Towards the role of smart services as well as AI in building and enhancing organizational resilience in small and medium-sized service companies – Part A: A conceptual framework

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Problem

The COVID-19 pandemic has led to numerous changes in politics, social environment and economy. The fear of the virus as well as the actions to contain the pandemic have threatened the existence of numerous German service companies. So far, many of them have only been able to avert the threat of bankruptcy by government interventions, short-time work and support from nongovernmental organizations (Adam & Alarifi, 2021). However, some of the service companies might not survive the pandemic. Small and medium-sized companies turned out to be particularly vulnerable. Unlike internationally active large enterprises, they have little financial cushion and therefore indicate higher bankruptcy risks (Peichl et al., 2021). While the manufacturing sector was able to continue business operations under certain conditions, many retailers and other service providers had to cease operations completely. As a result, the service sector, which is by far the most employment-intensive and at the same time the most value-adding sector in Germany, was confronted with challenges that have threatened its very existence (Peichl et al., 2021; Welter & Wolter, 2021).

Guides and frameworks that already exist in the academic literature to help increase organizational resilience may be viewed by SMEs in the service sector as either too complex or too generic. The ongoing study aims to derive recommendations for action for the service industry using current insights from organizational resilience research. Thus, the flexibility and resilience against external factors threatening the existence of service companies shall be increased. To facilitate this, a conceptual framework is presented that serves as a foundation for further industry- and company-specific extensions considering the heterogeneous structure of the service industry.

Methodology

The ongoing study consists of two parts. In the first part of the study, presented here, a literature review serves to provide an overview of existing models in organizational resilience research. These are evaluated for their suitability for SMEs in the service industry. The second part focuses on key insights gained from interviews with industry experts. Based on the information obtained, the conceptual framework recommendations for action are derived for service companies on how they can increase their own corporate resilience.

Key Findings

It is observable that the social and scientific interest in resilience and how to build it is steadily increasing and has been boosted by the COVID-19 pandemic. To meet the increased interest, numerous scientific papers have been published on this topic. For example, the number of scientific publications on the topic of organizational resilience has almost quadrupled from over 14k in 2012 to over 52k in 2020 (Digital Science, 2018-). Several standards such as BS 65000:2014 (British Standards Institution, 2014) or ISO 22316:2017 (International Organization for Standardization, 2017) have also been developed on this subject. In addition, numerous models and frameworks have been published in the scientific community over time to either identify the processes that contribute to increasing organizational resilience (e.g. Duchek, 2020) or to highlight the influencing factors (e.g. Barasa et al., 2018). Furthermore, the need for approaches that take company size into account has become apparent. While Burnard and Bhamra (2011) pointed out some implications of their resilient response framework for small and medium-sized enterprises (SMEs), Gunasekaran et al. (2011)

considered the characteristics of SMEs in their concept. A study by Sullivan-Taylor and Branicki (2011) identified a lack of technical as well as organizational capabilities and resources being characteristic obstacles in SMEs while rapidity has been found to foster their organizational resilience. Adam and Alarifi (2021) have examined the role of SME's innovation practices and external support in their performance during the COVID-19 crisis. They concluded that innovation practices of SMEs have a direct impact on the likelihood of surviving the crisis, while external factors (such as government support programs) play a mediating role. An overview of further factors and characteristics that have been found to influence resilience of SMEs can be obtained in publications of Korber and McNaughton (2018) and Ates and Bititci (2011).

Despite the plethora of generic frameworks on organizational resilience, little has been published specifically on resilience of SMEs in the service sector. In addition, many of the frameworks published to date have a high degree of abstraction, showing only "what" needs to be done to increase resilience, but not "how" it could be done. This lack of practicality might be considered as insufficient by some SMEs. To address this shortcoming, we present a conceptual resilience framework for SMEs operating in the service sector. The proposed concept is mainly based on previous work by Punzo et al. (2020) on resilience of complex systems. Complex systems are characterized by a variety of attributes (for a comprehensive approach, see Bar-Yam, 2002; Ladyman et al., 2013; Lloyd, 2001). Among its major ones are: "a large number of interacting parts; interactive complexity; and self-organization." (Tan et al., 2005, p. 38). The transfer from complex systems research is driven by the assumption that the high number of interactions and the behavior of entities in a service delivery network correspond to the properties of complex systems (Barasa et al., 2018; Briscoe et al., 2012; Burton et al., 2018; Engelseth et al., 2021; Rouse & Basole, 2010; Sebhatu et al., 2016; Tan et al., 2005). In addition, increasing connectivity in technology augmented services, such as smart services or the use of artificial intelligence, are associated with increasing complexity (Briscoe et al., 2012).

