

»»» Innovation during the coronavirus crisis: necessity is the mother of invention

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Small and medium-sized enterprises are innovating more in response to the coronavirus crisis. Already, 27% of enterprises have introduced product, process or business model innovations. If we add those companies who are still planning to do this, that share rises to 43%. This is a remarkably high share, not just because the crisis broke out a short time ago. It shows that innovating is an important way for SMEs to tackle the crisis.

Businesses that have suffered heavy losses in turnover, above all, are focusing on innovation, with a share of 41%. Companies that have already introduced innovations in the past are also more likely to innovate in the crisis (42% compared with 30% of businesses without innovation activity in the past years). This shows that innovative enterprises are capable of responding to crises at short notice. That makes them more crisis-resilient than others.

However, innovations resulting from the coronavirus crisis are less likely to be R&D-based and are implemented in the company almost without any lead time. This allows the conclusion that they are not the result of more long-term development processes but often represent measures that can be adopted on an ad hoc basis. In return, the companies' tight financial situation is likely to actually cause more fundamental innovation projects to be spread over a longer period, reduced in scope or abandoned entirely. So there is reason to fear that the coronavirus crisis will adversely impact the development of fundamental innovations in the SME sector.

Innovation is an important mechanism for enterprises to adapt to a changing environment, become more competitive or at least hold their own against rivals and thus secure their business success into the future.¹ But do these widely accepted insights remain valid even in a severe economic crisis? Do companies see innovation as an opportunity to mitigate the impact of the crisis on their business? Do they possess the necessary resources to successfully conduct and complete innovation projects in a crisis?

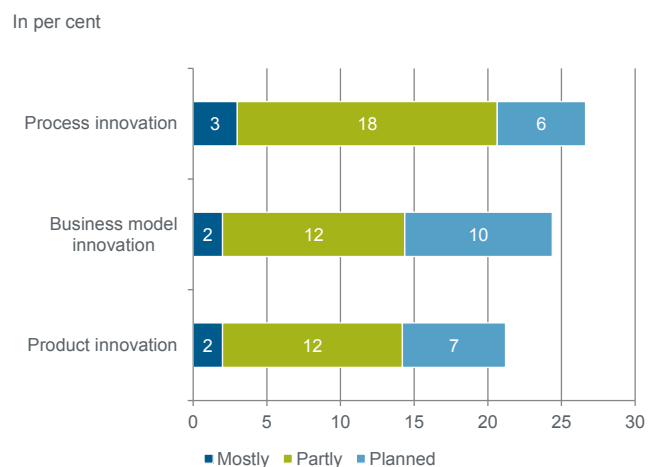
In order to answer this question, KfW Research asked small and medium-sized enterprises in a supplementary survey to the KfW SME Panel whether they have responded to the coronavirus crisis by innovating (see box for methodology). Specifically, they were asked whether and to what extent they have brought or are planning to bring into use product or process innovations or business model innovations. The wording of the questions closely followed the common definition of innovation used by the OECD², according to which an

innovation must 'differ significantly' from the unit's previous products or processes or business models in order to be defined as such.

SMEs are responding to the coronavirus crisis mainly with process innovations

Most SMEs have responded to the coronavirus crisis by bringing process innovations into their business. This includes switching to digital sales channels, for example. Extrapolated to all SMEs, 21% have improved or updated business processes. Three per cent of enterprises reported having improved or updated most of their processes, 18% improved or updated some of them. A further 6% were still planning to introduce process innovations at the time of the survey (Figure 1).

Figure 1: Nature and scope of innovations introduced because of the coronavirus crisis



Source: KfW SME Panel, own calculations

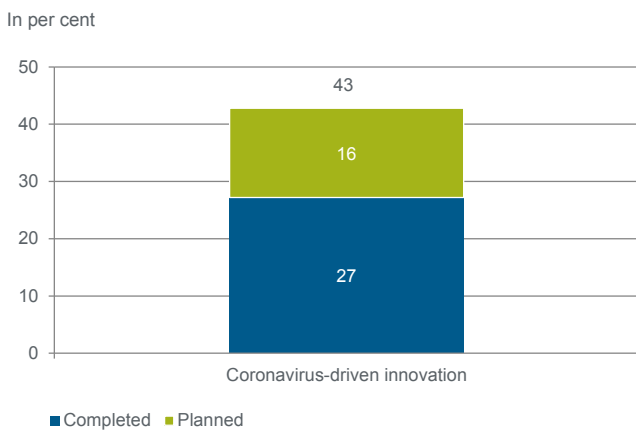
Business model innovations came in second, with 14% of SMEs reporting relevant improvements or updates. In this context, business model innovations were introduced quite independently from product or process innovations. Around half the SMEs that innovated their business model did not adopt any product or process innovation. The share of enterprises still planning to make such changes is highest, at 10%. As non-technical innovations, business model innovations (such as switching from dine-in service to takeaway) can often be implemented with relatively low financial expenditure and a short lead time – provided the business has a viable idea for adapting the business model.

