience construct, thus undermining its role in a highly volatile business environment (Vakilzadeh & Haase, 2020). Against this backdrop, the overarching objective of this study is to establish the concept of resilience as a theoretical construct. By suggesting a clear theorizing definition, we enhance the operational compatibility between studies so that the measurement is consistent and comparable across studies. Further, improving the internal validity would contribute to resolving problems such as endogeneity, once the formalization eliminates the factors or variables that do not influence the relationship testing.

An extant review of the literature shows that scholars have adopted different definitions of the concept (Hosseini, Barker, & Ramirez-Marquez, 2016; Saad, Hagelaar, van der Velde, & Omta, 2021). Resilience has been defined/conceptualized in multiple ways, each reflecting the local tones from various contextual domains. In psychology, resilience is an adaptation in the face of adverse conditions (Mukherjee & Kumar, 2016). In mechanics, it is the ability to absorb overload without complete failure (Hosseini et al., 2016). Within a social context—society or community (urban)—it is the adaptive capacity to manage change and disorder over time (Hosseini et al., 2016). In the supply chain, resilience concerns the capacity to persist, adapt, or transform (Wieland & Durach, 2021). In aesthetics and art, it is the

property of an artwork to remain relevant and creative over time (Kagan & Kirchberg, 2016). In material science, resilience concerns the process of absorbing energy when deformed to be released (Vegas & Martin del Yerro, 2013). Finally, in information technology, resilience is about the strength of a computer network to faults and hacking (Vegas & Martin del Yerro, 2013).

Given this variability, our first objective is to propose a framing of relevant and rigorous resilience definition in an organization context using categorization of attributes, emanating from cross-disciplinary foundation. We search out commonalities among the various definitions of resilience, and provide an overview of studies from various fields, particularly social ecology, along with social and mechanical ecology streams to formalize the concept. We capture the similarities and differences to delineate a formal definition, thereby leading to a more rigorous starting point for theoretical study.

Further, our review of the business management literature on resilience reveals some confusion as to whether resilience is categorized as a process, structure, or action/strategic move (Gunderson & Folke, 2005; Hamel & Valikangas, 2003; Limnios, Mazzarol, Ghadouani, & Schilizzi, 2014). Moreover, some researchers classify it as a process (Carmeli & Markman, 2011; Sun, Buys, Wang, & McAuley, 2011), while others consider it as a capability or capacity (Duchek, 2014; Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017). Richtnér and Löfsten (2014) criticized that the capacity-based view should be separated from the capability-based view.

Hence, a key contributions of our study is to bring clarity to the confounding problem regarding the concept of resilience. In our paper, we analyze resilience in three different dimensions in line with our second objective: framing of resilience attributes under process, structure and strategic move/action. First, a process denotes capabilities e.g., learning, coping, anticipating, responsiveness, etc. In contrast, a structure refers to a permanent aspect like

capacity e.g., experiential context, norms, people and financial resources, and protocols. Finally, a strategic move denotes purposeful actions to prune tenacity value. Unlike the literature with a broad-brush view, our approach details the concept with great nuances as our exploration covers business management, ecology, mechanical, and social literature to make it more inclusive.

Clarification of these concepts is critical for appropriate scaling and measurement of the resilience construct. Our methodological approach is based on "framing," which defines a construct as a bundle of attributes that clarifies these ambiguities. As constructs suffer from vagueness, the framing approach can eliminate, or at least minimize, any confusion by rendering a concept's features more perspicuous (so that the concept would be better understood) (Deligonul, 2022). In doing so, framing recognizes that the components of a given "concept" may exhibit overlapping features, but some features may not necessarily be shared by all. For example, Frydrych (2017) explains that members of a biological family can exhibit shared physical characteristics (e.g., certain members having the same nose shape, some the same mouth shape) without there being one that is common to the whole family (e.g., everyone having the same eye color). In this situation, framing can seek some combination that best represents the construct's essence. Hence, the third objective of this study is to present a new methodological approach i.e., a frame-based methodology to define and clarify the concept of resilience.

Resilience encompasses much more than the concept of strength against adversity. Given the instability in the current business environment, empirical refinement is necessary. As such, we seek to advance the: (i) conceptualization and (ii) operationalization of the construct when formally used in research. The present study aims to contribute to the literature in the following ways. First, we root our definition in the ecology literature and develop a formal construct definition using categorization attributes under process, structure,

strategic move. The reasons for starting with the ecology literature are explained below. Second, the study offers conjectures and propositions for multinational enterprises (MNEs)**,** drawing ideas from the social and mechanical ecology literature. Third, we present a new methodological frame-based approach. Using the frame-based approach, we categorize attributes of a latent construct to: (i) suggest subordinate concepts for a clear-cut delineation, and (ii) provide a more robust definition of resilience.

The remainder of this paper is organized as follows. First, we provide a theoretical background summarizing the use of resilience in ecology, business, social, and mechanical streams of literature. We present the definitions and attributes of resilience in these four disciplines to elucidate their similarities and differences. Second, we define the frame-based methodological approach for identifying different attributes and related measures, and suggest sub-ordinate concepts to base the construct definition. Third, in the contributions section, we present resilience as a refined construct regarding attributes classified under process versus structure. We also show the benefits of borrowing from the ecology literature relevant to organizational resilience studies. Fourth, we present our conclusions, limitations, and directions for future research.

2. Theoretical Works as Background

Resilience is a concept that is prominently featured in the field of ecology. It refers to the capacity of an ecosystem to absorb disturbances, adapt to changes, and maintain its essential functions and structure (Holling, 1973). Resilience is closely linked to the stability and sustainability of ecosystems and their ability to recover from various disturbances, such as natural disasters, climate change, and human activities.

A retrospective examination of scholarly publications clearly reveals that resilience is deeply rooted in and inherent to specific fields. Further, it has transcended disciplinary boundaries over time. This trajectory is unsurprising, considering that resilience offers a

valuable framework for comprehending and effectively managing complex systems, emphasizing adaptive capacity, flexibility, and the capacity to learn from disturbances. These shared characteristics are observed in particular disciplines, including health science, mechanical systems, population ecology, and social ecology (Folke, 2006; Holling, 1973).

The most extended history of the concept is situated in ecology. One of the seminal works that introduced the concept of resilience in ecology goes back to the paper by Holling (1973). Holling on p. 17 defined resilience as "the persistence of relationships within a system and the ability of the system to absorb changes and still persist." He highlighted the importance of understanding resilience in managing and conserving ecosystems, emphasizing that ecosystems are complex, dynamic, and often exhibit nonlinear responses to disturbances.

Since Holling's influential paper, resilience has gained significant attention in ecological research and has been applied to various ecosystems, including forests, grasslands, coral reefs, and freshwater systems. Ecologists have investigated the factors contributing to ecosystem resilience, such as biodiversity, species interactions, and the presence of keystone species. Also, they have explored the consequences of losing resilience, including shifts to alternative stable states, loss of biodiversity, and reduced ecosystem services.

However, resilience is not limited to the field of ecology. The concept has also been recognized as a significant construct in several other disciplines, highlighting its interdisciplinary relevance. Next to population ecology, the most relevant realm is social-ecological systems. Therefore, resilience has been extensively used in social-ecological systems, encompassing the interactions between ecosystems and human societies. In that, the concept refers to understanding the adaptive capacity of coupled human-natural systems, such as agricultural landscapes, urban environments, and coastal regions (Folke et al., 2010). Specifically, resilience in this context emphasizes integrating ecological and social perspectives to achieve sustainability.

The second area of the concept of resilience is psychology and mental health. Resilience is a central concept in psychology, particularly in studying human development, well-being, and mental health. Psychological resilience refers to the ability of individuals to bounce back from adversity, cope with stress, and maintain positive functioning (Masten, 2001). Research in this field focuses on identifying protective factors, such as social support, self-efficacy, and problem-solving skills, that contribute to resilience in the face of challenges.

