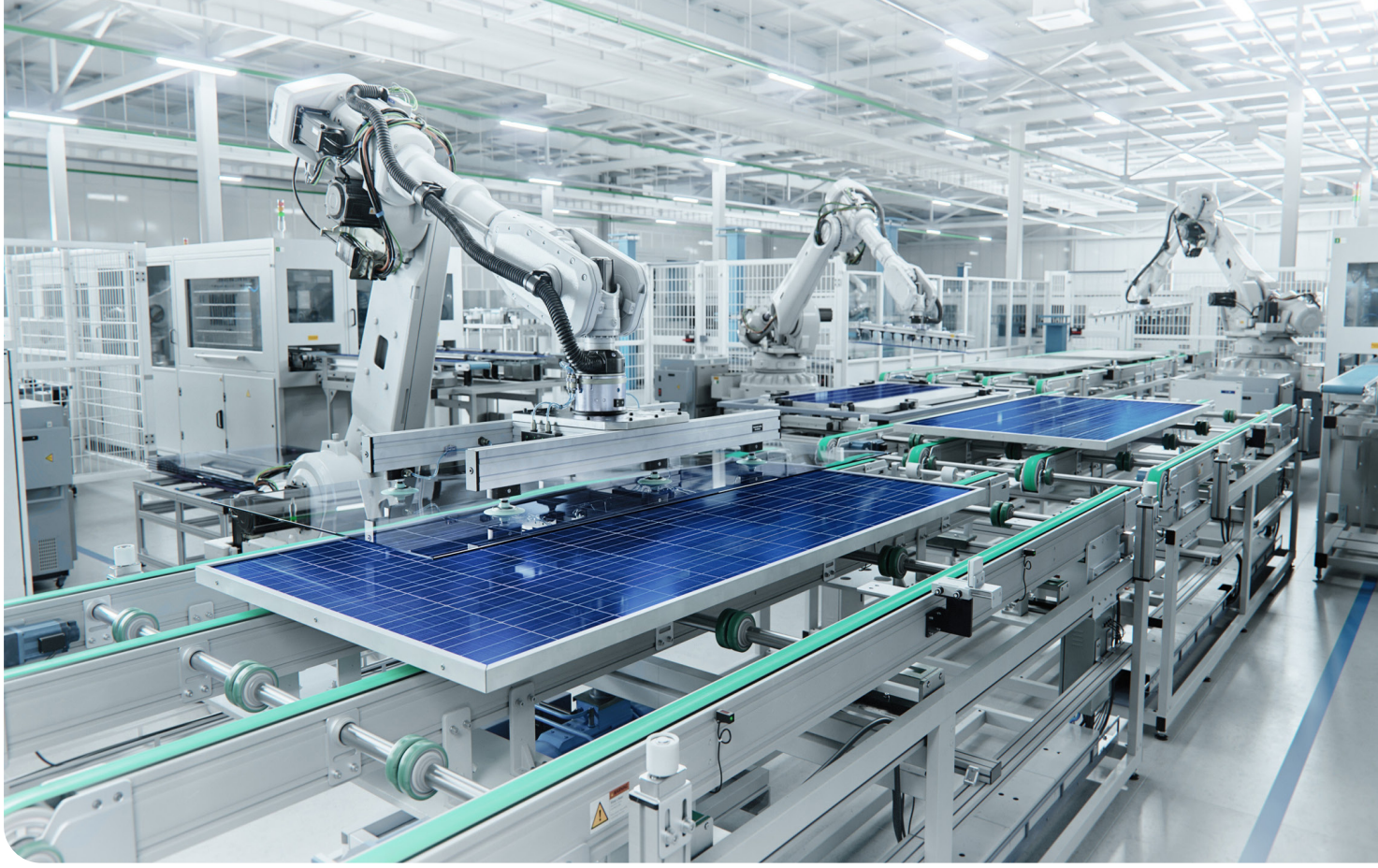

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KfW SME Innovation Report 2022

Innovator rate fell in the second year of the COVID-19 pandemic

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Contents

The innovator rate in the SME sector decreased in the second year of the COVID-19 pandemic compared with the previous year. It currently stands at 40%, a drop of two percentage points on the previous year's survey. This finding confirms earlier studies which showed that after a brief boom at the start of the pandemic, innovative activity decreased as the pandemic progressed.

All enterprise size classes experienced an at least moderate decline in the share of innovative businesses. Contrary to the general trend, businesses from the R&D-intensive manufacturing sector brought forth innovations more often in the second year of the pandemic than in the first year. This was due to the fact that businesses in this sector often have permanent innovation processes in place which did not come to a complete standstill even under the impact of the COVID-19 pandemic, enabling them to soon present completed projects again in a phase of economic recovery.

Innovation expenditure in the SME sector remained steady at just under EUR 34 billion. Small businesses with fewer than ten employees spent less on innovation than in the previous year, while large SMEs spent more. As a result, innovation expenditure was again concentrated in increasingly fewer and larger enterprises.

Skilled labour shortages and high innovation costs, but also organisational problems and high risks and difficulties in obtaining finance, were the most common barriers to innovation activity. Possible economic policy measures to support innovation activity in SMEs, especially across the board, address these central obstacles.

Easing skilled labour shortages is of great importance. All actions that improve the supply of skilled workers in the German labour market also constitute indirect innovation support measures. These can range from measures adopted in schools through vocational and academic training and education to actions aimed at mobilising the domestic labour supply and migration policy.

Expanding financial support is a particularly promising approach for the target group of innovation-oriented small and medium-sized enterprises without research and development (R&D). In the past one and a half decades, these companies in particular were increasingly confronted with constraints to innovation. At the same time, their share in innovation support received dropped at a disproportionately high rate during the period under review, so that they are now clearly underrepresented compared with their contribution to the SME innovation system. The innovation activity conducted by these enterprises is based, for the most part, on experiential skills. Their innovations usually emerge from their normal day-to-day business. Financial support for these enterprises must therefore address expenditure on product design and service design – not R&D expenditure.

