

# **Measuring resilience and vulnerability of SMEs to climate-related events: Evidence on why they need to go hand by hand**

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## **Summary**

SMEs play a crucial role in the economic system. If their existence was to become affected by climate-related impacts, social and economic development could be compromised. The objective of this paper is to investigate to what extent SMEs are vulnerable or resilient to climate change. Moreover, it examines the relationship between the concepts of vulnerability and resilience. These conceptualisations were operationalised with a number of variables, which were used to construct two indices, one for vulnerability and another for resilience. The analysis reveals that these two concepts are not simply opposite sides of a coin. This paper argues that an organisation that possesses coping capacities and resilient traits has the potential to manage climate events and incorporate these experiences by learning, adapting and renewing. This has important implications, since the efforts to reduce vulnerability and enhance resilience need to go hand by hand in order to promote change and transformation.

## **Abstract**

SMEs play a crucial role in the economic system. They represent around 95% of the entire private sector in many nations, and thus constitute a means of livelihood for local communities and a significant source of employment. If their existence was to become affected by climate-related impacts, social and economic development could be compromised. The literature suggests that small companies are prone to be harmed by external shocks, such as climate hazards. Nevertheless, these organisations have also been highlighted as being flexible and able to adapt to new circumstances, so they have resilient traits. Despite the importance that these organisations have to the socioeconomic system, how resilient or vulnerable they are to climate related impacts constitutes an under-researched area. The objective of this paper is to assess quantitatively to what extent SMEs are vulnerable or resilient to climate change and to investigate the relationship between these concepts.

Vulnerability is understood here as the propensity to be harmed in the short-term by a weather impact. It thus takes into account the inherent characteristics, as well as reactive mechanisms, to cope with the impact. Resilience involves longer term processes through which boundaries are pushed not only to survive future conditions, but also to thrive in them. In this sense, it comprises adaptive proactive measures that seek to protect from future impacts, the capacity to learn and the capacity to renew and change. These conceptualisations were operationalised with 94 proxy variables, which were used to construct two robust and transparent indices, one for vulnerability and a second for resilience. Data was obtained by means of a face-to-face survey applied to 326 SMEs, which was carried out in two prone coastal areas in Mexico. The analysis shows that, in general terms, SMEs are more vulnerable than resilient, highlighting the need to reduce vulnerability among SMEs. When vulnerability and resilience were contrasted, the results revealed an expected strong negative correlation, i.e. the most vulnerable firms tend to be the less resilient, and the most resilient firms tend to be the less vulnerable. Nevertheless, a deeper analysis revealed that vulnerability and resilience are not simply opposite sides of the same coin. Being less vulnerable does not imply enjoying automatically high levels of resilience, and vice versa. That is perhaps the most important aspect of this paper as efforts to increase resilience will not have an effect if vulnerability is not reduced. This paper argues that an organisation that possesses coping capacities and resilient traits has the potential to manage current climate events and incorporate these experiences by learning, adapting its practices and renewing itself. In this sense, these factors open up the opportunity to decrease the vulnerability through time and move to a higher state in the adaptive cycle. By investigating the vulnerability and resilience of SMEs, this paper provides empirical evidence that supports the connection between vulnerability and resilience and, more importantly, that these are not necessarily mutually exclusive concepts which has been widely theorised in the literature. We show also a way to measure the resilience of this type of organisations. These aspects have important development implications, since interventions to reduce vulnerability and enhance resilience need to go hand by hand in order to promote change and transformation among this backbone of the socio-economic system.