

IfM Background Paper

Climate risks from the perspective of companies

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Content

List of illustrations	II
1 Introduction	1
2 Climate change: Entrepreneurs in Germany mostly fear heat and heavy rainfall	2
3 Why entrepreneurs (don't) deal with the consequences of climate change	4
4 Value chains: Economic dependence is part of the risk assessment	8
5 Conclusion	13
References	14

List of illustrations

Figure 1:	Share of companies that consider extreme events to be a threat	2
Figure 2:	Assessment of the extent to which the company is protected against extreme events	3
Figure 3:	Subjects that companies feel well-informed about	4
Figure 4:	Consequences of climate change on parts of the value chain that companies have dealt with intensively	5
Figure 5:	Reasons for an intensive deal with the consequences of climate change	6
Figure 6:	Reasons why the consequences of climate change have not (yet) been dealt with intensively	7
Figure 7:	Dependency on market partners in general and on specific market partners	8
Figure 8:	Probability of the company being impacted by interruption to the value chain as a result of climate events	10
Figure 9:	Probability of the company being affected by disruption to the value chain as a result of climate events	11
Figure 10:	Measures to limit business risks due to interruptions in the value chain as a result of climate events	12

1 Introduction

Climate change and its consequences dominate discussions around the world. The effects are also becoming increasingly noticeable in Germany. Extreme weather events such as heat waves, prolonged droughts, storms, heavy rainfalls, and floods have impressively demonstrated this in recent years. The associated damage amounted to an average of more than € 6 billion per year (Prognos 2022). It can be assumed that such extreme events will occur more frequently and possibly on an even greater magnitude in the future (Umweltbundesamt 2017). They thus become a relevant risk factor for the business success of many companies.

However, how do entrepreneurs perceive these developments in the wake of climate change? Which extreme weather events do they consider a particular threat to the company? How well-informed do they feel about risks and adaptation options? To what extent have they addressed climate risks in different parts of their value chain? Moreover, how do they assess the respective risks? These questions are the focus of a special analysis of a nationwide company survey conducted in 2022 (Schlepphorst et al. 2023).

Empirical basis

From July to August 2022, the Institut für Mittelstandsforschung (IfM) Bonn surveyed entrepreneurs from all over Germany on how they perceive and deal with climate risks. Companies from all industries and size classes were involved¹. This special analysis is based on 1,315 completed questionnaires. The results presented here were extrapolated to the totality of all companies based in Germany according to the business register and turnover tax statistics so that the findings can be generalized.

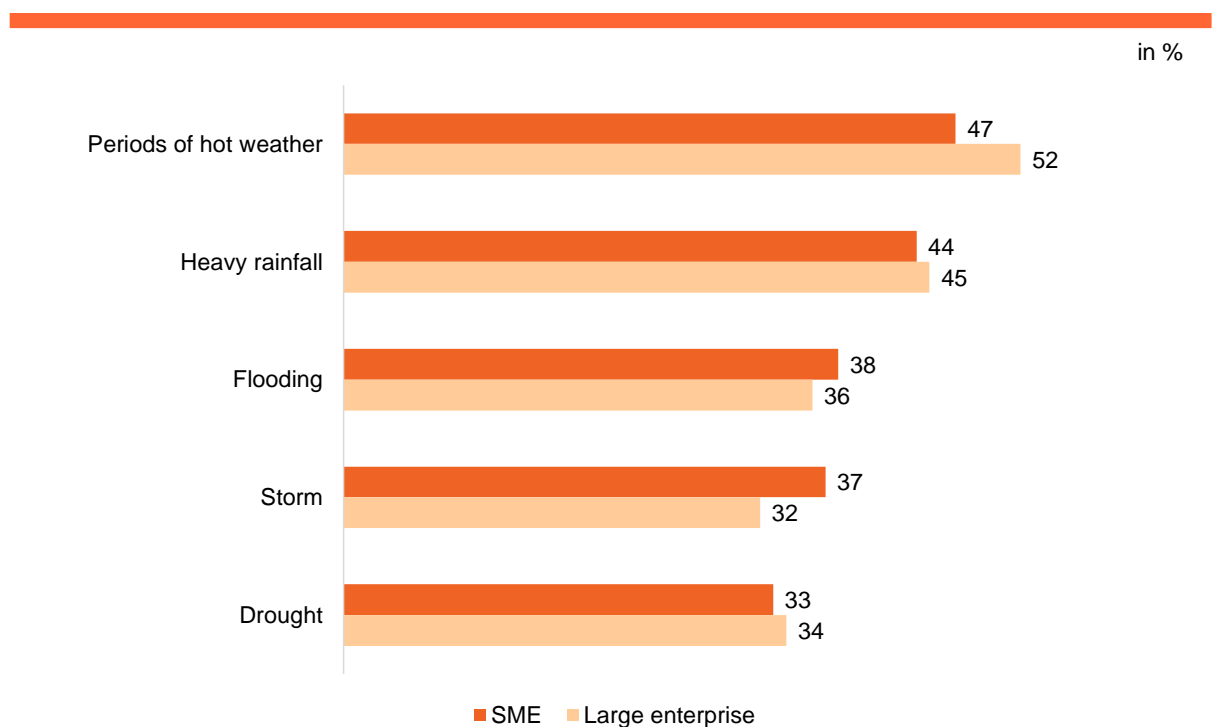
¹ The companies were asked about the number of employees subject to social security contributions. In the following, we classify a company as a small and medium-sized enterprise (SME) if it has fewer than 250 employees subject to social security contributions and as a large company if it has at least 250 employees subject to social security contributions.