There is also room for improving the skills required to carry out innovation projects. Besides easing skills shortages, relevant starting points include businesses' technical expertise, market information, ability to cooperate and strategic skills.

Here, key aspects include improvements to in-house processes of learning and understanding, modifications to the work and business organisation and a living risk culture, all of which can be supported by appropriate management practices. One option for providing relevant support could consist in combining advisory services with financial solutions.

Last but not least, a company's innovative capacity can be improved by strengthening its strategic skills. Many small businesses with well-established but not very innovative business models place little focus on the aspect of strategic business development because their day-to-day business is the main priority. Generating awareness of the strategic perspective is a key starting point here.

1. Introduction

Innovation is a driver of growth and prosperity

From a macroeconomic perspective, innovation is the driver of economic and productivity growth and accelerates structural change.[1] In developed economies it is therefore regarded as a guarantor for safeguarding and increasing prosperity.[2] Germany in particular, a highly developed country with few natural resources to call its own, must therefore secure its technological leadership or, where possible, take a leadership role in key business areas. Innovation is also important because it contributes to addressing societal challenges such as climate change, healthcare provision and the consequences of demographic change.

From a business perspective, innovating is an important strategy for developing a competitive position in the market. It creates new sales potentials and improves the use of resources. Numerous studies confirm that innovation increases enterprises' headcount, turnover, returns and productivity.[3] Successful innovation activity also benefits the employees of the enterprises involved. Innovative businesses pay higher salaries[4] and offer more stable employment relationships, even if they reduce employment overall.[5]

The German innovation ecosystem in international comparison

Germany's innovation ecosystem is generally quite well positioned in international innovation ranking indices. In the Global Innovation Index, for example, Germany ranks 8th of 132 countries. Other rankings and additional studies for Germany paint a similar picture.[6]

The strengths of Germany's innovation ecosystem consist in a strong research sector and extensive R&D activities in large enterprises. Over the past one and a half decades, Germany was able to make significant progress in R&D activities in particular.[7]

The transfer of knowledge and technology is particularly successful between large enterprises that actively conduct R&D in traditional business sectors and academia. In new technologies and start-ups, however, there is room for improvement. Furthermore, the concentration of innovation activity in increasingly fewer businesses is a sign of weaknesses in the diffusion of knowledge, particularly to small and medium-sized enterprises.[8]

Innovation is more than research and development

Innovations are more than just novelties based on research and development (R&D), such as, for example, new methods for the separation of sewage sludge or measuring devices for online drinking water analysis. Small and medium-sized enterprises, in particular, often develop innovations out of the normal production process or in cooperation with customers and suppliers without conducting any research ('learning by doing, using and interacting').[9] Examples of such innovations include hygiene protection shields with an inbuilt acoustic field, special glasses for people with retinal diseases or new stage technology characterised by easy assembly and low weight. Innovating can also mean adapting products and services to specific customer requests or introducing new services such as delivery. New or improved products (including services), processes, forms of workflow or business organisation as well as marketing methods are regarded as an innovation when they are new or significantly improved in essential aspects for the enterprise adopting it.[10]

According to calculations by the Mannheim Innovation Panel, small and medium-sized enterprises without own R&D generate 34% of the turnover achieved with product innovations in the SME sector and account for 42% of the cost reductions brought about by process innovations.[11] Other scientific studies also confirm that businesses without own R&D can be successful innovators. [12] The further development and adaptation as well as diffusion of new technologies by businesses therefore plays an important role. Not least, it secures the competitiveness of the economy as a whole.

Expanded OECD innovation definition now in use

KfW has previously reported about the development of innovation activity in terms of technical innovation – in accordance with the accepted OECD definition.

In a long-term analysis, the rate of technical innovators in the SME sector decreased by more than half (-56%) from its peak level in the 2004–2006 period to the 2016–2018 period. Small businesses and businesses without own R&D, in particular, scaled back their innovation activities. Thus, the share of technical innovators in companies with fewer than five employees dropped from 80 to 69% during that period. The share of innovative enterprises without own R&D among all technical innovators decreased from 74% in the 2009–2011 period to 66%.

In 2018 the OECD revised its innovation definition, which led to a broader concept of innovation.Since the 2018–2020 period, KfW Research has also recorded innovators in line with this expanded definition.

2. Development of innovation activity during the COVID-19 crisis

Innovator rate fell in the second pandemic year

Under the new OECD definition, the share of innovative enterprises in the SME sector currently stands at 40% (Figure 1).[13] The innovator rate measures the share of enterprises that have introduced at least one innovation in the past three years. Under the new OECD definition, the innovator rate now includes not just companies with technical innovations but those with marketing and organisational innovations (box: New OECD innovation definition). A direct comparison with the results of the previous period 2018–2020 is therefore not possible.

New OECD innovation definition

The accepted definition of innovation was developed by the OECD. It forms the basis for measuring innovation activity in the EU and many other countries. It is also used in the KfW SME Panel.

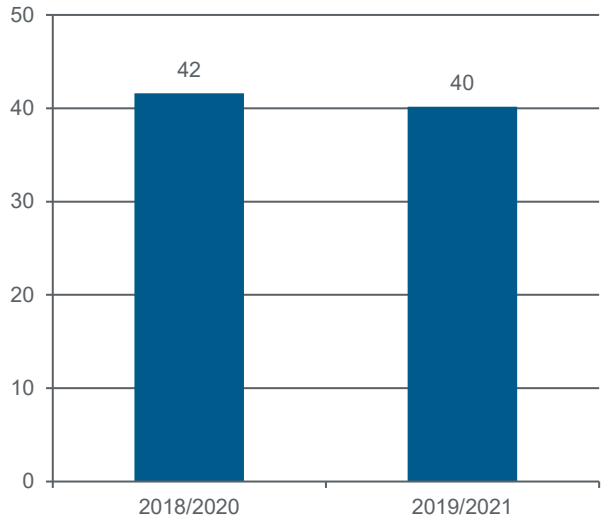
The OECD changed the definition of innovation in 2018.[14] New marketing methods and new organisational methods now also count as product or process innovations. The vast majority of marketing and organisational innovations are classified as process innovations. Substantial changes in design, however, are considered to be product innovations.