The other areas where resilience repeatedly take center stage are engineering, mechanical systems, and infrastructure. Indeed, resilience is increasingly recognized as a critical trait in designing and managing infrastructure systems, such as transportation networks, power grids, and water supply systems. Mechanical or engineering resilience refers to the ability of these systems to withstand shocks, adapt to changing conditions, and recover functionality after disruptions (Hollnagel, Woods, & Leveson, 2006). While Bruneau et al. (2003)'s paper focuses specifically on seismic resilience, it provides a framework for assessing and enhancing community resilience. It includes considerations for the ability of infrastructure systems to withstand shocks, the capacity to adapt to changing conditions, and recover functionality after disruptions. As in this example, resilience-based approaches in engineering aim to enhance system robustness, redundancy, and flexibility.

To maintain the integrity of the resilience concept and prevent its dilution, we carefully track its published trajectory and confine our discussion within specific boundaries. This approach allows us to highlight the inherent nature of resilience by focusing on its original context. This localized perspective proves valuable as these fields inherently experience episodes of stress and exhibit responses of resistance and survival reflex during such periods. By delimiting our scope, we preserve the concept as a unified whole, while also allowing for nuanced distinctions (Folke, 2006; Holling, 1973).

As mentioned earlier, the concept of resilience was first suggested by ecology scholars in the 1970s (Holling, 1973). Over time, other disciplines adopted it from psychology to sociology and from international development to business administration (Cai, Xie, Liu, Liu, & Feng, 2018; Capdevila, Stott, Beger, & Salguero-Gómez, 2020; Keck & Sakdapolrak, 2013; Martin-Breen & Anderies, 2011). However, scholars have used the term resilience with multiple meanings (Gunderson, 2010). Consequently, it is important to clarify the distinctions among these multiple meanings due to the fact that different meanings require different sets of policies and actions. Figure 1 summarizes the use of the attributes in the four scholarly streams of research. We commence our analysis with research in business studies, then explore works in the literature of ecology, mechanical, and social domains.

Insert Figure 1 about here

The topic of resilience has a long history in the ecology literature. According to Dimension Analytics[1], the top three disciplines with the highest publications regarding resilience all root and extend their studies from earlier ecological perspectives. The study of resilience in the business literature has grown substantially over the last five years.

2.1. Resilience in business-related literature

The topic of resilience in the business literature stems from a few seminal papers. In this early literature, resilience is considered to be about threat-rigidity in response to facing adversity (Staw, Sandelands, & Dutton, 1981). Meyer (1982) argues that resilience reflects the organizational ability to absorb adversity or adopt new practices or configurations. Specifically, each seminal work defines resilience as a functional (successful) or dysfunctional (unsuccessful) response influencing business survival in the wake of

[1] Dimension Analytics is a commercial database that compiles publications, reports them and analyzes some of their bibliometric features.

challenges. Resilience then denotes an inherent ability to respond and recover faster in the face of external threats by developing new ways of doing business (Sutcliffe, 2003).

The current literature explores the concept in various domains of studies, such as organizational responses to threats, reliability, employee strength, adaptability of business models, and design principles to reduce vulnerabilities (Linnenluecke, 2017). However, there is a gap in identifying attributes of resilience and categorizing these attributes under process versus structure for improved conceptual and operationalization clarity (Linnenluecke, 2017). The study of resilience in business is multifaceted as it borrows concepts from the ecological, social, and mechanical literature.

2.2. Resilience in the ecology literature

Ecology scholars suggest two distinct types of resilience: engineering and ecological (Capdevila et al., 2020; Gunderson, 2010; Hayes, Desha, Burke, Gibbs, & Chester, 2019). The former describes resilience as "the deviation from an equilibrium and the time required to return this equilibrium state after a disruption" (Mittelbach, Turner, Hall, Rettig, & Osenberg, 1995; Neubert & Caswell, 1997), whereas the latter refers to a new equilibrium state and measures resilience in terms of the "magnitude of disturbance that can be absorbed" (Gunderson, 2000; Holling, 1973). These two definitions can be characterized by distinctive attributes and correspond to two differing ends: (i) recovery -existing equilibrium, and (ii) adaptation -new equilibrium.

Engineering resilience is associated with rigidity (Capdevila et al., 2020; Hayes et al., 2019), stiffness (Capdevila et al., 2020; Hayes et al., 2019), résistance, maintenance (Capdevila et al., 2020), status quo (Hayes et al., 2019), and recovery (Gunderson, 2000). The engineering resilience of ecological systems resembles the resilience of mechanical systems with the overall objective of recovery from the likelihood of damage (Yodo & Wang, 2016). In this respect, we consider engineering and mechanical resilience as stand-alone concepts. In

contrast, as depicted in Table 1, ecological resilience refers to flexibility, agility, adaptation, change, and improvement, which lead to new equilibrium states. Observably, these multiple meanings and distinctive dimensions of resilience appear in different contexts and conditions. They indicate different needs in the ecological environment.

In addition to the above primary characteristics that differentiate ecological resilience from engineering or mechanical resistance, an in-depth coverage of species reveals other attributes of ecological resilience. Relatedly, redundant resources function as a reserve workforce against disruptions (Middleton & Latty, 2016). Functional redundancy of some species enables the continuity of specific functions in nature (Mori, Furukawa, & Sasaki, 2013). Size of types suggests mixed results in terms of resilience (Merlin, Perot, Perret, Korboulewsky, & Vallet, 2015). The cognitive process and memory of individuals' matter. For instance, bees contribute to the resilience of a bee colony (Granovskiy, Latty, Duncan, Sumpter, & Beekman, 2012). Moreover, decentralization in honeybees is a source of resilience (Middleton & Latty, 2016). Also, we learn from this literature that insect resilience is contingent on their networks' connectedness (Middleton & Latty, 2016).

2.3. Resilience in the mechanical literature

The resilience-related mechanical literature is relatively new and limited to engineering practices (Cai et al., 2018; Fang, Pedroni, & Zio, 2016; Hosseini et al., 2016; Youn, Hu, & Wang, 2011). Engineering resilience is defined as the "intrinsic ability of a system to adjust its functionality" (Hollnagel et al., 2006) without any discontinuity in functionality (Dell'Isola et al., 2020) during a disturbance and unpredicted changes. Also, the literature indicates resilient systems recover from the likelihood of damage and survive (Yodo & Wang, 2016). Overall, engineering metrics for scaling resilience change with the context, such as civil and mechanical systems.

Engineering or mechanical resilience diverges from ecological resilience in terms of its attributes, such as rigidity, resistance, maintenance, and recovery. It is more associated with fault tolerance (Hosseini et al., 2016), early detection, limitation of effects or minimization of failure, and controllability (Dinh, Pasman, Gao, & Mannan, 2012; Hollnagel et al., 2006).

2.4. Resilience in the social realm and its literature

This literature defines resilience as the ability and capacity to absorb and deal with social threats (Keck & Sakdapolrak, 2013). The members of a social group aim to maintain their well-being against disasters, disruptions, or shocks (Hall & Lamont, 2013; Koos, Vihalemm, & Keller, 2017). All definitions of social resilience include social entities, such as individuals, communities, or organizations. For instance, it is the capacity of a group or community "to bounce back or respond positively to adversity" (Maguire & Hagan, 2007). In the case of urban resilience, adaptive capacity prevails, and successful adaptation to perturbations comes to the fore. Related literature considers resilience as a hierarchical concept, layering at the individual, community, firm, and national levels. Reciprocal relationships among individuals lead to the next level, then community resilience shapes the higher level, and finally, we arrive at national resilience.

Social resilience refers to the abilities or capacities of social entities to tolerate, absorb, cope with, and adapt to several environmental and social threats (Keck & Sakdapolrak, 2013). It is associated with attributes such as robustness, stability, flexibility, resourcefulness, coordination capacity, redundancy, diversity, foresight capacity, independence, connectivity, collaboration, agility, adaptability, self-organization, creativity, efficiency, and equity (Sharifi & Yamagata, 2016). Scholars suggest that coping, adaptive, and transformative are the three capacities that explain social resilience (Keck & Sakdapolrak, 2013). In addition, community infrastructure, community networks, people-

place connections, regional economy, and engaged governance are considered the necessary factors to tolerate and absorb threats (Maclean, Cuthill, & Ross, 2014). In this context, resilient communities exhibit resistance, recovery, and creativity against a disaster (Kimhi & Shamai, 2004; Obrist, Pfeiffer, & Henley, 2010; Saul & Landau, 2004).