2 Climate change: Entrepreneurs in Germany mostly fear heat and heavy rainfall

The survey shows that, over the past five years, events such as extreme weather, heat, floods and low water have affected the business activity of 41% of small and medium-sized enterprises (SMEs) and 50% of large enterprises. Unsurprisingly, agriculture, energy and water supply companies and the hospitality industry were affected comparatively frequently.

Entrepreneurs from both SMEs and large companies perceive the effects of heat and heavy rainfalls as particularly threatening (see Figure 1). The lowest risk for them is posed by droughts, although there are considerable differences depending on the industry. As expected, companies in the agricultural sector are particularly likely to see such events as threatening.

Figure 1: Share of companies that consider extreme events to be a threat



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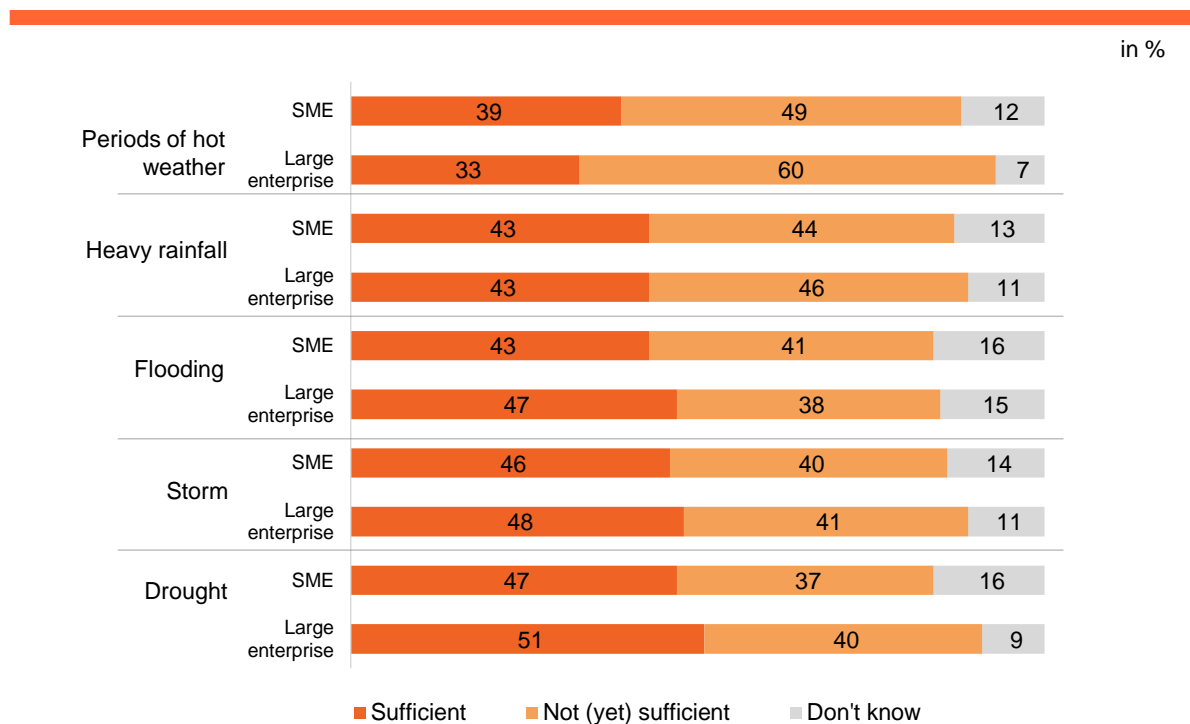
Source: IfM Bonn: Climate Change Survey (2022), special publication (share of companies indicating 4 or 5 on a scale of 1: No danger to 5: Great danger), extrapolated results.

However, entrepreneurs are not only aware of the risks, but they also act. Many have already taken measures to reduce the impact of climate risks. Nevertheless, there is a discrepancy between SMEs and large companies. The latter

have already implemented construction measures (46%) or taken out insurance (30%) significantly more often than SMEs (24% each).