The KfW SME Panel took this definition into account for the first time in the 2021 survey. The expansion of the definition of innovation means that the share of innovators measured is typically higher, for example in an unchanged economic environment, than before the definition was modified.

Thus, there are currently some 1.5 million innovative small and medium-sized enterprises. In the second year of the pandemic, the share of innovative enterprises fell slightly compared with the previous survey (-2 percentage points). This finding confirms past studies conducted on the basis of the supplementary surveys to the KfW SME Panel conducted during the past years, which found that after an initial innovation surge, companies that were in a tight liquidity situation and those expecting a prolonged crisis, in particular, scaled back their innovation activities in the further course of the crisis.[15]

Figure 1: Development of innovators among SMEs

in per cent



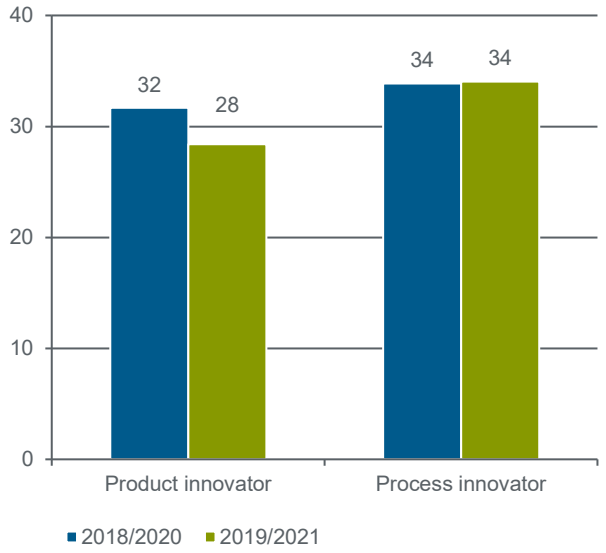
Note: Figures extrapolated to the number of enterprises; new OECD definition: Innovators inclusive of marketing and organisational innovations.

Source: KfW SME Panel, own calculations

The decline is due to the fact that enterprises are particularly reluctant to bring product innovations to market in a weak business cycle. After all, product innovations tend to perform poorly in the market in such phases.[16] It is also possible that working under pandemic conditions hampered actual innovation activity, for example because infection control measures made collaboration within the company and with business partners difficult (because of hygiene requirements and staff working remotely, for example). A major factor that likely played a role in the decline was that the longer the crisis lasted, the more businesses lacked the financial resources they needed to carry out comprehensive innovation activities. A large portion of SMEs recorded turnover losses which reduced their liquidity. As described above, those businesses in particular scaled back their innovation activities as the crisis progressed.[17]

Figure 2: Development of SME product and process innovators

In per cent



Note: Figures extrapolated to the number of enterprises; new OECD definition: Innovators inclusive of marketing and organisational innovations.

Source: KfW SME Panel, own calculations

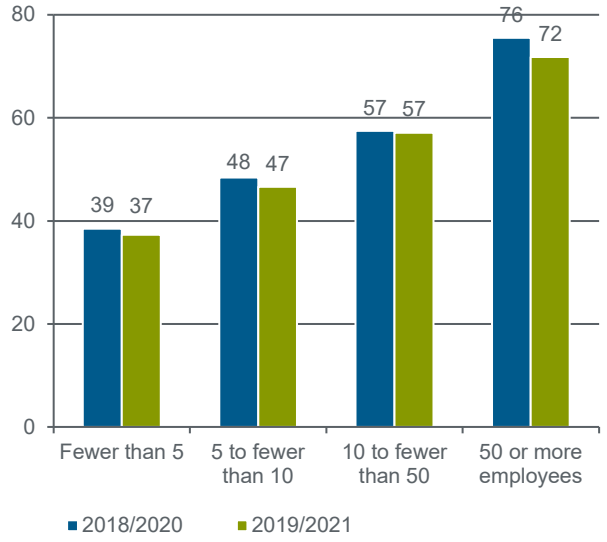
Pandemic put the brakes on product innovation

With regard to the distinction between product and process innovators, the corresponding shares are 28 and 34%, respectively (Figure 2). In other words, a good one million SMEs have recently brought new or improved products to market. Just under 1.3 million modernised their production processes or introduced organisational innovations or new marketing methods. It is not surprising that the share of both product and process innovators is higher than in the survey conducted using the old OECD definition.[18] After all, the expanded definition with the previously excluded marketing and organisational innovations and product design innovations applies to both process and product innovations.

The product innovator rate fell by 4 percentage points since the previous survey. This attests to the already described important role of the unfavourable economic environment for product innovation that prevailed during the pandemic. Most product innovations consist in incremental enhancements or imitative innovations. Only around 7% of small and medium-sized product innovators generate new-to-market innovations. Eighty-two per cent of innovative SMEs do not conduct any R&D of their own. Most of the innovative activities of SMEs thus consist in disseminating and adapting new technologies and methods to customer preferences or specific fields of application, for example.

Figure 3: Innovators by company size

In per cent



Note: Figures extrapolated to the number of enterprises; new OECD definition: Innovators inclusive of marketing and organisational innovations.