3. Methodology

Using the frame-based approach, we operationalize the resilience construct. The primary purpose of the frame-based approach is to delineate a domain of attributes that can be used to operationalize constructs. It is important to note that this process thinks of a construct as a bundle of measurable items or indicators. Also, important to note that this approach does not imply causality. It is based on association. The focal consideration here is that scaling and scoring the attributes doesn't occur in isolation; instead, it finalizes the transformation from a mental schema to a construct and from a construct to its indicators. In this regard, Shepard (1993) proposes an internal model of interrelated dimensions or subdomains of the construct [subordinates]. He follows it with an external model defining its relationship to other constructs [nomological net]. Bollen (2017) concurs by offering a checklist. He includes the theoretical definition, major dimensions, justification for indicators and their measurement, and finally, reliability and validity in his list.

In the present study, we apply the frame-based approach to identify resilience attributes. Cognitive scientists recommend the representation of the relationships of concepts by frames, sets of multivalued attributes integrated by structural connections (Barsalou 1992, pp. 45–52). The frame representation outlines the kinship structure in different abstract levels, from supraordinate i.e., a broad concept to subordinate. We replicate the case in Chen (2002) to apply the model. **Figure 2** demonstrates this example involving birds based on beak shape, foot length, and foot structure as the essential feature of two main categories: waterbird and land bird.

Insert Figure 2 about here

The model indicates an inclusive relationship between the supraordinate concept 'bird' and the sub-ordinate concepts ' water-bird' and 'land-bird,' narrowing the concept to its subsets (Please refer to (Chen, 2002). Additionally, the representation includes contrasting relationships between subordinate groups. Thus, we call a waterbird a 'bird' because of the species' inclusive features, but not a 'land-bird' because of its contrasting features. Ideally, terms belonging to the same subordinate group cannot overlap in their referents, so no object is both a 'waterbird and a 'land-bird.' This is the non-overlap principle of kinship relationships. The supraordinate concept frame contains two properties: an attribute list and a value list. Next to the frame is the subordinates (waterbird and land-bird). They connect to all attributes but only some from the value list. Each pattern of selection constitutes the prototype of a subordinate concept. By specification of the frame, the model captures several important intra-conceptual distinctions.

Referring to (Chen, 2002)’s bird example, first, the frame model captures the hierarchical relations within the supraordinate concept. Contrary to the conventional assumption that all features within a concept are structurally equal, the frame representation divides attributes into two different value levels. A value attaches to a particular characteristic (such as "round" to "beak"), representing an instance in that attribute. Consequently, not all features within the supraordinate concept are functionally equal.

Second, the frame model highlights the relations among the attributes of a concept. For example, there is a correlation between the value of "beak" and "foot": having a "webbed" foot is usually associated with a "round" beak and a "clawed" foot with a pointed beak. These are physical constraints imposed by nature to be environmentally fit. Because of such constraint relationships, the attributes "beak" and "foot" become defining features in classification.

Third, the frame-based model also reveals the mechanisms behind the contrasting relations among subordinate concepts. For example, since the frame "bird" has three attributes and each has two possible values, there are twelve possible combinations (3x2x2) of possible concepts at the subordinate level. But, due to the constraints, some of these combinations are conceptually impossible, such as a "round" beak with a "clawed" foot. This way, the frame specifies the contrastive relations between the two subordinate concepts. They contrast each other concerning beak and foot. These two mutually exclusive but jointly exhaustive subordinate concepts constitute the contrast set under the supraordinate one/broad concept.

Applying the above-mentioned procedure, we present the frame-based analysis of the resilience construct. Next, we categorize the attributes of resilience using the definition of process, structure, and strategy. Finally, we delve into the ecology, social and mechanical literature to present generalizations and propositions, introducing new insights into the organizational resilience literature. We search the extant literature to find out the fields where resilience has been predominantly studied. We found that ecology is the root of resilience literature, while resilience is also widely studied in social and mechanical literature. Thus, we used the three domains in classifying the attributes to provide a holistic view of resilience. It is noteworthy here that source of adversity can vary across different disciplines. For example, in sociology, it could a traumatic incident in personal life. In ecology, it could be unexpected systematic shocks. In business management, it could be surprising attacks from business competitors. In mechanics, it could be physical damages measured by scales of forces and energies. Similarly, the measure of healthiness may also differ between individuals and organizations, but the concept of resilience would essentially be the same. Therefore, considering the objective of this study, we identified the common and uncommon attributes of different domains.

Regarding the inclusion criteria, we looked at the most recent comprehensive reviews on organizational resilience and studies included in those reviews to ensure all organizational resilience attributes are covered. Our search term for finding the articles include "resilience". We did not specify a time period as we looked at the most recent review. We considered Hillmann and Guenther (2021) work and the studies mentioned in their work, as it is the most recent comprehensive work appeard in context of resilience. We learnt that ecology is the root of resilience theorization. Furthermore, social and mechanical are also rooted in ecology. Therefore, we did a select literature review of the seminal and recent papers for social, mechanical and ecology for theorization of organization resilience. Given resilience was first introduced in 1970s (Holling, 1973). We used Holling's work as the baseline paper for defining resilience from ecology perspective. We looked at the select studies that have cited Holling's work. For social and mechanical literature, we used the same search string i.e., resilience, and looked at the select recent studies. Knowing that ecology literature is the root, we developed our propositions for the organization literature, primarily, borrowing new attributes from ecology literature, which did not already appear in the organization literature.

This research is not based on a systematic review approach, where researchers follow a specific time and journals. Further, we suggest a clear framing of the definition of a concept: 'resilience', emanating from a cross-disciplinary perspective. For this purpose, our study adopted a frame-based approach in defining resilience through categorization of its attributes. Hence, we are doing a typology of process, structure, and strategic move. Also, it is not our aim to do an empirical study or an analysis of what has been done before, such as in the case of a bibliometric analysis. Rather, the frame-based approach allows categorization of the attributes of 'resilience' under 'subordinates or interrelated dimensions in order to arrive at a time and reference independent definition. Similarly, the present study did not start defining resilience by selecting an existing version from the literature, or adopt a highly

inclusive phrasing. Instead, we specifically categorize attributes into subordinates (interrelated dimensions).

3.1. Frame based approach vs alternative methods

The frame-based approach, similar to taxonomic modeling in bioscience, distinguishes itself by its emphasis on theoretical relationships. The framing serves as a foundation for various applications requiring a clear identification of relationships (Garnett & Christidis, 2017). In the context of understanding constructs such as resilience and their nature across different organizations, adopting a framing perspective becomes crucial. One of the key reasons why the frame-based approach provides value is its ability to specify a standardized vernacular for reference. By defining a specific construct and ascertaining the membership groups of entities (organizations), researchers can establish a semantic meaning to describe and refer to a latent variable, such as resilience. The upshot is ensuring clarity and consistency, hence enhancing comparability across studies (Turland et al., 2018).

The main difference between the frame-based approach and its review-based alternatives (such as bibliometric methods, meta-analysis, content studies, etc.) lies in its focus and objectives. Frame-based research and review-type methods (such as bibliometrics, content study, meta-analysis, etc.) are distinct approaches, each serving different purposes and providing unique insights. All of those approaches look at past findings and analyze a review of previous research. However, such methods have distinct perspectives for analyzing data and gaining insights. When deciding between them (meta-analysis, content study, and bibliometric methods), researchers should consider the nature of their research question, the type of data available, and the objectives they wish to achieve.

Against such alternatives, the frame-based approach distinctly stands as a method of classifying and categorizing traits to explore organizations on shared characteristics and relationships. This tool is different from other methods, which focus on quantitative analysis

examining the structure and dynamics of scientific knowledge within a specific field or research domain. Below we also systematically compare the conditions under which different methods can be preferred.