Despite the measures taken, a considerable proportion of entrepreneurs do not feel sufficiently protected against the respective extreme weather events by the measures taken. This applies in particular to events they consider a higher risk to their own company, i.e., heat and heavy rainfalls (see Figure 2). In addition, a non-negligible proportion of entrepreneurs are unsure whether the measures taken are sufficient to counteract the respective risks.

Figure 2: Assessment of the extent to which the company is protected against extreme events



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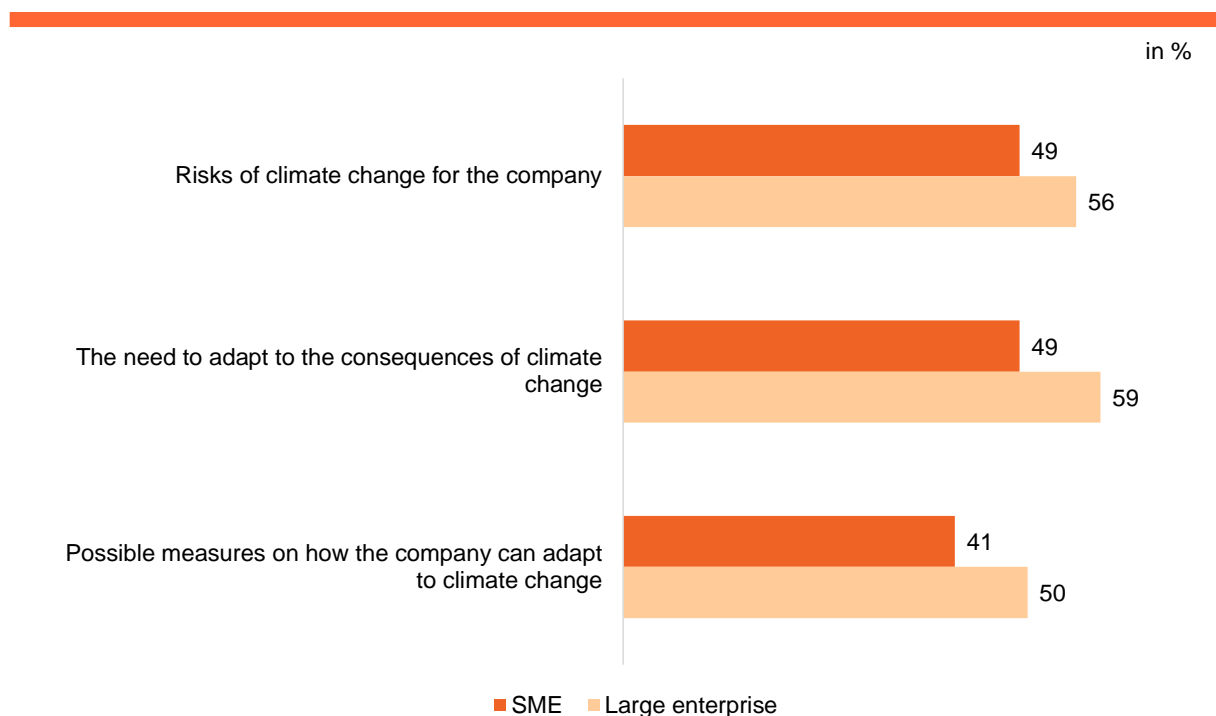
Source: IfM Bonn: Climate Change Survey (2022), special publication (share of companies), extrapolated results.

3 Why entrepreneurs (don't) deal with the consequences of climate change

However, what is the basis for these assessments by entrepreneurs? Do they feel well-informed about risks and options for adaptation?

Around one in two entrepreneurs from SMEs and large companies feel (very) well-informed about the risks of climate change for their own company (see Figure 3). The same applies to the need to adapt to the changes caused by climate change. On the other hand, SME entrepreneurs consider themselves less well-informed about the possible measures companies can take to adapt to climate change. In other words, there is a gap between sensitivity to climate-related threats and familiarity with possible adaptation measures. For all three subjects – climate risks, need for adaptation needs, and adaptation options – SMEs feel less well-informed than large companies.