New or improved products and services were brought to market by 14% of SMEs as well. The fact that a lower propor-

tion of enterprises brings in product innovations than process innovations is consistent with the notion that product innovations are more often brought to market in upswing phases.³ Besides the often-cited more complete market penetration during upswing phases, another factor that likely plays a role in the current crisis is that cost-reducing process innovations have an immediate effect on the enterprise. In contrast, new products must first find buyers before they benefit the business.

All three types of innovations have in common that the businesses have only partly updated or improved their products, processes or business models. The response option 'mostly' was provided by only 2 to 3% of SMEs in each case.

Figure 2: Coronavirus-driven innovation by SMEs



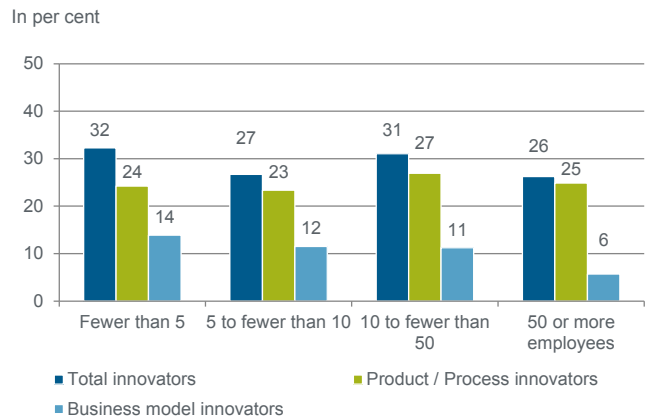
Source: KfW SME Panel, own calculations

In total, 27% of enterprises have implemented at least one of the three types of innovation. If we add those that have already planned (but not yet completed) the introduction of innovations, 43% of SMEs have brought innovations into their business in the context of the coronavirus crisis (Figure 2). That is a remarkably high share. Given the short time that has passed since the outbreak of the pandemic in Germany, the same is true for the percentage of completed innovations.⁴

High coronavirus-driven innovation activity in small businesses

This high percentage is due to the fact that, in responding to the coronavirus crisis, small businesses in particular are introducing innovations much more often than they have done in previous years. With rates between 32 and 26%, the innovator rate (including business model innovations) oscillates between enterprises of different sizes without a recognisable trend. This also applies to the introduction of product and process innovations, where shares also vary between 23 and 27%. In this aspect, innovation activity in the current coronavirus crisis clearly differs from innovation in a 'normal' economic environment.⁵ The share of business model innovations even declines with the size of the enterprise. Large SMEs with 50 or more employees in particular are less likely to innovate their business model, at 6%, than smaller enterprises (Figure 3).⁶

Figure 3: Coronavirus-driven innovation by enterprise size



Source: KfW SME Panel, own calculations

Supplementary coronavirus survey to the KfW SME Panel

The current analysis is based on a supplementary online survey conducted as part of the KfW SME Panel from 2 to 12 June 2020 to identify the current impacts of the coronavirus crisis. All enterprises that participated in the KfW SME Panel and had provided a valid email address were surveyed. As the supplementary survey was linked to the main database of the KfW SME Panel,⁷ these survey results can be extrapolated to the total population of SMEs. Crisis-driven innovation activity was surveyed by asking the following question:

‘To what extent have you or your enterprise introduced the following innovations to the business as a result of the coronavirus crisis?’

