Resilience in Organization and Supply Chain: An Integrative Conceptual Review

Shaodong Zhang
School of Economics and Management, Southwest Petroleum University, Chengdu 610500, China

Abstract
Resilience is a topic which has aroused extensive discussions in literature focused on organization and management research. However, a consensus on the definition of resilience has not been achieved due to some subtle divergence when scholars construe resilience from different perspective. In this paper, we explain why resilience barged to the forefront when risk management in organization and management research has already achieved great success in coping with factors leading to undesirable outcomes and compare connotations of resilience in different paper based on an overview of previous research on organizational resilience and supply chain resilience respectively, then we detect those divergences that prevent resilience from becoming a consistent construct and provide a comprehensive definition of resilience. With this study, we aim to develop a clearer concept that can act as a foundation for future empirical work.

Keywords
Organizational Resilience; Supply Chain Resilience; Conceptual Review.

1. Introduction
As the world is becoming more and more turbulent, an increasing number of enterprises are stressing the importance of resilience for the purpose of surviving adverse events and achieving positive outcomes. People confer resilience with different meanings form their own industry practice, resulting that a consistent definition of resilience is still in the absence[1], which prevents scientific research from advancing and resilience in practice turns out to be rhetoric. Of all the topics about resilience in organization and management research over the years, organizational resilience and supply chain resilience are the most popular ones[2], so a comprehensive conceptual review and clarify of them is of great significance.

This paper is structured as follows: in section two, we provide an explanation that why resilience barged to the forefront when risk management in organization and management research is already a developed branch to cope with factors leading to undesirable outcomes. In section three, based on an overview of previous research on organizational resilience and supply chain resilience respectively, we compare connotations of resilience in different paper and construe those divergences that prevent resilience to become a consistent construct and then provide a comprehensive definition of resilience. Finally, in section four, a summarization of our findings is provided as well as some implications for future research.

2. From Risk to Resilience: A Trend in Organization and Management Research
A traditional way for organizations and supply chains to deal with internal and external adverse factors is to resort to risk management practice. Those adverse factors - generally related to the economic or technological environment - may affect the business performance of enterprises if not properly handled, but rarely threaten the survival of them. Different from ordinary adverse
factors, adverse events refer to events that cause organizations or systems to fall into adverse situations, such as disasters or crises, which may endanger the survival of enterprises. Faced with more and more frequent adverse events, the traditional risk management practice is slightly inadequate. Resilience is significantly different from risk management in the following two aspects, and some scholars have turned their attention to the study of resilience.

First, risk management assumes that the risk is identifiable[3]. Based on historical data and other information, it is possible to calculate and evaluate the probability of the occurrence of a specific risk and its consequences, so as to eliminate the specific risk before it occurs or minimize its consequences through preparation. Resilience theory recognizes that unpredictable risks may occur[4], instead of seeking to accurately calculate the probability of risk occurrence, it focuses on how to effectively cope with the inevitable impact and "bounce back" from the impact.

In the face of emergencies, traditional risk management can play a limited role. Traditional risk management measures mainly include "enterprise risk management (ERM)" and "business continuity management (BCM)" [5]. Since the mid-1990s, ERM has been widely used in various large enterprises. It can provide comprehensive and detailed risk information about enterprise business activities, thus providing a basis for senior executives to make decisions. BCM absorbed some elements from crisis management and disaster recovery plan, mainly applied to supply chain management, including backup of operation system and response to supply chain interruption. Although the two have played an important role in the enterprise or supply chain to cope with risks, there are certain deficiencies due to the fact that risk identification and risk assessment may not be accessible. Firstly, both of them rely heavily on risk identification. However, many risks cannot be known in advance. In practice, it is not realistic to investigate all potential risks[6]. Secondly, the information that ERM and BCM rely on may not exist. Risk assessment has high requirements for the quality and reliability of information. If the information is not consistent with the reality, the conclusions of risk assessment may be fallacious. In addition, people lack corresponding knowledge about some low probability/high impact events, so managers are likely to underestimate their probability or overestimate their consequences. Finally, the traditional risk management process (including risk identification, risk assessment, risk response and risk monitoring) is based on reductionism, and each risk is identified and dealt with separately, ignoring the superposition effect of various risks. Some adverse events have great contingency, which are caused by the overlapping of different events occurring at the same time in time and space[7], and its cross consequences are difficult to predict [8]. The advantage of resilience is that by strengthening the resilience of the system, the negative consequences of adverse events can be mitigated without risk calculation [9].