Figure 3: Subjects that companies feel well-informed about

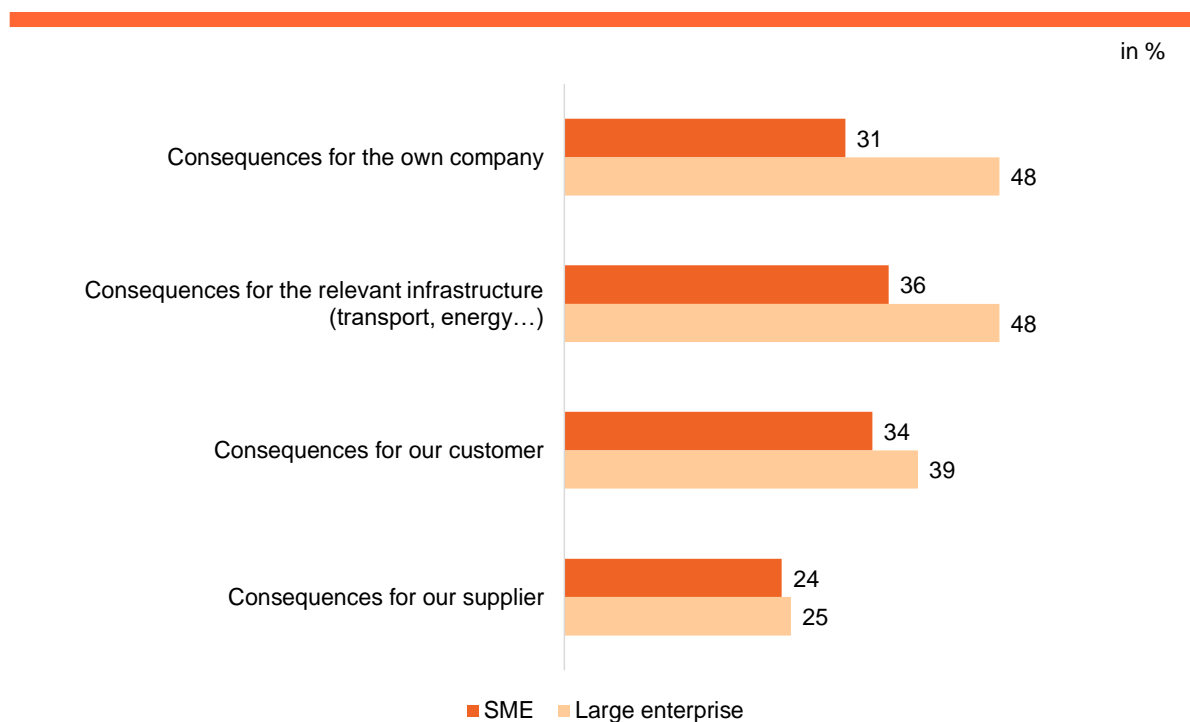


Source: IfM Bonn: Climate Change Survey (2022), special publication (share of companies indicating 4 or 5 on a scale of 1: Not informed to 5: Very well informed), extrapolated results.

In addition to the direct effects of climate change, these can also indirectly impact SMEs and large companies. For example, companies in Germany are

heavily involved in foreign trade activities (Fuest 2022; Kranzusch/Holz 2013). This makes them indirectly vulnerable to the effects of climate change in other regions of the world. In addressing the potential impacts of climate change at various parts in their value chains, apparent discrepancies emerge between SMEs and large companies. Overall, almost 54% of SMEs and 69% of large companies have dealt intensively with the effects of climate change for at least a part of their value chain. This considerable discrepancy is understandable insofar as the value chains of SMEs are comparatively less widely spread – for example, because they are less likely to source products and services from abroad or sell them in foreign markets. At the same time, SMEs more often operate within Europe (Kay et al. 2014) and thus in regions that are (as yet) less affected by the consequences of climate change compared to regions outside Europe (Die Bundesregierung 2020).

Figure 4: Consequences of climate change on parts of the value chain that companies have dealt with intensively



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Source: IfM Bonn: Climate Change Survey (2022), special publication (share of companies indicating 4 or 5 on a scale of 1: Not at all to 5: Very intensively), extrapolated results.