Source: KfW SME Panel, own calculations

Innovator rate declined among businesses of all size classes

With respect to company size, the new innovation definition also paints the familiar picture that the share of innovators grows with the size of the enterprise. At 72%, the share of innovators in the group of companies with 50 or more employees is today significantly higher than among small businesses with fewer than five employees (37%, see Figure 3).[19] This is because small businesses have fewer resources and cover smaller markets.[20] That makes it harder for them to innovate and reduces profits which they could generate from innovating. These disadvantages are exacerbated by the fact that innovation projects often cannot be split up at will.[21] Minimum project sizes and high fixed costs mean that innovating places a higher financial strain on small enterprises than on larger ones.[22]

Compared with the previous year, the share of innovative enterprises has decreased at least moderately in all enterprise size classes. This underscores the fact that irrespective of company size, conditions for innovating were unfavourable for all businesses in the second pandemic year.

R&D-intensive manufacturing and knowledge-based services have the highest innovator rate

An analysis by sector shows that R&D-intensive manufacturers (for example, in mechanical engineering, electronic technologies and the chemical industry) continue to generate the most innovations (Figure 4).

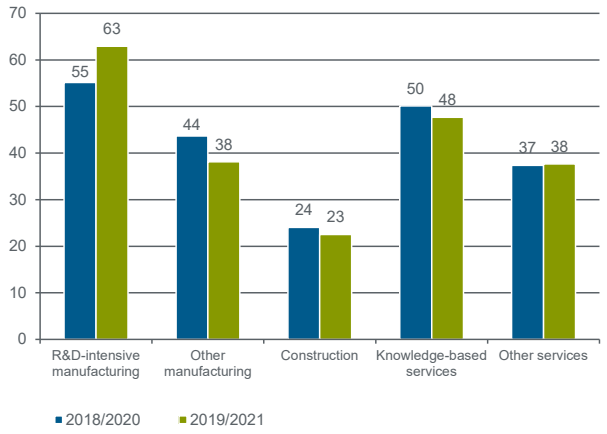
The share of innovative enterprises in these sectors currently stands at 63%. Knowledge-based service providers such as IT and information service businesses, law firms, tax accountants and management consulting firms come in second with an innovator share of 48% each. They are followed by other manufacturers, which comprise the food and animal fodder production and metal products industries, and other (non-knowledge-based) services such as hospitality, transport and storage with 38% each, as well as construction with 23%.

Bucking the trend, R&D-intensive manufacturers increased share of innovative enterprises

The development of the innovator rate by economic sector paints a mixed picture. While the share of innovative enterprises in construction and other (non-knowledge-based) services remained nearly steady, the innovator rate in knowledge-based services and other manufacturing evolved in line with the overall trend in the second pandemic year.

Figure 4: Innovators by industry

In per cent



Note: Figures extrapolated to the number of enterprises; new OECD definition: Innovators inclusive of marketing and organisational innovations.

Source: KfW SME Panel, own calculations

The revival of innovation activity in R&D-intensive manufacturing against this trend is likely due to the fact that these enterprises have permanent innovation processes in place, so that despite having reduced their activities in the first pandemic year, they were able to bring to the market completed innovation projects or develop their internal processes early once the pandemic-induced burdens eased. Past studies had shown that businesses that were already innovating before the pandemic, in particular, were also more likely than other enterprises to continue innovating.[23]

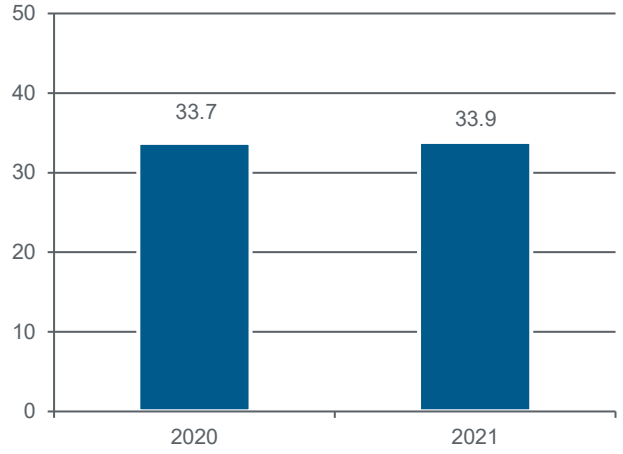
3. Development of innovation expenditure

Innovation expenditure was steady in the second pandemic year

Innovation expenditure remained steady in the second pandemic year. Aggregate innovation expenditure of SMEs currently sits at just under EUR 34 billion (Figure 5). Innovation expenditure includes all spending on innovation including personnel costs and capital expenditure related to developing innovations and bringing them into the market.[24] The likely reason for this steady development was that while many companies scaled back their innovation activities well into the year 2021, pioneering firms with high innovation expenditure in particular stepped up their innovation efforts again in the course of the year. Thus, overall innovation expenditure remained steady.

Figure 5: Aggregate innovation expenditure in the SME sector

in EUR bn



Note: Values extrapolated from the number of employees, new OECD definition: Innovation expenditure inclusive of marketing and organisational innovations.

Source: KfW SME Panel, own calculations

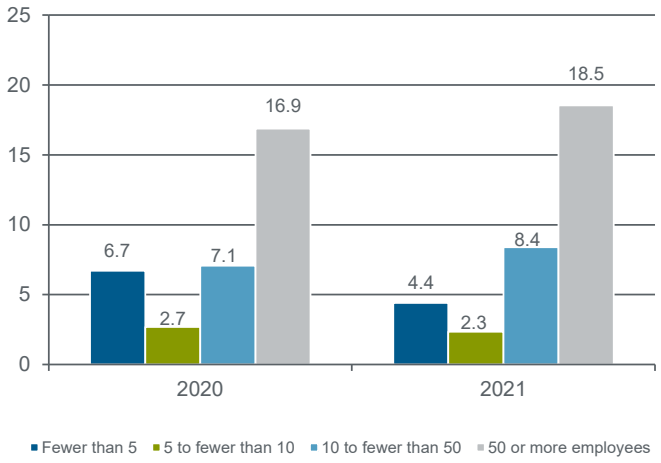
Large SMEs' innovation expenditure has increased

Large SMEs with 50 and more employees account for more than half the innovation expenditure in the SME sector – EUR 18.5 billion. Enterprises with ten to fewer than 50 employees rank second with EUR 8.4 billion, followed by micro-businesses that have fewer than five employees with EUR 4.4 billion (Figure 6). Compared with the survey of the previous year, smaller enterprises with up to ten employees reduced their innovation expenditure.