Respondents could choose from the following reply categories:

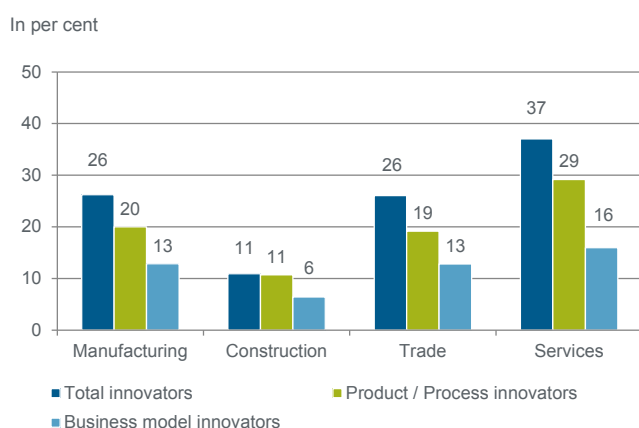
- Shift to new or improved products and services that differ significantly from previous products and services
- Shift to new or improved processes, production and distribution procedures that differ significantly from previous processes and procedures
- Adjustment of the business model (note: we define this as a new or significantly altered mode of operation of the business and the way in which it generates profits)

The following responses were possible: ‘mostly’ / ‘in part’ / ‘planned’ / ‘not at all’.

Service providers have the highest innovator rate

Significant differences in coronavirus-driven innovation are evident across economic sectors. The services sector ranks first with 37% (Figure 4). A comparison of economic sectors shows that the innovator rate here is typically mid-range. However, this also includes hospitality, travel and tourism, sectors that have been hit by the crisis particularly hard. In the relatively unaffected construction sector, on the other hand, 11% of firms have brought in innovations, the lowest share of all. In manufacturing, retail and wholesale – the latter two of which carry out relatively low innovation activity of their own in normal times – the innovator rates are between these two extremes. These findings are also reflected in the categories of product and process innovations and business model innovations.

Figure 4: Coronavirus-driven innovation by economic sector



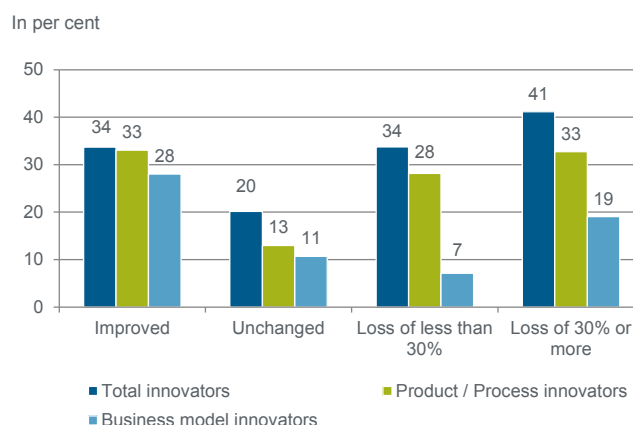
Source: KfW SME Panel, own calculations

High innovation activity in enterprises with heavy losses in turnover

A look at innovation activity as a function of coronavirus-induced losses in turnover provides an important explanation for the relatively high innovator rates (Figure 5). Enterprises whose turnover has not changed as a result of the crisis exhibit the lowest innovation activity. This applies specifically to innovation activity as a whole (20%) and to the introduction of product and process innovations (13%). In enterprises whose business activities developed better through the month of May – meaning they achieved higher turnover on the previous month – innovation activity is significantly higher in each of the types of innovation surveyed. Depending on the type of innovation, the shares ranged from 28 to 34%. This finding was to be expected on the basis of past surveys.⁸

The coronavirus crisis also provides an insight into innovation behaviour when business activity collapses, which can hardly be analysed in phases of 'normal' economic development. What we see is that businesses who have lost turnover respond to the crisis with particularly intense innovation activities. In companies who have lost up to 30% of their turnover, the overall innovator rate is 34% and the proportion of those with product/process innovations is 28%, which places them on a similar scale as expanding enterprises.

Figure 5: Coronavirus-driven innovation by development of turnover



Source: KfW SME Panel, own calculations

In enterprises that have suffered even higher losses in turnover, the innovator rates are even higher. This applies to business model innovations in particular. Here, the share rises from 7% for enterprises with losses in turnover of up to 30% to 19% in the group of enterprises that have lost 30% or more of their turnover. This observation shows that companies that suffer high losses in turnover, in particular, are more likely to introduce process rather than product innovations (26 vs 20%). Thus, with an overall rate of 41%, innovation is a coping mechanism often adopted by enterprises affected by the crisis.