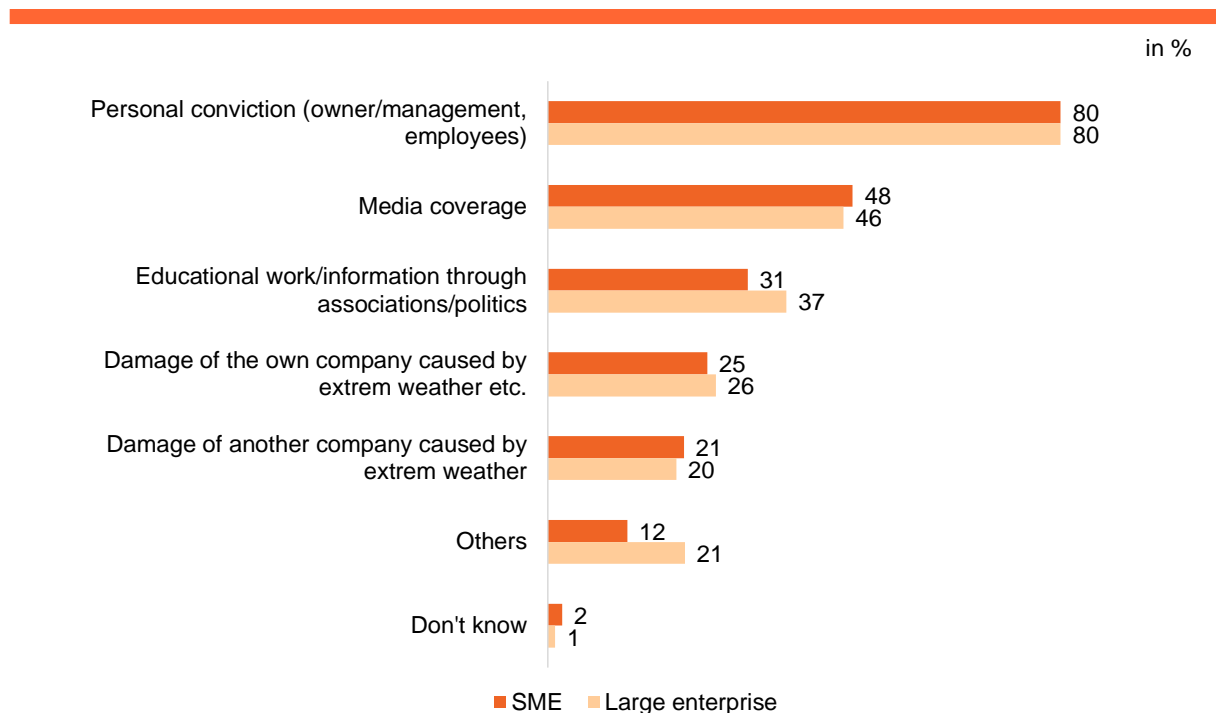
A closer look at the different parts of the value chain shows that large companies deal with the effects of climate change directly for their own company and the company-relevant infrastructure considerably more often than SMEs (see Figure 4). This discrepancy is not surprising because large companies have

specialized professionals at their disposal. Surprisingly, however, the differences in the consequences for customers and suppliers are comparatively small.

Why do entrepreneurs deal intensively with the direct and indirect effects of climate change for their companies? Why are some not doing so?

In many companies, the personal convictions of management, owners (families of owners), and employees determine the level of engagement (see Figure 5). At a clear distance – albeit still considerable – follow the media coverage and the educational work and information through politics and associations. In addition, experience of damage by extreme weather in one's own company or a known company can also drive attention to the issue.

Figure 5: Reasons for an intensive deal with the consequences of climate change



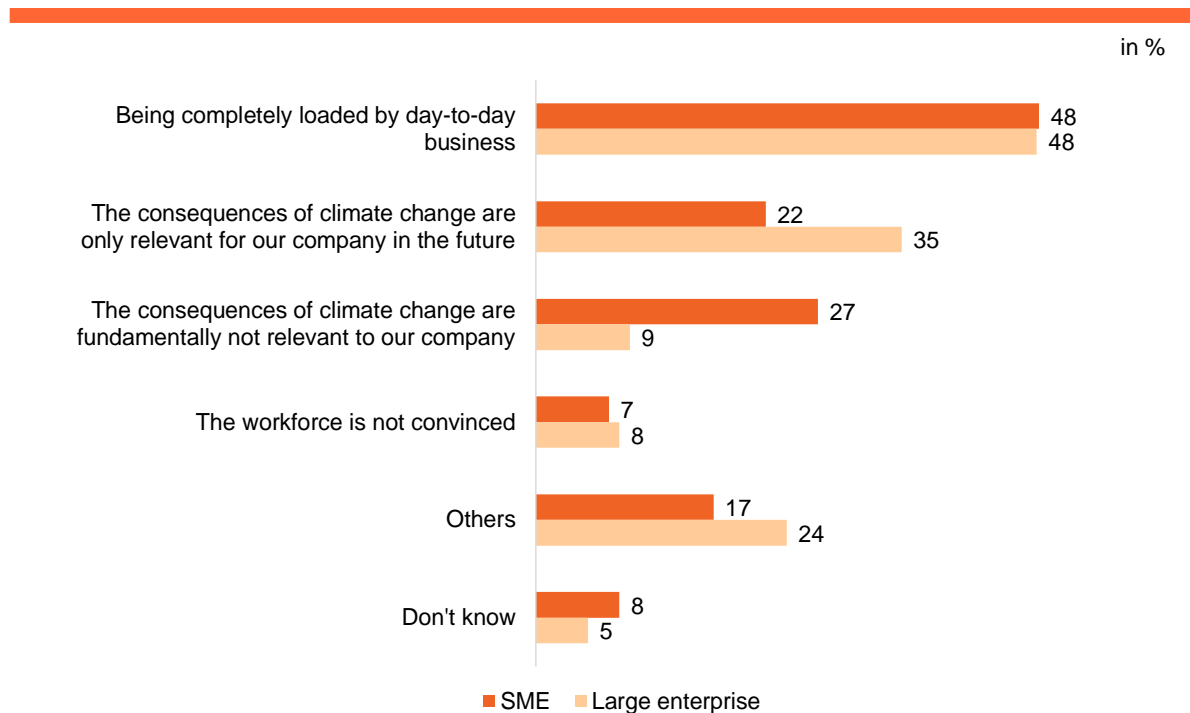
© IfM Bonn 23 2207 005

Source: IfM Bonn: Climate Change Survey (2022), special publication (share of companies; the question was posed only to companies that have dealt intensively with the consequences of climate change in at least one part of their value chain; multiple answers possible), extrapolated results.