Micro-businesses with fewer than five employees in particular spent more than EUR 2 billion less than in the previous year. This finding confirms past studies which found that small businesses in particular scaled back their innovation activities during the COVID-19 pandemic.[25] At the same time, companies with ten or more employees are currently spending more on innovation.

Figure 6: Aggregate innovation expenditure by enterprise size

in EUR bn



Note: values extrapolated from the number of employees, not counting enterprises of the remaining economic sectors, new OECD definition: Innovation expenditure inclusive of marketing and organisational innovations.

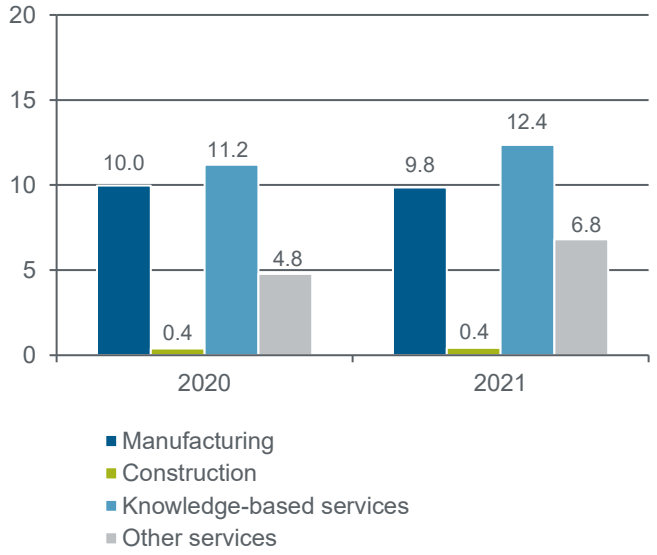
Source: KfW SME Panel, own calculations

Knowledge-based services account for highest aggregate innovation expenditure

At sector level, knowledge-based service businesses spent the highest amounts on innovation with EUR 12.4 billion, closely followed by manufacturers with EUR 9.8 billion. Knowledge-based services represent 41% of SMEs, the largest share of all enterprises in this group. Manufacturers, on the other hand, make up only 6% of SMEs. Thus, in relation to the number of enterprises, R&D-intensive manufacturers in particular inject high financial resources into their innovation processes.

Figure 7: Aggregate innovation expenditure by sector

in EUR bn



Note: values extrapolated from the number of employees; not counting businesses with fewer than five employees, new OECD definition: Innovation expenditure inclusive of marketing and organisational innovations.

Source: KfW SME Panel, own calculations

Ranked third at some distance are other services, with just under EUR 7 billion. Innovation expenditure was lowest in the construction sector, at EUR 0.4 billion (Figure 7), but remained almost unchanged on the previous year in both manufacturing and construction, while increasing slightly in the services sector.

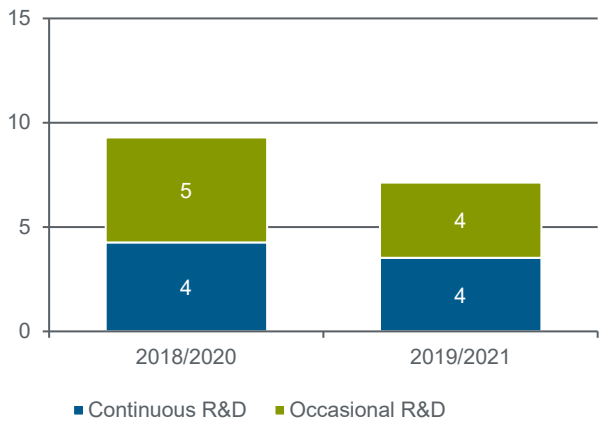
4. Development of R&D activity

SMEs rarely conduct own R&D

As mentioned, many innovations by small and medium-sized enterprises are not based on their own R&D. R&D is defined as 'systematic creative work aimed at expanding existing knowledge [...] and using it with the objective of finding new potential applications'.[26] Instead, it is common for SMEs to develop innovations on the basis of experiential knowledge that emerges from the normal production process or in collaboration with customers and suppliers.[27]

Figure 8: Enterprises with research and development activities of their own

In per cent



Note: Figures extrapolated to the number of enterprises.

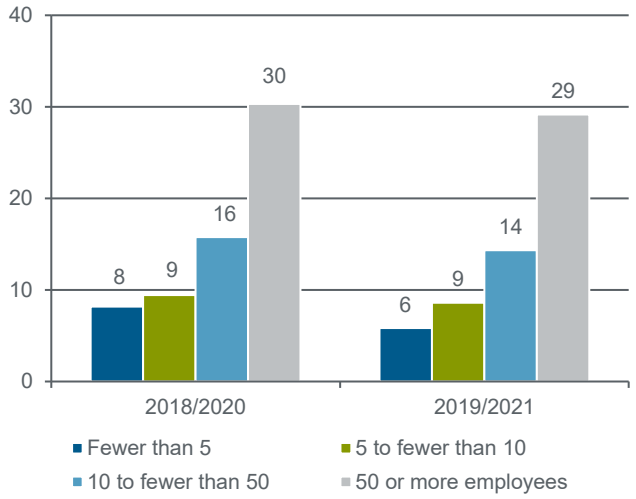
Source: KfW SME Panel, own calculations

In the 2019–2021 period, a mere 4% of SMEs conducted R&D continuously and a further 4% occasionally (Figure 8). In absolute figures, that means just under 300,000 SMEs conducted R&D of their own. The share of businesses with occasional R&D activities fell by 1 percentage point on the previous survey. This decline is also likely to be associated with the impact of the COVID-19 pandemic. In terms of innovation activity, that means a total of around 82% of SMEs introduce new or improved products and processes without conducting their own R&D.