3.1.1. Bibliometric Methods: Bibliometric methods focus on the analysis of bibliographic data to gain insights into the patterns, trends, and impact of the scientific literature (e.g., Zupic & Cater, 2015). This method provides quantitative metrics and analyses to assess publication productivity, citation patterns, research collaborations, and other aspects of the scientific knowledge domain. These methods retrospectively examine the structure and dynamics of scientific knowledge within a research stream. Such deliverables by a research method may be very useful for many studies but are not intended in our study. Bibliometric methods may be preferred under the following conditions:

1. Analyzing research trends and impact: If the objective of the research is to gain insights into the patterns and trends in the scientific literature, assess the impact of research publications, or identify influential authors or articles, bibliometric methods provide quantitative measures and analyzes to study publication productivity, citation networks, and research collaborations.
2. Examining the structure of scientific knowledge: If the aim is to understand the organization and development of scientific knowledge within a specific field, bibliometric methods can provide information about emerging research topics, interdisciplinary collaborations, and knowledge diffusion within the scientific community.
3. Analyzing large-scale data: If the research involves a large volume of publications, citations, or other bibliographic data, bibliometric methods offer efficient and scalable approaches to analyze and visualize the data, enabling researchers to identify patterns, trends, and influential works within the literature.

4. Examining scientific impact and collaboration: If the research objective is to assess the impact of scholarly publications, track citation networks, or analyze research collaborations and co authorship patterns, bibliometric methods provide quantitative metrics and network analysis techniques to examine these aspects within the scientific community.
5. Exploring retrospective status in a research stream: Bibliometric analysis is one possible option if the objective is a review of published research by looking back in time.

Frame-based and bibliometric type methods serve different purposes in research. Frame-based research is suitable for organizing and categorizing traits to develop a construct based on their characteristics and relationships. In contrast, bibliometric methods provide insights into the patterns, trends, and impact of scientific literature. The choice between these methods depends on the research question, the objectives, and the specific context of the study.

3.1.2. Content Analysis: Content analysis is a systematic and objective approach for analyzing textual, visual, or audio data in order to identify patterns, themes, and relationships within the data (Krippendorff, 2018). It involves coding and categorizing the content based on predefined criteria or emerging themes, allowing researchers to draw inferences and interpret the meaning and significance of the data.

The main difference between content analysis and bibliometric methods lies in their data sources and analytical approaches. Content analysis deals with the analysis of primary data, such as textual documents, interviews, or media content, and involves qualitative coding and interpretation of the data (Prior, 2014). Bibliometric methods, on the other hand, utilize secondary data derived from bibliographic databases, citation indices, or other sources and involve quantitative analysis of the data. Content analysis is particularly advantageous under the following conditions:

1. Exploring textual or qualitative data: If the research question involves analyzing textual documents, interviews, social media posts, or other qualitative data sources to identify themes, patterns, or meanings within the content, content analysis provides a systematic and rigorous approach to extract and interpret the data.
2. Understanding subjective or nuanced aspects: If the objective is to delve into the subjective experiences, attitudes, or perspectives of individuals or groups, content analysis allows for a detailed examination of the content and provides insights into the underlying meanings and interpretations.
3. Exploring extant research: If the objective is to review the content in comparable studies by looking back in time, content analysis is one possible option.

In summary, content analysis serves different purposes in empirical research. Specifically, it is suitable for analyzing qualitative data and understanding subjective aspects.

3.1.3. Meta-Analysis: A meta-analysis is another way to capture the consistency of previous studies by statistical analysis by focusing on covariance structures. It involves systematic review and quantitative synthesis of data from multiple primary studies to obtain an overall effect size or estimate the magnitude of an effect (Borenstein, Hedges, Higgins, & Rothstein, 2011). It aims to provide a comprehensive summary of existing research findings and draw robust conclusions by combining and analyzing data from individual studies.

The main difference between meta-analysis, content analysis, and bibliometric methods lies in their data sources and analytical approaches. Meta-analysis deals with the analysis of primary data obtained from individual studies, and it involves statistical techniques to pool and analyze the data. Bibliometric methods, on the other hand, utilize secondary data derived from bibliographic databases, citation indices, or other sources and involve quantitative analysis of the data. Meta-analysis is particularly advantageous under the following conditions:

1. Investigating the effectiveness or impact of interventions: If the research question involves evaluating the effectiveness of a specific intervention, treatment, or policy, meta-analysis provides a robust approach to synthesize data from multiple studies and estimate the overall effect size or treatment effect.
2. Addressing research questions based on empirical evidence: If the objective is to systematically review and analyze empirical evidence on a particular topic, meta-analysis allows for quantitative data synthesis, enabling researchers to draw evidence-based conclusions and make generalizations.
3. Integrating Effect Size: Meta-analysis looks backwards and explores the effect size consistency.
4. Providing bird's eye view of past empiricism. If the objective is to aggregate samples from retrospective findings and combine them into a meta-covariance structure, meta-analysis provides the tools.

To summarize, the selection of a method depends on the research question, the objectives, and the specific context of the study. Given the scope and objective of present study i.e., framing the definition of resilience by categorizing the attributes across different domains, frame-based methodology fulfils the purpose.

4. Results from the Frame-Based Approach

By adopting a frame-based approach, we specified the attributes of resilience in the ecology literature in terms of structure, process, and action. First, we identified the attributes provided in the four streams of research and created Table 1. This table is the key to our frame-based analysis. Second, we used the attributes in Table 1 to define subordinate concepts. In accordance with the literature, we could match the attributes with the three subordinate concepts using the process, structure, and strategic dimensions that emerged from the extant review of the literature (Gunderson & Folke, 2005; Hamel & Valikangas, 2003;

Limnios et al., 2014). We concluded that there are three subordinate concepts to conceptualize resilience: (i) structural resilience, (ii) process resilience, and (iii) action/strategic resilience. Drawing from our method, Figure 3 provides the output of the frame-based approach, showing the broad concept, resilience, its attributes, and subordinate concepts.

Insert Table 1 here

Insert Figure 3 about here

We contend that structural resilience is associated with memory, decentralized control, redundant resources, and connected network. Likewise, we captured the attributes of the subordinate, process resilience, as flexibility, agility, absorption, change, adaptation functional redundancy, stepwise evolution, networking, and immunity. Finally, learning, proactivity, and preparedness are the components of action/strategic resilience. Our work improved clarity to prevent over-stretching the construct of resilience.

In studies, choices during the conceptualization stage deeply intertwine with contrasting issues. Notably, it is a paradox that proper constructs are needed to formulate a good theory, but we need a good theory to arrive at the proper constructs (Adcock and Collier 2001). We address this by narrowing the resilience construct, ensuring practical clarity. Shepard (1993) suggests that theorizing requires an internal model of interrelated dimensions or subdomains of the construct [subordinates].

5. Defining Propositions Regarding MNEs Resilience Based on Borrowed Concepts from Ecology, Social and Mechanic Literature

On one hand, internationalization provides myriad opportunities for MNEs in terms of learning and knowledge. With such learning, MNEs develop flexibility and agility in response to disruptive events (Puhr & Müllner, 2022; Khan 2020). On the other hand, disruptive events often surprise MNEs and cause setbacks. Thus, it is important to examine

what makes MNEs thrive during stressful events (Chung et al. 2010; Fainshmidt et al. 2017; Puhr & Müllner, 2022). MNEs requires new processes, structure, and capabilities to flourish competitive vitality and adaptability when facing unprecedented events (Luo, 2022).

Our study narrows the resilience construct for greater rigor. Bordering the construct with a precise scope, we believe, will facilitate internal validity as the measurement process will improve. Also, it will enhance external validity as the studies will achieve coherence, concord, and clarity, instead of incoherence, fragmentation, and inconsistency. Finally, it allows us to introduce propositions for MNEs by drawing from ecology, sociology, and mechanics literature.

5.1. Propositions regarding structural resilience

5.1.1. Memory: Ecology scholars reveal that honeybee colonies exhibit resilience through the memory of individual bees. Even if communication is disabled, they can remember and find rewarding food sources previously located (Granovskiy et al., 2012). Similarly, in their study conducted in China, Greece, Italy, Morocco, and Spain, Wilson et al. (2017) suggest that communities learn, and there is a positive relationship between social memory and resilience. Therefore, learning and memory may be necessary elements in defining resilience. For example, if communities know earthquakes are destructive when the buildings are cinder block construction, they keep this information in mind and switch to wood in their new constructions.