Second, risk management is committed to preventing the emergence of adverse situations, and the resilience perspective can explore the opportunities buried in adverse situations, so that the organization or supply chain may "bounce beyond".

"Risk" can be defined as "effect of uncertainty on objectives". It is usually quantified as the probability of occurrence (adverse) events multiplied by its (negative) impact, but risks may also have a positive impact, such as providing opportunities for some stakeholders[10]. In the face of risk, unlike natural systems, which can only passively bear the negative impact of risk, human systems can also benefit from the exploration of the positive impact of risk by human beings in the system to turn the risk into an opportunity. In this process, the "adjustment", "adaptation" and "learning" behaviors of the system under human management provide the basic means to achieve the goal. In fact, this kind of adjustment, adaptation and learning just constitute the important capabilities needed in different resilience stages, enabling the organization or supply chain to integrate resources, restructure and even actively innovate from adverse events, increasing flexibility and agility, which is the basis for the organization or
supply chain to bounce beyond[11]. Risk management measures will not only eliminate risks, but also lose the opportunity to overcome and improve in adversity. Although compared with traditional risk management, systematic resilience is increasingly favored as the main practical activity to deal with adverse events, the emphasis on resilience does not mean that risk management is completely abandoned. More and more scholars call for combining risk management and resilience to better cope with various adverse events[3, 5, 8, 9]. In fact, the two are not mutually disjoint parallel lines. In order to achieve effective response to adverse events, we should actively seek effective integration of resilience and risk-based thinking.

3. Connotation of Resilience in Organization and Supply Chain

3.1. Organizational Resilience

Research on resilience has become increasingly rich. In general, resilience is used to describe how organizations, systems or individuals can respond to disturbances to maintain their stability, reduce the degree of impact or fluctuation, and quickly restore their original state[1]. Scholars have developed a rich understanding of the connotation of resilience, and there are several topics in the research on organizational resilience.

The first issue concerns the severity of the challenges faced by the organization. Is organizational resilience used to cope with rare destructive events or disturbances? Some studies focusing on organizational adaptation have discussed the role of resilience in the organization’s response to conventional disturbances[12], but more studies believe that resilience is not only conducive to coping with conventional events, but also the key to the organization’s survival in adverse events[8, 13, 14]. Mithani divided the events encountered by the organization into traumatic events and life-threatening events[14]. Unlike traumatic events, which can only affect the performance of the enterprise, fatal events can also endanger the physical and mental health of the members of the organization. After the occurrence of a fatal event, mutual support and cooperation among the members of the organization become crucial, and resilience can help the organization cope with the fatal event.

The second topic concerns the nature of resilience. Studies related to crisis management tend to regard resilience as a process [15]. Based on the process view, resilience can be seen as the adjustment process of the relationship between the organization and the environment or the adaptation process of the organization to the environment. Accordingly, these studies pay less attention to the structure or other internal characteristics of the enterprise [6], but focus on the whole process of adverse events affecting the enterprise (before, during and after the event) and the corresponding proactive and responsive behavior of the enterprise. For example, Williams et al. (2017) defined organizational resilience as the whole process of building an organization’s ability endowment, and taking corresponding actions to achieve positive adjustment before, during and after the crisis, so as to promote the normal operation of the organization.

The process view emphasizes that human perception or expectation of potential adverse events before the crisis and post-crisis learning are included in the resilience framework[16]. For example, Williams et al. (2017) pointed out that organizational resilience includes three elements: anticipation of potential adverse events, adjustment of actions to adapt to the crisis environment, and post-crisis learning. Similarly, McManus (2008) also emphasized the role of situational awareness, and believed that organizational resilience can be promoted through situational awareness, management of keystone vulnerabilities and adaptive capacity building[17].