The decline in R&D activity in the SME sector is nevertheless cause for concern because these businesses are, to a certain extent, at the spearhead of innovation in the SME sector. With the high degree of novelty introduced by their innovations,[28] these enterprises often bring new ideas to market, thereby driving technological progress and structural transformation. The coming years will reveal whether the current decline is a response to cyclical conditions or whether the share of companies with R&D is falling for structural reasons.

Figure 9: Enterprises with own (occasional or continuous) R&D by size

Shares in per cent



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Share of SMEs engaged in R&D is falling across almost all size classes

Large SMEs are much more likely to conduct their own R&D than other enterprises. In the period under review, 29% of SMEs with 50 or more employees conducted their own R&D, compared with 6% of enterprises with fewer than five employees. In other words, large SMEs conduct more than twice as much R&D as enterprises with ten to fewer than 50 employees. Among large SMEs, that share is actually nearly five times higher than in enterprises with fewer than five employees. This is an indication that larger enterprises undertake innovation activities more systematically and that their innovation processes are more permanent.[29]

The decline in the share of companies conducting R&D can be observed in almost all enterprise size classes. The drop was slightly steeper in small businesses with fewer than five employees than among larger SMEs. Only among businesses with five to fewer than 10 employees did the share remain unchanged at 9% (Figure 9).

R&D-intensive manufacturing SMEs are most likely to conduct own R&D

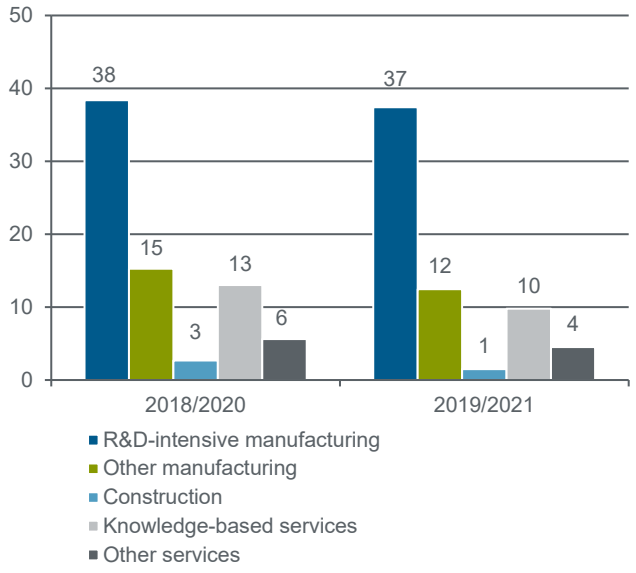
R&D-intensive manufacturers are by far the most active in conducting own R&D, leading all other sectors by a wide margin (Figure 10). At present, 37% of SMEs in this sector continuously or occasionally conduct R&D of their own. This rate is higher than in the other eco-

nomic sectors and forms the basis for the higher share of innovators. In-house R&D activity is likely to boost the generation of technical innovations in particular.

The shares of SMEs conducting their own R&D differ little between other manufacturing and knowledge-based services. Both sectors rank second and third, with similar values of 12 and 10%. An even lower percentage of other service providers conducts own R&D. R&D is least common in the construction industry. The shares of businesses conducting their own R&D dropped slightly on the previous period in all sectors.

Figure 10: Enterprises with own (occasional or continuous) R&D by sector

Shares in per cent



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

5. Conclusion

Key findings on the development of innovation activity in the SME sector

The OECD's broader definition of innovation, which has been in use for a few years, also leads to a higher share of SME innovators. The findings of past surveys, which are based on the old definition, can no longer be directly compared with those of current surveys.

The share of innovators among SMEs currently stands at 40%. It has fallen since the previous year's survey. This finding confirms earlier studies which showed that after a brief boom at the start of the pandemic, innovation activity decreased in the further course of time. All enterprise size classes experienced an at least moderate drop in the share of innovators. Bucking the general trend, businesses from the R&D-intensive manufacturing sector brought forth innovations more often in the second year of the pandemic than in the first year. Enterprises in this sector in particular often have permanent innovation processes in place that have likely helped them present completed projects early.

Innovation expenditure in the SME sector remained steady at just under EUR 34 billion. This finding masks the trend that small businesses with fewer than ten employees spent less on innovation, while larger enterprises slightly increased their innovation expenditure in the second pandemic year. The process of innovation expenditure concentrating in increasingly fewer and larger enterprises, which could already be observed before, is therefore continuing.

The previous KfW SME Innovation Report already found that enterprises that had suffered severe liquidity shortages and expected the crisis to continue for a long time were most likely to reduce their innovation efforts. This is evidence that during the COVID-19 crisis, financing innovations presented a particularly formidable challenge for businesses.

Differentiated innovation promotion in Germany

The analysis of the promotional landscape for innovation activity in Germany shows that a differentiated offering of support measures already exists which addresses all phases and all actors in the innovation process.[30] Major gaps in the promotional landscape are hardly identifiable. However, the scope of promotion in individual segments varies, so that different potentials for further enhancing the promotional schemes on offer can be identified. Segments that have previously been addressed less strongly and the key hurdles for innovation activity in particular are starting points for economic policy.

Barriers to innovation in the SME sector

Over the past one and a half decades, the impacts of constraints to innovation have grown in almost all segments of the SME sector. This applies to the group of innovators without R&D to a particular degree. What has not changed, however, is that enterprises with R&D activities are the ones most likely to be impacted by constraints. This is probably because they are more likely to encounter barriers and difficulties due to their more ambitious competition strategies and more extensive innovation activities. The focus of the federal government's promotional activity therefore lies on the early stages of the innovation process, and typically on R&D promotion. An aspect that also supports this promotion is that R&D-based innovation projects can be expected to have the greatest spill-over effects.