Among those entrepreneurs who have not (yet) dealt intensively with the consequences of climate change, a considerable share point to the workload in their day-to-day business as an essential reason (see Figure 6). SMEs and large

companies are the same on this point. Still, there are differences when it comes to the argument that the consequences of climate change are not (yet) relevant for the company: While about a quarter of SMEs fundamentally rule out such relevance, substantially more large companies justify their wait-and-see attitude by stating that the consequences will only become relevant in the future.

Figure 6: Reasons why the consequences of climate change have not (yet) been dealt with intensively



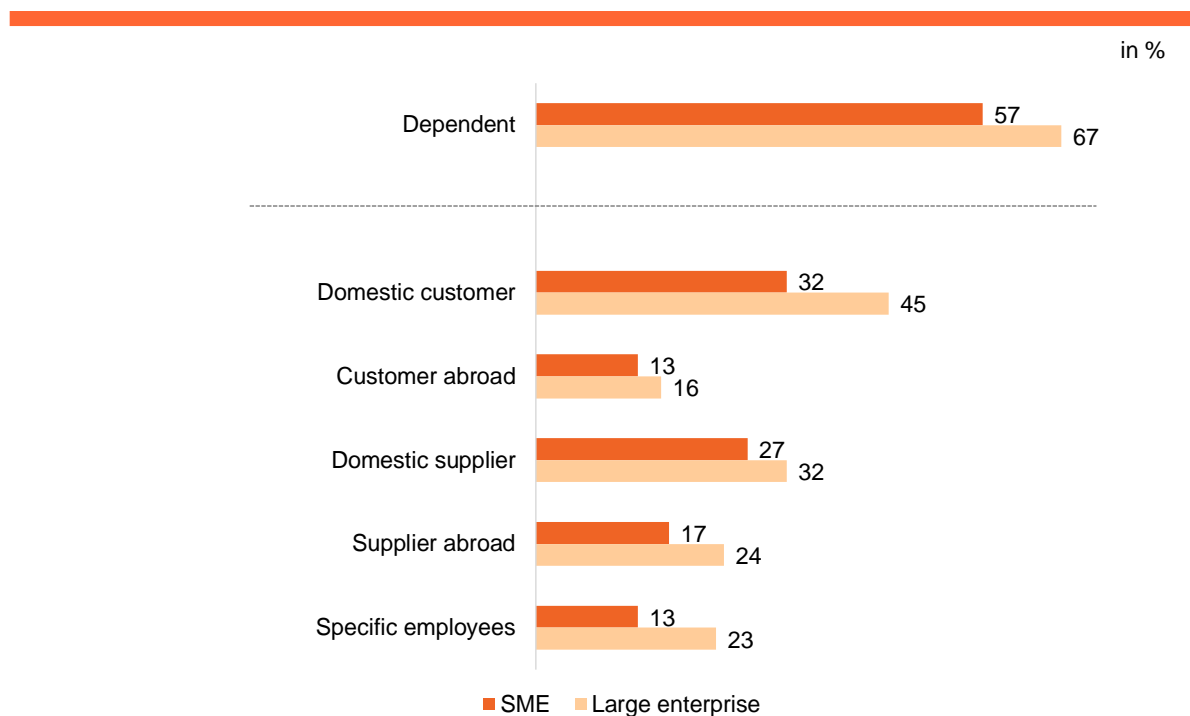
© IfM Bonn 23 2207 006

Source: IfM Bonn: Climate Change Survey (2022), special publication (share of companies; the question was only posed to companies that have not dealt intensively with the consequences of climate change in any part of their value chain; multiple answers possible), extrapolated results.

4 Value chains: Economic dependence is part of the risk assessment

The extent to which companies are indirectly affected by climate events in their value chain depends mainly on two influencing factors. On the one hand, the probability of an extreme event occurring at one part of the value chain is decisive. On the other hand, the importance of the particular market partner for the company's business activity determines whether and what influence an extreme event ultimately exerts on the company. In this respect, the coronavirus pandemic demonstrated impressively how dependent many companies are on functioning value chains (Rieger-Fels et al. 2022). How do entrepreneurs assess these two influencing factors – the estimated probability of occurrence of a climate event and the perceived economic dependence on market partners – on the indirect impact of climate risks?