Furthermore, in the literature on social insects, each member, including the queen, is replaceable due to social learning (Adcock & Collier, 2001). There is no leader and no blueprint in their world. A social insect colony exhibit decentralized problem-solving (Bonabeau, Sobkowski, Theraulaz, & Deneubourg, 1997a). When the queen dies, honeybees quickly find emergency queens. Replaceability leads to resilience. Scholars have similar findings for organizations' decentralization-resilience relationship (Abimbola, Baatiema, &

Bigdeli, 2019; Aghion, Bloom, Lucking, Sadun, & Van Reenen, 2021). We argue that memory is key for MNEs' resilience, as memory loss might become a barrier to absorbing the new knowledge gained in international markets (Casey & Olivera, 2011). Loss of organizational memory may also lead to operational vulnerability (Baral, 2013; Quinello, 2006). The historical trajectories and memories shape societal institutions (Ocasio, Mauskapf, & Steele, 2016). In a similar vein, MNEs can learn from their experience, apply their learnings in different contexts, and become resilient through their memories. In testing the learning proposition, scholars can possibly consider the experiential learning theory (Kolb, 1976).

> ***Defining Proposition 1:*** *The stronger the organizational memory – developed through learning – the greater the MNEs' resilience.*

5.1.2. Redundant Resources: In the world of social insects, a colony may respond to perturbations rapidly through redundant individuals who act as a reserve workforce (Middleton & Latty, 2016; Winston & Fergusson, 1985). For instance, idle workers become functional with disruptions, such as predator attacks. Even if the "reserve workforce hypothesis" has not been empirically tested yet (Charbonneau, Sasaki, & Dornhaus, 2017), it is comparable to organizational slack in firms. Leitner and Dornhaus (2019), in their recent study, could not support their initial prediction about the reserve workforce hypothesis; however, their series of post hoc analyses suggested the existence of two types of reserve workers: (i) walkers and (ii) inactive workers. Inactive workers acts as a "special workforce" to function for brood care.

Organizational slack also acts as a "special workforce" in organizations (Bourgeois III, 1981). Moreover, scholars suggest that organizational slack leads to better performance under certain circumstances (Chiu & Liaw, 2009; Tan & Peng, 2003). For instance, slack improves innovation performance (Merlin et al., 2015) and survival under increasing environmental

uncertainty (Azadegan, Patel, & Parida, 2013). We argue that, in broader terms, resource slack in MNEs improves resilience, considering the resource based view (Barney, 1991). Resource slack refers not only to the workforce but also to other resources, such as extra cash and inventory stock.

Defining Proposition 2 **:** *The greater the slack in select resources – facilitating the new arrangement of and relations between organizational elements – the greater the MNEs' resilience.*

5.1.3. Connected Network: Connectedness of networks is associated with resistance to damage in social insect infrastructures. This is known as robustness (Middleton & Latty, 2016). The sociological view also supports the positive relationship between social relations and the resilience of individuals (Fuller-Iglesias, Sellars, & Antonucci, 2008). Further, reciprocal relationships among individuals lead to the next level. Community resilience shapes at a higher level, finally arriving at national resilience (Callueng, Aruta, Antazo, & Briones-Diato, 2020; Nemeth & Olivier, 2017).

Similarly, business scholars suggest that there is a positive relationship between networking and firm resilience (Tung, Worm, & Fang, 2008). Social network relationships include organizations, such as firms, government agencies, and customers. Firms build strategic collaborations with other organizations so that they can access external resources and capabilities for synergy (Acquaah, 2012). Such collaborations may become particularly important and effective in collectivist countries. Pananond, Gereffi, and Pedersen (2020) developed a typology of global strategy for global value chain, where they argue that globalization is increasingly being tested by disruptive events such as pandemic. Hence, network optimization through collaboration with value chain partners across borders is fundamentally important for a resilient global value chain. Therefore, we argue that networking is one of the keys to achieving MNEs' resilience, and this can possibly be

underpinned using the compositional networking based theoretical perspective (Khan, 2022; Luo & Bu, 2018).

Defining Proposition 3 : *The greater the firm network, the greater the MNE resilience.*

5.2. Propositions regarding process resilience

The ecology literature identifies some well-known process attributes, such as flexibility, agility, change, and adaptation (Bonabeau et al., 1997a; Granovskiy et al., 2012). Scholars also highlight the impact of functional redundancies, and the episodic nature of resilience development, and connected network, which may lead to sustainable immunity (Biggs et al., 2020; Middleton & Latty, 2016).

5.2.1. Functional Redundancy: Functional redundancy is associated with redundant species performing similar functions in nature (Biggs et al., 2020). When multiple species perform similar functions, the decline of one species can be compensated by the others having similar functional roles (Mori et al., 2013). While functional diversity supports ecosystem performance (Abimbola et al., 2019), functional redundancy helps species respond to disruptions and acquire resilience (Elmqvist et al., 2003).

Therefore, we argue that functional redundancy contributes to MNEs' resilience in two ways: (i) firms may mutate or adapt their routines to survive and gain competitive advantage as a result of skills and assets gained through learning from the competition; (ii) multinational enterprises may have similar functional units in different locations, such as research and development. Such redundancy may foster better performance through strong internal links across locations (Alcácer & Zhao, 2012). The geographic dispersion of units leads to knowledge absorption and integration (Gupta & Govindarajan, 2000).

Defining Proposition 4: *The greater the functional redundancies – mutating/adapting processes in the shortest response time – the greater the MNEs' resilience.*

5.2.2. Immunity (not one time – a dynamic capability)*:* The immunology literature addresses building immunity to deal with shocks. Immunity is defined as a system that fights for establishing equilibrium state at the advent of a risk (Eberl, 2010). As an example, immunocompromised persons are more exposed to life threatening events and more prone to opportunistic infections that are otherwise harmless or ubiquitous. It is argued in the literature that immunity is established with repeated exposure to a situation (Metcalf, Ferrari, Graham, & Grenfell, 2015; Randolph & Barreiro, 2020). It is also applicable to the context of MNEs i.e., with a strong immunity, they are able to cope from crisis i.e., resilience.

Adversity or disruptions can impact various aspects of immunity functions (e.g., emotional and behavioural factors), which may potentially modulate resilience (Dantzer et al. 2018). Further, a stressful event can lead to the deregulation of the immunity system of MNEs (e.g., capabilities), which may impact ability to cope with the crisis (resilience). Considering the example of the recent COVID-19 pandemic and herd immunity – the indirect protection from infection conferred to susceptible individuals when a sufficiently large proportion of immune individuals exist in a population and its relation to fatality rate (Metcalf et al., 2015; Randolph & Barreiro, 2020), resilience scholars may study the factors that help in building immunity to maintain longevity. In this context, we argue that functional redundancies, episodic nature of resilience development, and connected network contribute to sustainable immunity and strengthen MNEs' resilience, in line with the dynamic capability theoretical perspective (Teece, Pisano, & Shuen, 1997). Learning from past events can build immunity to deal with future disruptions (Zarghami & Zwikael, 2022)

Defining Proposition 5.1: *The greater the immunity developed through past exposures to disruptions, the greater the MNEs resilience in the wake of future disruptive events.*

5.2.3. Episodic nature of resilience development: Ecology literature describes resilience in two formats. The first is the time required to return to an equilibrium state after a disruption (Mittelbach et al., 1995; Neubert & Caswell, 1997), whereas the latter refers to a new equilibrium state and measures resilience in terms of the magnitude of disturbance that can be absorbed (Gunderson, 2000; Holling, 1973). Inspired by such ideas, we argue that resilience evolves due to intermittent events, and each event triggers resilience development. Simply put, resilience is a response to episodic events to reinstate stability.