SMEs that innovated in the past are also more likely to innovate in the coronavirus crisis

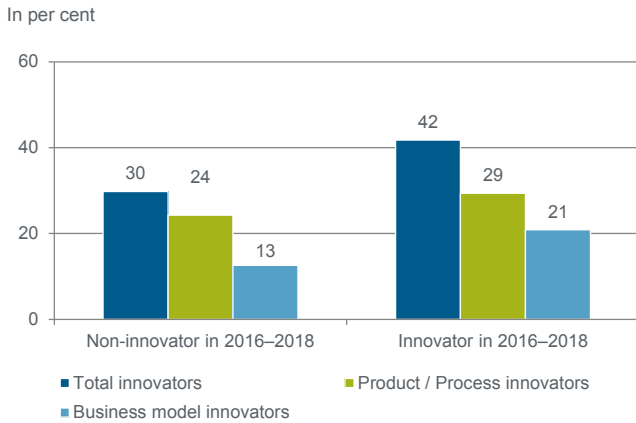
Enterprises that have innovated in the past, in particular, are capable of responding to the coronavirus crisis by innovating. In all types of innovation examined, the share of enterprises with coronavirus-driven innovations is higher among enterprises that brought forth product or process innovations between 2016 and 2018 than in those enterprises that did not innovate previously (Figure 6). This finding underscores once again that the ability to adapt to new market circumstances quickly when necessary is a company-specific ability and closely linked to its innovative potential. This applies not just to introduction of product and process innovations but to business model innovations as well. The ability to innovate thus also makes businesses more resilient in acute crises.

Own R&D is less important for innovation during the coronavirus crisis

The distinction between enterprises that conduct research and development (R&D) and those that do not helps to assess the characteristics of coronavirus-driven innovations in more detail. Thus, for innovation activity overall and for product/process innovation specifically, we see the familiar picture that companies with R&D activities bring forth innovations more often than those without R&D. However, the gap between both types of enterprises is much wider in 'normal' cyclical phases than at present. The rate of enterprises with product or process innovations among companies with R&D is typically around 2.5 to 5 times higher than in companies without R&D.⁹ Most recently, this difference was nearly

seven-fold. For the coronavirus-driven product or process innovations, this gap is merely 1.7-fold (Figure 6). Coronavirus-driven product and process innovations are therefore much less likely to be based on R&D than innovations typically are.

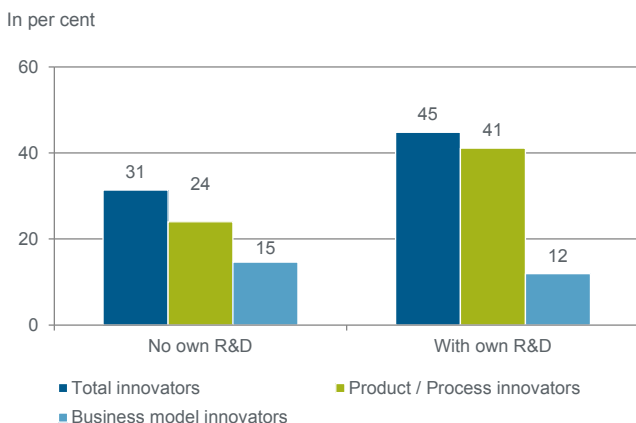
Figure 6: Coronavirus-driven innovation by past innovation activity



Source: KfW SME Panel, own calculations

This finding likely reflects the fact that innovations introduced during the coronavirus crisis are rarely based on prolonged development phases and primarily represent improvements made to products and processes on an ad hoc basis. As the crisis broke out only a short time ago, any necessary extended development phases required for such innovations would not even have been completed at this time. Another factor that would make more comprehensive development processes unlikely is that enterprises would have even greater difficulty securing finance, given their losses in turnover, than in a normal business cycle.¹⁰

Figure 7: Coronavirus-driven innovation by firms with and without own R&D



Source: KfW SME Panel, own calculations

Finally, business model innovations are introduced more often even by companies without R&D (21%) than by those with R&D (13%). This is likely due to the general nature of business model innovations, which often do not consist in technological innovations.

Conclusion

Small and medium-sized enterprises are responding to the coronavirus crisis with more innovation. Product, process or business model innovations have already been introduced by 27% of enterprises because of the crisis. If we add those that have already planned but not yet completed the introduction of innovations, 43% of SMEs responded to the coronavirus crisis by innovating. Even when measuring the innovations adopted using the relatively narrow OECD definition, we can establish that the share of enterprises that have introduced innovations is extremely high – especially given the short period that has passed since the outbreak of the crisis in Germany. This is unlike what was observed in the economic and financial crisis of 2008/2009. At the time, the innovator rate plunged from its peak of 43% in the period of 2005–2007 to 29% in 2007–2009.¹¹ By comparison, innovating currently constitutes an important approach to tackling the crisis in the SME sector.