For the purpose of better feasibility in practical use, the circular representation of the "resilience wheel" (Punzo et al., 2020, p. 3870) has been converted into a linear process visualized by a horizontally aligned sequence of arrows (see figure A in appendix). Also there have been made minor changes to the terminology. As we hypothesize that leveraging and offering smart services as well as using artificial intelligence in service delivery will increase resilience in SMEs, an additional, practice-related layer, "Actions & Methods", has been added to serve as a placeholder. This extension helps to account for heterogeneity in the service sector because it encourages to make case-specific adaptations. Initially, it includes a sample of conceivable activities and tools that can be adapted and extended to the area of application. One of these tools is a so-called "stress test" or simulation. Along with impact and risk analysis, these can be powerful instruments for creating awareness of potential hazards and developing solutions to address them.

Clients play a central role in the service delivery process. Therefore, they should also be highly relevant for activities to increase the resilience of service companies. As mentioned before, we assume that offering smart services and leveraging artificial intelligence can generate benefits for both providers and customers with a positive impact on the company's resilience. Thus, ongoing studies are intended to identify appropriate methods, tools and actions for each process phase that are suitable for a particular service branch or entity in the service delivery network.

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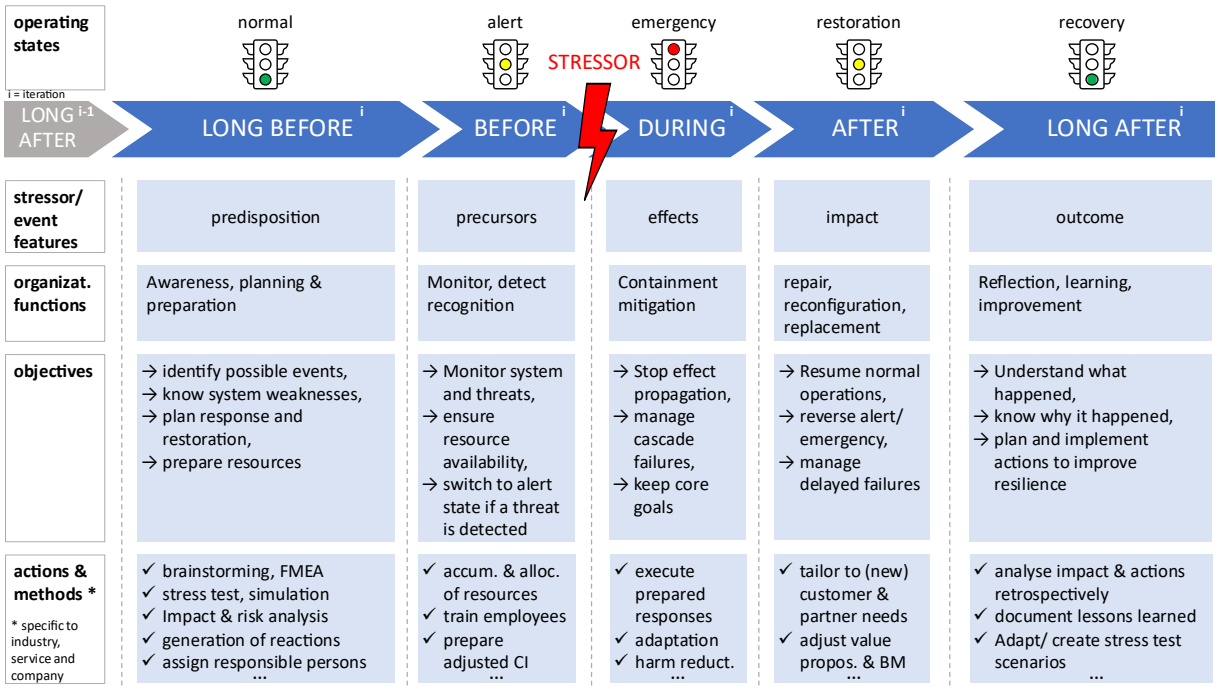
Appendix

Figure 1: Conceptual resilience framework for SMEs in the service delivery network.



Note. Adapted from "Engineering Resilient Complex Systems: The Necessary Shift Toward Complexity Science", by G. Punzo, A. Tewari, E. Butans, M. Vasile, A. Purvis, M. Mayfield and L. Varga, 2020, *IEEE Systems Journal*, *14*(3), p. 3870 (https://doi.org/10.1109/JSYST.2019.2958829). CC BY 4.0 (https://creativecommons.org/licenses/by/4.0/).