We observe that disruptions or crises in international business are also episodic. For instance, (i) the financial crises in 1966, (ii) the oil shock in 1973, (iii) Black Monday in 1987, (iv) the Great Bond Massacre in 1994, (v) the stock market crash in 2001, (vi) the stock market crash in 2008, and (vii) the stock market crash in 2015. IMF has recorded 145 banking crashes since 1970 (Markman & Venzin, 2014). Specifically, in Turkey, following the low-point in the 2001 crisis, the banking sector and banking system were more resilient during the 2008 crisis due to restructuring reforms in 2001 (Aras, 2010; Kılınç, Kılınç, & Turhan, 2012). Thus, we argue that resilience develops in a stepwise way as a result of episodic perturbations. In testing the episodic disruptions, the evolutionary economics perspective can be taken into consideration (Boero, 1996) in MNEs resilience development (Pettigrew, Woodman, & Cameron, 2001).

Defining Proposition 5.2 : *Episodic disruptions lead to stepwise increases in immunity.*

5.3. Propositions regarding action/strategic resilience

5.3.1. Learning: Experience in episodic disruptions is associated with episodic learning. Episodic learning is a change in process, structure, and actions that occur as a result of an event. For example, a fear of dogs that follows being bitten by a dog is episodic learning. Episodic learning in humans is so named because events are recorded into episodic memory,

one of the three forms of explicit learning and retrieval, along with perceptual and semantic memory. We argue that a similar collective cognition applies to business systems as those systems carry analogous registration of history embedded in experience.

Learning has a positive influence on social-ecological resilience in natural disturbances (Berkes, Colding, & Folke, 2000; Carpenter, Walker, Anderies, & Abel, 2001; Folke, 2006; Olsson, Folke, & Hahn, 2004). Specifically, learning from a certain disturbance can increase the resilience to that very disturbance through enhancing the adaptability of the social-ecological system (Carpenter et al., 2001; Gunderson, 2000; Kuang & Liao, 2020). We suggest that MNEs also develop resilience through learning from past disruptions. The above banking sector experience (see 5.2.2) supports this argument. Further, drawing on to the international business literature, it is proposed that the recent turbulence in the world such as natural disasters, pandemic, and political conflicts have raised new questions about developing resilience (Benito et al., 2022). In this regard, MNEs may need to develop global strategy for new learnings (Benito et al., 2022).

Defining Proposition 6 : *MNEs Resilience is a learned: (1) process, (2) action set, (3) structure, and (4) capability.*

5.3.2. Proactivity/Preparedness: Take the real-life example of Pakistan, a flood-prone country that has been experiencing major floods since 2001 (Memon, Muhammad, Rahman, & Haq, 2015). Delving into the literature on climate and environmental crises (Ahmad & Afzal, 2022), the country should have been proactive in building resilience in the advent of such a crisis, knowing it would be a recurring natural disruption. The recent 2022 devastating flood has damaged hundreds of thousands of homes, public health facilities, water systems, and schools (Unicef, 2022). Tapping into community resilience literature, the government should have developed the necessary infrastructure to recover from natural disasters (Koliou et al., 2020). Putting into a perspective for MNEs, crises often cause setbacks to the firms. As

an example, the COVID-19 pandemic reduced global foreign direct investments by one third to $1trillion in 2020 (UNCTAD, 2021). Similarly, wildfires, flooding, wars, and manmade disasters also result in affecting international business transactions. Hence, firms need to be proactive and prepared to with crisis (Neilsen, Wechtler, & Zheng, 2023).

Defining Proposition 7 *: The greater the proactive decision-making by MNEs -- facilitating flexibility to increase the count of future action options -- the greater the MNEs' resilience.*

6. Conclusion

6.1. Contributions

Given the significant disruptions caused by recent events in business ecosystems, an organization's resilience has become a crucial asset for managers. This is especially true for multinational enterprises (MNEs) that operate across various political, social, and economic spheres. MNEs prioritize strategic endurance to maintain market strength and stability and avoid potential threats. Consequently, they must mitigate additional socio-political risks, as their exposure to distant markets and unfamiliar institutional environments can lead to strategic disadvantages.

In their comprehensive work, Hillmann and Guenther (2021) have identified challenges and issues in resilience conceptualization, its measurements and suggested a formative measure for organizational resilience. The present study further contributes to the literature by adopting a multidisciplinary lens in examining the resilience construct. We also present a holistic or inclusive classification of resilience attributes, borrowing attributes from different theoretical lenses (ecology, social and mechanical). Further, we develop a number of propositions that serve as the basis for future empirical investigations.

First, our work provides conceptual insights. Next, we examine and contrast the resilience attributes studied in various fields, including ecology, social science, and mechanics. In doing so, we identify attributes that can be adopted from these disciplines to

expand the organizational resilience literature. This endeavor does not seek integration, but rather juxtaposes essentials and compatible elements.

Our study provide insights through a bird's eye view of the various applications of the concept. As described earlier, the latent construct of resilience in ecology covers key attributes such as flexibility vs. rigidity, agility vs. stiffness, absorbance vs. resistance, adaptation vs. maintenance, change vs. status quo, and improvement vs. recovery. In comparison, engineering/mechanical resilience relates to rigidity, stiffness, resistance, maintenance, status quo, and existing equilibrium. These attributes also appear in international business literature. Therefore, we argue that the "ecological resilience" and "engineering/mechanical resilience" terms could be extended to cross border studies.

Second, in our study, we not only identify the resilience attributes, but also categorize them in the dimensions of structural, procedural, or action-orientation. This differentiation provides a more nuanced understanding of the focal constructs and their interrelationships. In this categorization, we define structural attributes to include the physical, financial, and technological aspects of an organization that contributes to its resilience. Next, we include procedural attributes to include the processes and practices that an organization employs to manage risk and uncertainty. Finally, action-oriented attributes entail the strategic decisions and actions taken by an organization to address potential threats and maintain its resilience.

Third, our study draws upon theoretical frameworks from other disciplines to expand the resilience literature and devise it for a form more applicable to multinational companies. By utilizing ideas and propositions from ecology, social science, and mechanics, we identify and address the unique challenges faced by MNEs, such as exposure to multiple political, social, and economic environments.

As a result of these efforts, the conceptualization of resilience gains greater validity and relevance. By incorporating ideas and insights from different fields, our study contributes

to developing a more comprehensive and robust understanding of organizational resilience. This, in turn, has practical implications for MNEs to enhance their resilience in the face of an increasingly complex and uncertain global business environment.

Fourth, we contribute to the literature by adopting a new frame-based methodological approach to identifying the attributes of resilience and their classifications in different disciplines. This novel approach introduces much needed clarity to construct definition. It also stands as a methodological advancement in scientific inquiries.

Finally, we systematically compare the frame-based approach with alternatives methods i.e., bibliometric review, meta-analysis and content analysis and provide observations regarding the conditions under which each of them is useful and how frame-based substantiate from these methodologies. In this regard, this study also presents an important methodological contribution.

6.2. Managerial Implications

Business literature is replete with illustrations of failure due to fragile and inadequate processes, structures, and strategies. Failures in international markets are often costly, causing multinationals more than the loss of reputation. In such a competitive and challenging era, managers ought to be systematic about reinforcing the resilience of their companies. The following represent constructive actions multinational managers may consider in building resilient organizations.

First, firms operating across national borders must create agile organizations that take advantage of evidence-based decision making. This requires timely and wholesome information gathering and analysis on the part of managers. Second, MNEs may create teams that assume accountability and ownership of outcomes. When teamwork is based on an understanding of complete responsibility for unit outcomes, more robust results can be expected. Third, resilience implies a proactive organization. If managers adopt an

“anticipating organization” one that constantly monitors the environment, develops proactive plans, and swiftly implements them, a more resilient organization will be built.

By their approach, managers must acknowledge that resilience applies to many aspects of the enterprise. It is simultaneously about finance, operations, technology, business model and more. All facets of the enterprise must embrace resilience building activities. Finally, resilience is an essential dimension of organizational culture. Managers must work tirelessly to create an organization that invites change, promotes adaptability, and rewards achievements. Naturally, this is a slow process as it implies a cultural change.

6.3. Limitations and Future Research Directions

Our study is not without limitations. Firstly, future studies can expand on our work by identifying and exploring outliers and contingencies. By doing so, we can gain a better understanding of the conditions that may influence the resilience attributes identified in our study. Moreover, future research can also apply the frame-based approach to further enhance the essentials of organizational resilience. Scholars can also consider defining resilience from other domains such as genetic resilience in biology or national resilience in political science.