Capacity and financing-related constraints top the list of innovation barriers in the SME sector. Skilled labour shortages and the high cost of innovating are the most frequent obstacles. However, organisational problems as well as high risks and difficulties in obtaining finance are also mentioned often.[31]

Possible starting points for boosting innovation activity in the SME sector

Ease skilled labour shortages

Easing skilled labour shortages is of particular importance. All actions that improve the supply of skilled workers in the German labour market indirectly constitute innovation support measures. These measures may extend from the school classroom (for example by reducing secondary school dropout rates and improving knowledge of basic skills by supporting students with learning difficulties) through occupational and academic training and education to the mobilisation of the domestic labour supply (e.g., by increasing the workforce participation of women) and migration policy (by taking in workers with skills that are in high demand).

Improve funding opportunities

Financing-related barriers present a hurdle for all SMEs. Financing difficulties can be addressed by expanding the level of R&D and innovation promotion in the context of tried and tested promotional measures. The special role of businesses that undertake continuous research activities suggests that comprehensive incentives should be provided to ensure that businesses maintain their existing R&D capacity. Broadly applied measures such as the research grant that was introduced in 2020 can be effective instruments.

Other promotional financing approaches are low-threshold promotional modules for the target group of innovation-oriented small and medium-sized enterprises without R&D. In the past one and a half decades, these companies in particular were increasingly confronted with constraints to innovation. At the same time, their share in innovation promotion dropped at a disproportionately high rate during the period under review, so that they are today clearly underrepresented compared with the contribution they make to the SME innovation ecosystem.[32]

The vast portion of the innovation activity of these enterprises is based on experiential skills that are acquired through informal processes of learning and understanding and arise from day-to-day working ('learning by doing, using and interacting').[33] Financial support for these enterprises therefore should not target R&D expenditure but their expenditure on product design and service design.

Build innovation skills

The skills required to carry out innovation projects also have room for improvement.[34] This can also help to inspire the businesses in question to initiate R&D activities. To achieve this, it will be necessary to address the specific prerequisites which businesses must fulfil to carry out innovation projects and initiating R&D. This means acquiring missing technical expertise and market information, as well as strategic capabilities and developing the ability to cooperate with academia as well as with suppliers and customers.

Important sources from which enterprises without own R&D draw their innovative strength are external knowledge and informal learning processes based on, for example, intensive exchange within the enterprise and a corresponding business organisation.[35]

With respect to improving access to external knowledge, integration into regional innovation systems plays an important role because the enterprises referred to here, in particular, often act locally, and these innovation systems differ from one region to another.[36] In-company processes of learning and understanding can be improved by modifying the work and business organisation[37] and by appropriate management practices. They can be aimed at facilitating knowledge flows within the enterprise, giving workers scope for decision-making and introducing ideas and providing incentives for generating innovations. Not least, they also include a living risk culture that promotes new ideas and accepts failure.[38] One option for supporting these aspects could consist in combining advisory services with financial solutions for their implementation.

Another approach would be to support the development of capacities for organising innovation activities in small and medium-sized enterprises. This should also benefit enterprises without own R&D in particular. The primary aim here is to increase the availability of staff who are able to design and drive innovation projects. Important aspects here include promoting continuing education schemes around innovation management and more closely integrating innovation aspects into vocational education and training.[39]

Improve strategic skills

In addition, strengthening strategic capabilities can increase the innovative capacity of businesses. Enterprises without an innovation orientation are the main target group here. Many small businesses with well-established but not very innovative business models pay little attention to the aspect of strategic business development because their day-to-day business is the main priority. Approaches aimed at improving strategic capabilities include, among other things, awareness raising campaigns that highlight specific role models and best-practice examples, consolidating low-threshold information offers for SMEs on innovation strategies and innovation management, continuous monitoring and further development of the quality of advisory services in existing advisory programmes and infrastructures.

Helpful approaches can also include explicitly addressing strategic aspects in the context of innovation promotion, such as an innovation audit that can be used in modular form and accounted for as a reimbursable cost.[40]

Annex

The structure of innovative SMEs

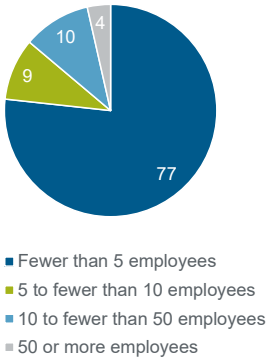
The SME sector, according to KfW's definition, covers all enterprises in Germany whose annual turnover does not exceed EUR 500 million. By this definition, around 3.79 million SMEs exist in Germany. The SME sector thus accounts for 99.95% of all enterprises in Germany. Around 1.5 million of these enterprises are innovators.

The majority of innovative SMEs are small enterprises. The majority of innovative SMEs (1.2 million enterprises, or 77%) have fewer than five employees. This high proportion of small innovators is due to the overall structure of small and medium-sized enterprises. Eighty-two per cent of SMEs have fewer than five employees. The manufacturing industry accounts for 7% of innovators while the service sector represents 88%.

Eighty-two per cent of innovative SMEs do not conduct any R&D of their own. A mere 9% research continuously and a further 9% undertook own R&D activities only occasionally in the past three years.

Figure 11: Innovative SMEs by company size

In per cent

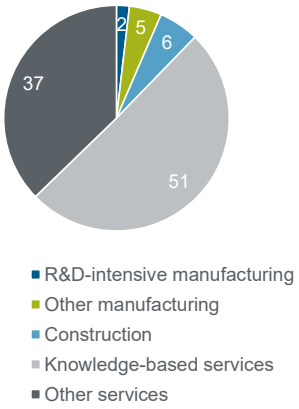


Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Figure 12: Innovative SMEs by industry

In per cent

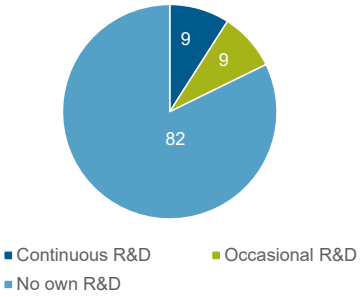


Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Figure 13: Innovative SMEs by own R&D activity

In per cent



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

KfW SME Panel

The KfW SME Panel (KfW-Mittelstandspanel) has been conducted since 2003 as a recurring postal survey of small and medium-sized enterprises in Germany with annual turnover of up to EUR 500 million.