From the perspective of process view, resilience is dynamic in nature[11], reflected in the process of interaction between the organization and the environment. However, the process
view has two defects: first, the process is to some extent a "black box", which makes it difficult to understand resilience in depth [18]; Second, the measurement of resilience can only be carried out after the event, and depends on enterprises that can successfully cope with adverse events. Another view regards resilience as a potential ability[19], which is only shown when adverse events occur. Based on the ability view Meyer (1982) defined resilience as "the ability of an organization to absorb and dissolve various environmental disturbances and restore the previous order, which is reflected in the organization's resources, culture, practices and structure"[20]. This definition focuses on the resources, practices and organizational structure on which the formation of resilience depends. It comprehensively summarizes the organizational characteristics on which resilience depends, and has a profound impact on subsequent research. For example, Lengnick-Hall et al. (2011) defined resilience as "the ability of an enterprise to realize benefits by taking advantage of destructive accidents that may endanger the survival of the enterprise. This ability requires the enterprise to absorb shocks, respond to specific situations and ultimately promote organizational change", and believed that the development of organizational resilience needs to rely on a series of processes, practices and practices[21].

Based on the ability view, scholars also discussed whether there is a common path to achieve resilience. This topic involves the heterogeneity of enterprises, and the resource-based view and dynamic capability theory are widely used. For example, Gittell (2006) defined resilience as a dynamic capability that is beneficial to organizational adaptability developed over time based on the existing literature, and emphasized that this capability comes from a specific process of retaining resources, which can retain resources in a flexible, storable, transformable and malleable manner[13]. Ortiz-de-Mandojana (2016) and others pointed out that resilience is not a static attribute, but a series of capabilities with path-dependent characteristics developed by the organization after many unexpected events. He also pointed out that the social and environmental practices of enterprises to a certain extent constitute the path on which the formation of resilience depends. This path is related to the trust of employees in the organization and the trust of suppliers in the organization. It can be seen that there are indeed common paths that contribute to the formation of toughness, although there are some differences in these paths.

Duchek (2020) defined organizational resilience as "the ability of an organization to predict potential threats, effectively respond to adverse events and adapt to the changing environment, which is essentially a meta-ability based on specific organizational practices and organizational capabilities" on the basis of absorbing the stage division of resilience in the "process view". The "ability view" attaches importance to the resources, practices, capabilities and even organizational culture required for the formation of organizational resilience, which helps guide enterprises to develop organizational resilience at the practical level[11]. The third topic is about the results of resilience. Some scholars believe that resilient organizations can recover to their previous state after experiencing adverse events, that is, bounce back. More and more scholars point out that the experience and successful response of enterprises to adverse events can help them learn and grow and effectively adapt to the turbulent environment, and bounce beyond[2, 18, 21]. Munoz et al. (2022) further clarified the concept of the results of resilience and divided them into three parts: robustness, resilience and antifragility. Robustness emphasizes the bearing capacity, that is, after being impacted, its own fluctuation is very small, and it does not involve bounce back; Resilience refers to a certain degree of fluctuation after impact, but can return to the original state, emphasizing rebound; Anti-vulnerability tends to post-crisis growth, emphasizing improvement or stronger[22]. Most scholars regard robustness, resilience and antifragility as the results that resilient organizations can show.
3.2. Supply Chain Resilience