Studies will benefit from detailing of the concept further in the context of international management, where unique challenges are faced, and different factors may impact an organization's resilience. For example, scholars may explore the concept of agility dimension of the construct (Khan, 2020), and how it contributes to an organization's resilience in an international setting. Similarly, research can examine the role of internationalization strategy (Ozkan, 2020) in enhancing the resilience of multinational companies.

Additionally, given the voluminous literature on resilience, researchers may carry out meta-analyses of extant works. Such research would extend our knowledge of the role of resilience, and potentially its use as an antecedent versus as a process and outcome. Further,

researchers may attempt to develop and validate formal scales of resilience for use in international business management literature. The framing approach advanced in the present study is especially useful in such endeavors as it conceptualizes the resilience construct as a bundle of underlying attributes.

By addressing these limitations and expanding on our work, future research can deepen our understanding of organizational resilience and its applicability in the context of international management. This can have important practical implications for organizations looking to enhance their resilience and better navigate the complex and ever-changing global business environment. It is our hope that the insights provided in this paper will stimulate and inspire rigorous and useful future work on a critical and contemporary construct as resilience.

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Figure 1 Resilience in Business, Ecology, Social and Mechanical Literature

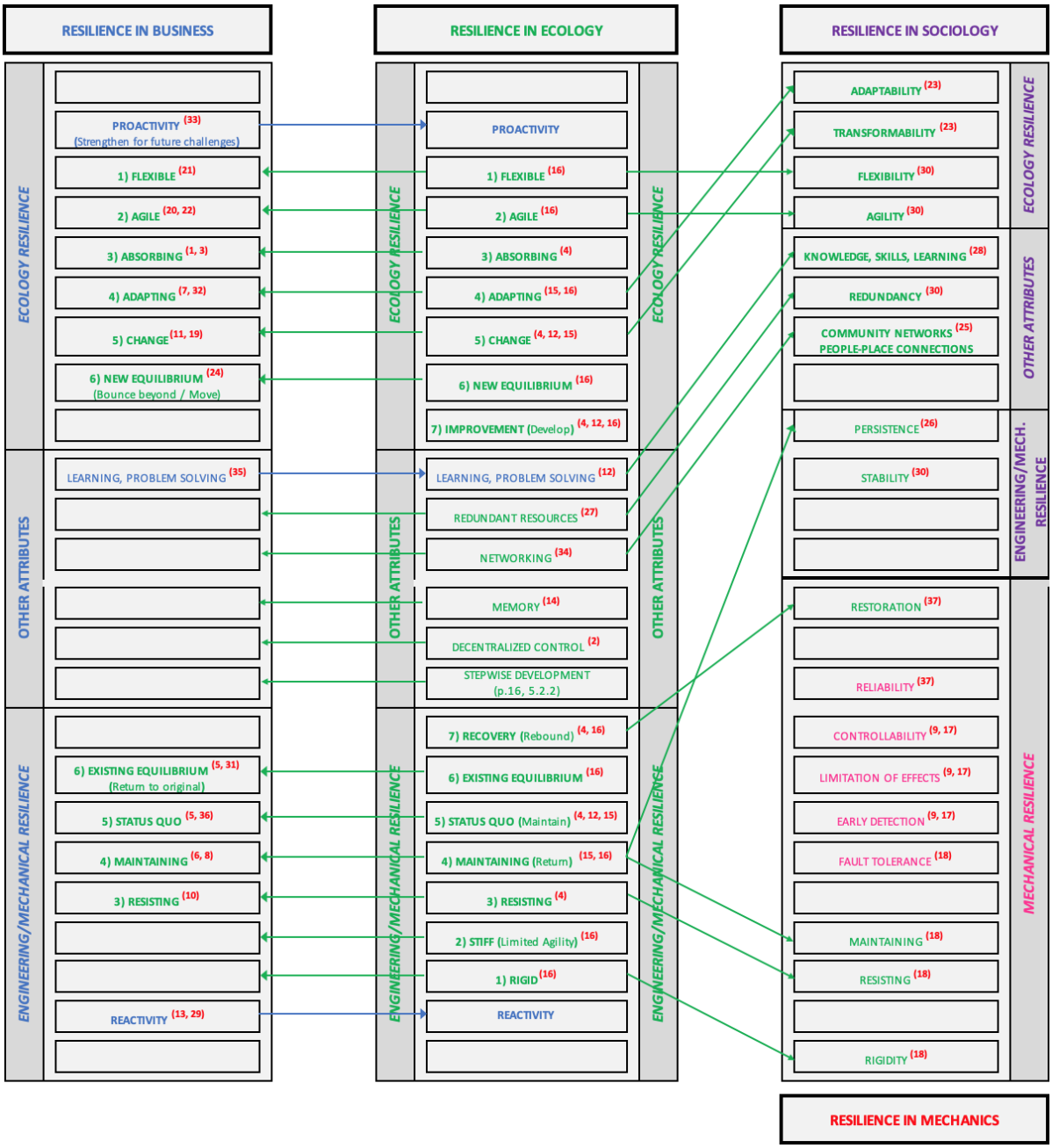

Figure 2 An Example for Frame-based Approach (Chen, 2002)