High innovator rates can be observed particularly among service providers and small businesses. The relatively high share of innovators is due to the fact that a large portion of businesses that suffered high losses in turnover in particular focus on innovations. The proverb ‘necessity is the mother of invention’ – which cannot be confirmed during phases of normal business cycles – thus holds true in the current crisis. But what is also evident is that enterprises that have innovated in the past are also capable of doing so in the crisis. This applies not just to product and process innovations but to business model innovations as well. In this way, an innovation potential that is spread across many enterprises also reinforces the business sector’s overall resilience to crises.

However, the findings of the survey also indicate that the characteristics of the coronavirus-driven innovations differ from those carried out in normal times. R&D is much less often the basis of innovation than usual. Moreover, the short span of time that has passed since the beginning of the crisis and the realisation of innovations allows the conclusion that they are more likely to be ad hoc innovations and not so much innovations based on extended development processes. However, it must be feared that businesses’ tight financial situation will cause the more in-depth innovation projects that are based on longer-term innovation processes to be spread out over a longer period, reduced in scope or abandoned altogether.¹² Therefore, the high current innovator rate should not conceal the fact that the coronavirus crisis is jeopardising precisely the pursuit of longer-term and, hence, fundamental innovation projects in many enterprises.

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¹ Cf. Griliches, Z. (1979): Issues in assessing the contribution of research to productivity growth; *Bell Journal of Economics* 10 p. 92-116, Georgellis, Y., Joyce, P. and Woods, A. (2000): Entrepreneurial action, innovation and business performance: The small independent business, *Journal of Small Business and Enterprise Development* 7(1), p. 7-17 or Renko, M., Carsrud, A. and Brännback, M. (2009): *Journal of Small Business Management* 47(3), p. 331–369.

² Cf. OECD/EUROSTAT (2005): *Oslo Manual. Guidelines for Collecting and Interpreting Innovation Data. Third Edition. The changeover to the revised definition according to OECD/Eurostat (2018), Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th Edition, The Measurement of Scientific, Technological and Innovation Activities*, took place under the KfW SME Panel only in the current survey wave.

³ Cf. Mansfield, E.; Schwartz, M. and Wagner, S. (1981): Imitation costs and patents: an empirical study, *Economic Journal* 91, p. 907–918, Peters, B. et al. (2014): *Firm Growth, Innovation and the Business Cycle. Background Report for the 2014 Competitiveness Report*.

⁴ Cf. Zimmermann, V. (2020): **KfW SME Innovation Report 2019**. Innovator rate drops to 19%, KfW Research.

⁵ Cf. Zimmermann, V. (2020): **KfW SME Innovation Report 2019**. Innovator rate drops to 19%, KfW Research.

⁶ A look at manufacturing, commerce and services also shows that larger SMEs innovate their business models less often in these sectors.

⁷ Cf. Schwartz, M. (2019): **KfW SME Panel 2019** After a record year, dark clouds are gathering – businesses between all-time highs and recession fears, KfW Research.

⁸ Cf. Zimmermann, V. (2017): **SME innovations: Seven reasons for the decline in the share of innovators**. Focus on Economics No. 185, KfW Research, Poschen, K. and Zimmermann, V. (2014): **Falling sales expectations curb SME innovation activity in Germany**, *Economics in Brief* No. 58, KfW Economic Research, and in more detail Zimmermann, V. (2010): *Innovation und Konjunktur (Innovation and economic activity)*, *Points of View* No. 10, June 2010, KfW Economic Research.

⁹ Cf. Zimmermann, V. (2019): **KfW SME Innovation Report 2018**. Innovator rate has fallen again, KfW Research.

¹⁰ Cf. Zimmermann, V. (2019), **How SMEs fund their innovation and investment expenditure – a comparison**, Focus on Economics No. 237, KfW Research

¹¹ Cf. Zimmermann, V. (2020): **KfW SME Innovation Report 2019**. Innovator rate drops to 19%, KfW Research.

¹² Cf. BMWi (2020): *Transferinitiative Mehr Ideen – mehr Erfolge (Transfer initiative More Ideas – More Successes – our title translation, in German only)*. Results of an online survey – How is the coronavirus impacting on research and innovation in innovative enterprises? https://www.bmwi.de/Redaktion/DE/Downloads/E/ergebnisse-online-befragung-corona-forschung-innovation.pdf?__blob=publicationFile&v=12, last retrieved on 25 June 2020.