Due to the existence of geographical and legal boundaries, it is possible for a traditional single organization to form a relatively complete list of risk sources [23], but the supply chain system usually contains several organizations, and the complexity it faces will multiply. In the context of economic globalization, the development of more detailed and specialized division of labor, more diversified outsourcing business and the global supply of products and services have created a global supply chain with increasing complexity and length. Accordingly, the phenomenon of supply chain disruption is becoming more and more frequent. On the one hand, this supply chain disruption is caused by natural disasters, geopolitical conflicts and other accidents. On the other hand, it is related to various practices of the supply chain itself to reduce costs (such as maintaining low inventory levels) [24]. Compared with the traditional supply chain risk management method, supply chain resilience pays more attention to the characteristics of the supply chain system rather than the source of risk, which provides a new idea to reduce the impact of supply chain disruption on enterprises, and also increasingly attracts the attention of scholars. Scholars have defined supply chain resilience from different perspectives. From the perspective of system, Christopher and Peck (2004) defined supply chain resilience as "the system returns to the previous state or jumps to a better state after experiencing disruptions"[25]. On the basis of this definition, Brandon-Jones et al. (2014) made a requirement on the recovery speed of the supply chain, defining it as "the system returns to the previous state within an acceptable time after the interruption" [24]. This type of definition emphasizes the resilience of the supply chain after the disruption, and does not specify the ability of the supply chain to withstand external shocks. Ponomarov and Holcomb (2009) integrated a multidisciplinary perspective and defined supply chain resilience as "an adaptive ability to prepare for unexpected events, respond to interruptions, and recover from them. This adaptive ability requires maintaining necessary operational continuity and effectively controlling the structure and functions of the supply chain"[26]. Similarly, Wieland and Durach (2021) believe that there are certain defects in studying the supply chain from the perspective of engineering system or ecosystem. For example, the engineering system aims to return to the original equilibrium and ignores other possible equilibria; The ecosystem perspective ignores the role that human activities can play in the face of threats. From the perspective of social ecosystem, they defined supply chain resilience as "the ability of supply chain to maintain, adapt or change in the face of change", and stressed that supply chain adaptability and supply chain reform are the proper meaning of supply chain resilience [23]. Different from the definition that only emphasizes resilience in the first category, the definition in the second category also believes that a resilient supply chain can maintain certain functions and achieve change after being hit.

In general, supply chain resilience is regarded as a kind of capability, but scholars have used different terms for the specific composition of this capability, such as capabilities, elements, competencies and preconditions. This paper agrees with Duchek (2020) and believes that supply chain resilience can be regarded as a meta-capacity, which is composed of different capabilities. Based on different studies, these capabilities roughly include: efficiency, redundancy, collaboration, flexibility, agility, speed, visibility and bearing capacity[27]. However, due to different understanding of these capabilities and the relationship between them, scholars have different views on the connotation of supply chain resilience and the capabilities that constitute supply chain resilience. For example, Brandon-Jones et al. (2014) believed that supply chain resilience refers to the ability of the supply chain to maintain its functions under internal or external shocks, while supply chain resilience only describes the process of bouncing back of the supply chain after disruption. Therefore, although they are related, they represent two different concepts. Correspondingly, Wieland and Wallenburg (2013) believed that robustness is the ability of the supply chain to resist changes without
adjusting its initial stable configuration. They regarded robustness as a discriminant variable of proactive resilience, and agility (the rapid deployment ability of the system in the face of unforeseen unexpected events) as a discriminant variable of responsive resilience, both of them constitute two different dimensions of the concept of supply chain resilience[28]. The above different views enrich the understanding of the connotation of supply chain resilience. Moreover, the understanding of redundancy and flexibility also affects scholars' judgment on the composition of supply chain resilience. Sheffi and Rice (2005) believe that redundancy and flexibility are two mutually independent capabilities that constitute resilience[29]. However, Jüttner and Maklan (2011) point out that redundancy is the duplication of capacity, which can ensure the continuous operation of the system after the outage, so they regarded redundancy as a way to achieve flexibility[30]. In this view, if flexibility is included in the composition of resilience, it should not include redundancy. Scholten and Schilder (2015) also agree with this view. They follow the view of Christopher and Peck (2004) that "redundancy and efficiency are a pair of contradictions and cannot be achieved at the same time", pointing out that redundancy in the form of slack resources, idle resources and multi-skilled employees can promote the flexibility of organization[27]. Therefore, both of the above studies believe that supply chain resilience consists of four capabilities: flexibility, speed, visibility and collaboration.

Based on the analysis above, this paper defines resilience as the capability of the system to be awareness of the environment and its own vulnerability, and make adjustments to recover from adverse events and achieve goals. Resilient organizations or supply chains can bounce back or bounce beyond from the shocks. The realization of this result depends on the organization or supply chain to make the organization or supply chain flexible when adverse events occur by preparing redundant resources in advance.

4. Conclusion

This paper reviews the relevant literature on organizational resilience and supply chain resilience, compares the definitions of resilience in different literature, analyzes its implicit assumptions and its subtle differences, and selects those convincing perspectives to form the definition of resilience, providing a reference for future research. In the process of literature review, the selection of literature is mainly based on influential papers in mainstream journals, which lack systematic review and may omit some potentially valuable views. Future research in this field should try to develop the measurements of resilience so that there will be more empirical study.

References