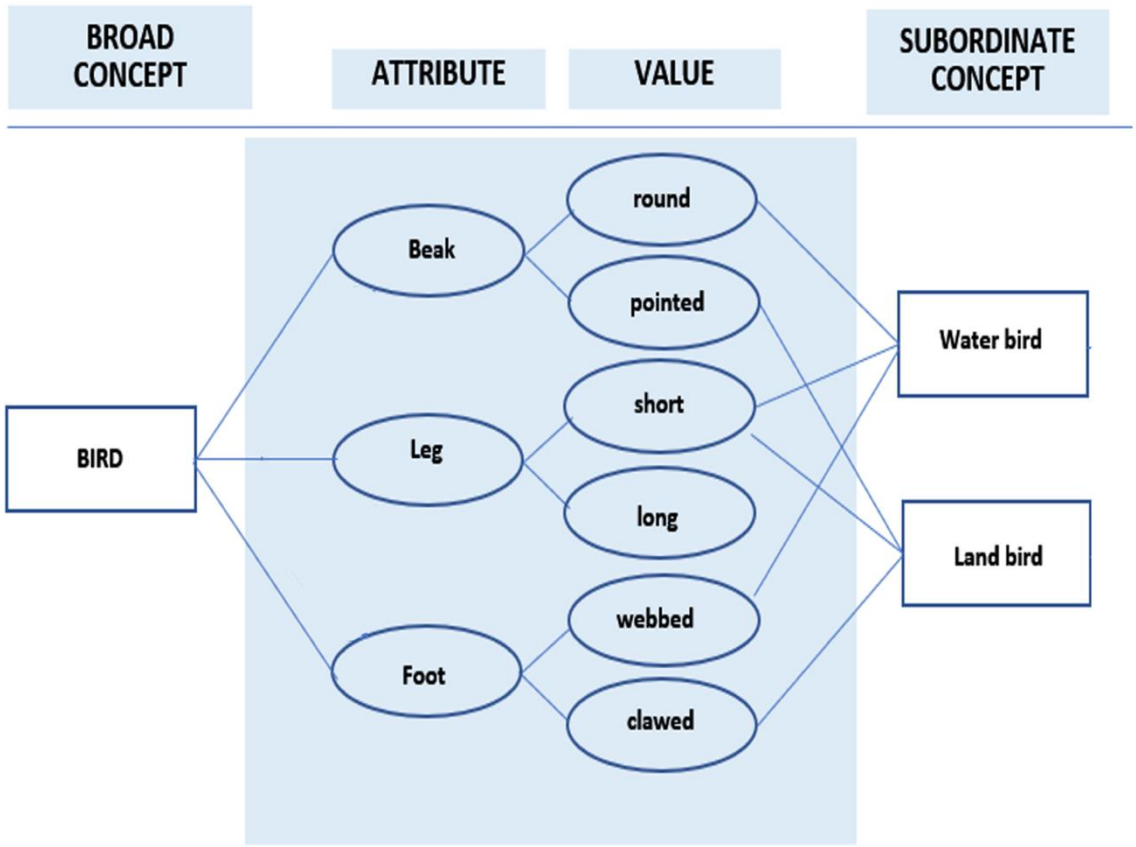

Figure 3 Results: Frame-based Approach for Business Literature

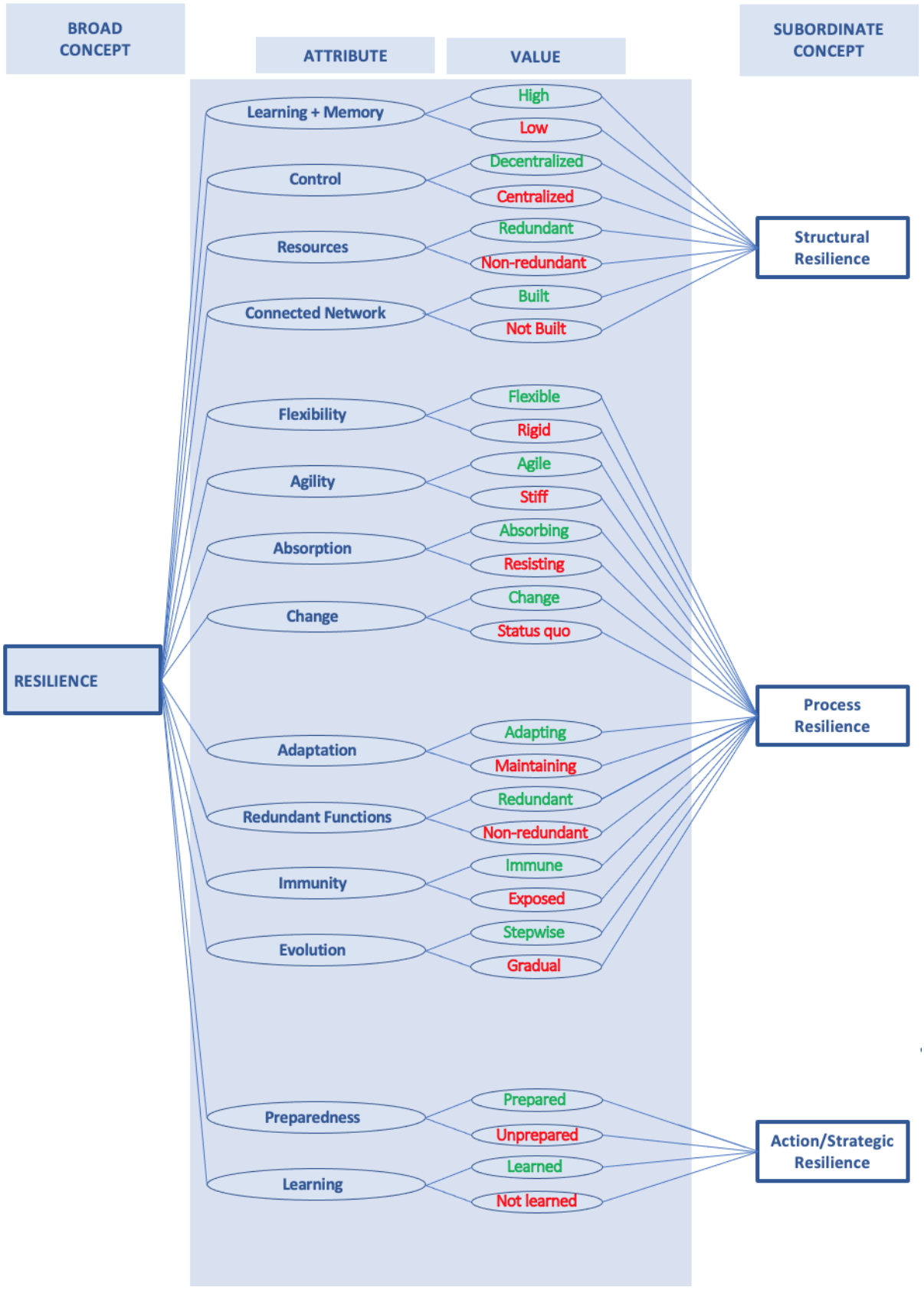

Table 1: Selected Studies on the Broad Concept: Resilience

No	Study	Attribute	Description	Subordinate Concept	Defining Propositions
1.1	Adcock and Collier (2001) Granovskiy et al. (2012) Wilson et al. (2017)	Learning (Learned)	A **structure** refers to a permanent aspect like capacity, e.g., experiential context, norms, people and financial resources, and protocols. Past learnings are associated with the capacity that enables organizations to take necessary measures in similar disruptions and conditions.	Structure	**p1**
1.2	Granovskiy et al. (2012) Wilson et al. (2017)	Memory	A **structure** refers to a permanent aspect like capacity, e.g., experiential context, norms, people and financial resources, and protocols. Memory is associated with the capacity to store and remember information acquired through past learnings and experience. A firm policy may be building an effective organizational memory to be resilient against disruptions.	Structure	**p1**
1.3	Aghion et al. (2021) Bonabeau, Sobkowski, Theraulaz, and Deneubourg (1997b)	Centralized/Decentralized Control	A **structure** refers to a permanent aspect like capacity, e.g., experiential context, norms, people and financial resources, and protocols. Decentralized control is associated with capacity that enables resources at distance to take actions based on past learnings and experience. A firm policy may be adopting decentralized organization so that distant units may act independently against disruptions, when necessary.	Structure	-
1.4	Leitner and Dornhaus (2019) Middleton and Latty (2016)	Resources / Slack	A **structure** refers to a permanent aspect like capacity, e.g., experiential context, norms, people and financial resources, and protocols. Resources are associated with the capacity to use the reserved workforce/organizational slack when needed.	Structure	**p2**
1.5	Tung et al. (2008)	Connected Network	A **structure** refers to a permanent aspect like capacity, e.g., experiential context, norms, people and financial resources, and protocols. Connected Network is associated with capacity that enables organizations to use connections when needed in case of disruptions.	Structure	**p3**
2.1	Hayes et al. (2019) Erol, Sauser, and Mansouri (2010)	Flexibility	A **process** denotes capabilities or response mechanisms, e.g., learning, coping, anticipating, responsiveness, etc. Flexibility, Agility, Absorption, Change, and Adaptation are general attributes that are associated with response mechanisms to change with changing environment. For instance, agility can be associated with responsiveness against surprise events, instead of maintaining stability and rigidity. Absorption can be the capability to integrate new routines and processes.	Process	-
2.2	Hayes et al. (2019) Coullahan and Shepherd (2008)	Agility			
2.3	Capdevila et al. (2020) Dewald and Bowen (2010)	Absorption			
2.4	Boin and Van Eeten (2013) Hamel and Valikangas (2003) Williams et al. (2017)	Change			
2.5	Eltantawy (2016) Huber, Gomes, and de Carvalho (2012)	Adaptation			

Table 1: Selected Studies on the Broad Concept: Resilience (Continued)

No	Study	Attribute	Description	Subordinate Concept	Propositions
2.6	Abimbola et al. (2019)	Functional Redundancy	A **process** denotes capabilities or response mechanisms, e.g., learning, coping, anticipating, responsiveness, etc. Functional redundancy is a response mechanism through which species or organizations respond to disruptions in case some functional groups disappear or collapse. Thus, species or organizations survive.	Process	**p4**
2.7	Aras (2010) Boero (1996)	Immunity	A **process** denotes capabilities or response mechanisms, e.g., learning, coping, anticipating, responsiveness, etc. For instance, disruptions have episodic nature and resilience develops in a stepwise way as a result of episodic perturbations.	Process	**p5**
3.1	Berkes et al. (2000) Folke (2006)	Learning (Intentional)	A **strategic move** denotes purposeful actions to prune tenacity value. Learning can be a structure, process, or strategy. In our proposition, we suggest learning as both structure (p1) and strategy (p7). It is also a strategy adopted by organizations to be proactive and improve preparedness.	Strategic / Action	**p6**
3.2	Ahmad and Afzal (2022)	Proactivity/Preparedness	A **strategic move** denotes purposeful actions to prune tenacity value. We consider "being proactive and improve preparedness" as a purposeful action.	Strategic / Action	**p7**