Figure 7: Dependency on market partners in general and on specific market partners



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Source: IfM Bonn: Climate Change Survey (2022), special publication (share of companies; multiple answers possible for dependency on specific market partners), extrapolated results.

Almost two out of three large companies and just over one in two SMEs depend on certain market partners such as important suppliers, customers, or specific employees (see Figure 7).

At first glance, it seems surprising that the perception of dependency is more widespread among large companies. After all, they have more diversified supply chains and customers than SMEs and should, therefore, show less economic dependency. However, this is likely to reflect that their owners manage the majority of SMEs that are thus “Mittelstand” in nature (Pahnke et al. 2023). Independence is among the key characteristics of the German Mittelstand (Welter et al. 2014). While Mittelstand companies are, of course, also subject to market constraints, a previous survey already revealed that Mittelstand companies prove to be less dependent on market partners than non-Mittelstand (and thus, more frequently, large) companies (Welter et al. 2014). In other words, compared to non-Mittelstand companies, Mittelstand companies are more likely to assert their economic independence.

Entrepreneurs of SMEs assess the probability of climate events interrupting the value chain and thus affecting their business activities as high as large companies – in some cases even somewhat higher. They see the greatest risks in interruptions caused by the loss of production at domestic suppliers in Germany and abroad and logistical problems at their suppliers. The malfunction of domestic customers is a more substantial concern for SMEs than for large companies (see Figure 8).

Figure 8: Probability of the company being impacted by interruption to the value chain as a result of climate events

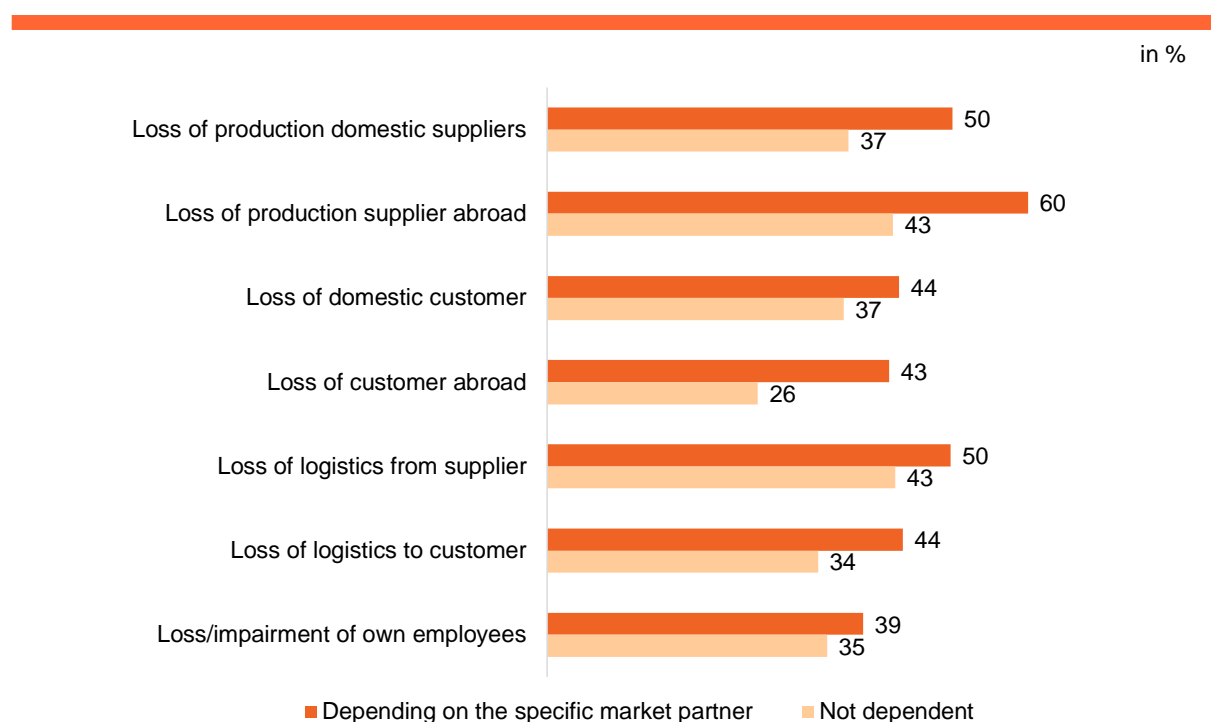


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Source: IfM Bonn: Climate Change Survey (2022), special publication, extrapolated results.

The fact that the perceived dependency plays a role in the risk assessment of companies is evident in those companies that are economically dependent on specific market partners. They assume a much higher probability that their value chain could be interrupted by climate events at precisely these parts (see Figure 9).

Figure 9: Probability of the company being affected by disruption to the value chain as a result of climate events



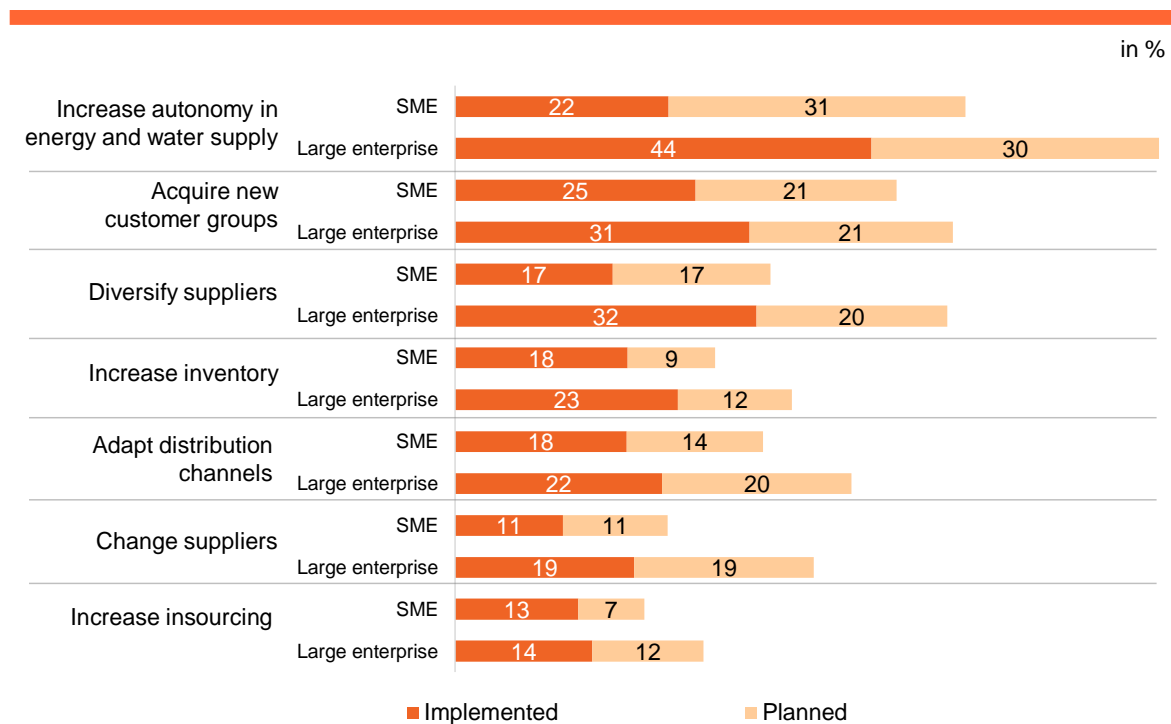
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Source: IfM Bonn: Climate Change Survey (2022), special publication, extrapolated results.

In the face of these risks, entrepreneurs do not remain inactive. Indeed, they have no influence on whether and when the business activities of a market partner are affected by climate change effects. However, they can reduce the impact a damaging event at a market partner has on their business activities through targeted measures, such as changes to their supplier and customer structure, distribution channels, or increased stockholding. First and foremost, SMEs and large companies have implemented – or are planning to implement – measures to increase their energy and water supply self-sufficiency and acquire new customer groups (see Figure 10). In addition to protecting against climate risks, the former measure certainly brings further advantages given the sharp rise in energy prices.

In contrast, there are noticeable differences between SMEs and large companies in the extent of diversification and change of suppliers. This is not surprising, however, as SMEs' diversification options are limited due to lower purchasing volumes.

Figure 10: Measures to limit business risks due to interruptions in the value chain as a result of climate events



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Source: IfM Bonn: Climate Change Survey (2022), special publication (shares of companies, multiple answers possible), extrapolated results.

5 Conclusion

Companies in Germany do perceive the increasing occurrence of extreme events owing to climate change as a threat to their business success. Most entrepreneurs deal with the consequences of climate change for their own company. Nevertheless, entrepreneurs of SMEs, in particular, do not feel sufficiently informed about the possible measures they can take to adapt their companies to climate change. Also, comparatively few entrepreneurs have so far addressed the risks to their value chain, even though many assess the risk as not insignificant. This raises the question of how entrepreneurs – especially SMEs – can be supported in their efforts to protect themselves from the consequences of climate change. Since one of the reasons for their inaction is their workload due to other operational challenges, the state could give companies greater latitude by reducing bureaucratic burdens.

The size of SMEs limits the availability of common measures, such as diversifying their value chain. This can leave entrepreneurs of SMEs viewing the risks they are exposed to from their value chains less as an "acceptable" risk than as a risk "to be accepted." Instead, they need to rely on the adaptation efforts of their market partners: If the market partners take measures to reduce their risks to the effects of climate change, the respective business partners also benefit indirectly from these measures. From a societal point of view, every adaptation effort made by an individual company generates positive externalities to protect other companies. This would justify government support for adaptation measures.

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