With data based on up to 15,000 companies a year, the KfW SME Panel is the only representative survey of the German SME sector, making it the most important source of data on issues relevant to the SME sector. Due to the fact that it is representative of all SMEs of all sizes and across all branches in Germany, the KfW SME Panel offers projections for even the smallest companies with fewer than five employees. A total of 10,796 SMEs took part in the current wave.

Analyses of long-term structural developments in the SME sector are performed on the basis of the KfW SME Panel. It gives a representative picture of the current situation and the needs and plans of SMEs in Germany. It focuses on annually recurring information on companies' performance, investment activity, innovation and digitalisation activities and financing structure. This tool is the only way to determine quantitative key figures for SMEs such as investment spending, loan demand and equity ratios.

The basic population used for the KfW SME Panel comprises all SMEs in Germany. These include private-sector companies from all sectors of the economy with annual turnover of not more than EUR 500 million. The population does not include the public sector, banks or non-profit organisations. Currently there are no official statistics providing adequate information on the number of SMEs or the number of people they employ. The survey used the German Company Register (Unternehmensregister) and the official employment statistics (Erwerbstätigenrechnung) to determine the current population of SMEs as a starting point.

The KfW SME Panel sample is designed in such a way that it can generate representative, reliable data that are as precise as possible. The sample is split into four groups: type of promotion, branches, firm size as measured by the number of employees, and region. In order to draw conclusions on the basic population based on the sample, the results of the survey are weighted/extrapolated. The four main stratification criteria are used to determine the extrapolation factors. These factors look at the distribution in the net sample (in line with the four group characteristics) in relation to their distribution in the population as a whole. Overall, two extrapolation factors are determined: an unlinked factor for extrapolating qualitative parameters to the number of SMEs in Germany, and a linked factor for extrapolating quantitative parameters to the number of employees in SMEs in Germany.

The survey is conducted by the Financial Services Division of GfK SE on behalf of KfW Group. The project received expert advice from the Leibnitz Centre for European Economic Research (ZEW) in Mannheim. The main survey of the 20th wave was conducted in the period from 10 February 2022 to 17 June 2022.

Further information can be obtained at **www.kfw-mittelstandspanel.de**.

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[5] Cf. Dauth et al. (2017): German Robots – The Impact of Industrial Robots on Workers, IAB Discussion Paper 30/2017.

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[8] Cf. Zimmermann, V. (2022), Types of SMEs in the innovation system: activities, constraints and successes, Focus on Economics No. 394, KfW Research, and Rammer, C. et al. (2022): Drivers and Barriers for Innovation in the German SME sector, study commissioned by KfW Group, Leibniz Centre for European Economic Research.

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[10] Cf. OECD and Eurostat (2018) (publishers), Oslo Manual 2018. Guidelines for collecting, reporting and using innovation data. OECD Publishing.

[11] Cf. Zimmermann, V. (2022): Types of SMEs in the innovation system: activities, constraints and successes, Focus on Economics No. 394, and Rammer, C. et al (2022): Drivers and Barriers for Innovation in the German SME sector, study commissioned by KfW Group.

[12] Cf. Thomä, J. and Zimmermann, V. (2020), Interactive learning — The key to innovation in non-R&D-intensive SMEs? A cluster analysis approach, Journal of Small Business Management 58(4):747-776, and Zimmermann, V. and Thomä, J.: (2019), Interactive learning or R&D: How do small and medium-sized enterprises generate innovations?. Focus on Economics No. 264, KfW Research, Zimmermann, V. and Thomä, J. (2019), Business performance of different types of small and medium-sized innovators, Focus on Economics No. 265, or Rammer, C., Czarnitzki, D. and Spielkamp, A. (2009): Innovation success of non-R&D performers: substituting technology by management in SMEs. Small Business Economics 33(1), p. 35–58.

[13] The KfW SME Panel captures whether an enterprise has introduced innovations for a three-year period using the method commonly applied across Europe.

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

[23] Cf. Zimmermann, V (2021): KfW SME Innovation Report 2020. Coronavirus crisis is slowing down innovation, KfW Research.

[24] This includes expenditure on internal and external research and development (R&D), innovation-related expenditure on machinery, equipment, software and external knowledge (e.g. patents and licenses). It also includes expenditure on product design, construction, service design and preparation for the manufacture and sale of innovations. Expenditure on training conducted in the context of innovations and their introduction into the market is included as well.

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[29] Cf. Zimmermann, V. (2017): KfW SME Innovation Report 2016: Innovation is concentrated in increasingly fewer enterprises, KfW Research.

[30] Cf. Kulicke, M.; Beckert, B. and Stolz, C. (2023): Studie zum Förderfeld „Digitalisierung und Innovation" im Auftrag der Kreditanstalt für Wiederaufbau (KfW) (*Study on the promotional area of 'Digitalisation and innovation' on behalf of KfW* – our title translation, in German), Fraunhofer Institute for Systems and Innovation Research ISI, and Zimmermann, V. (2023): Wo steht Deutschland bei Innovation und Digitalisierung im internationalen Vergleich? (*Where does Germany stand in innovation and digitalisation in an international comparison?* – in German only), Focus on Economics No. 412; KfW Research.

[31] Cf. Zimmermann, V. (2022), Types of SMEs in the innovation system: activities, constraints and successes, Focus on Economics No. 394, KfW Research, and Rammer, C. et al (2022): Drivers and Barriers for Innovation in the German SME sector, study commissioned by KfW Group. ZEW.

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[37] Cf. Totterdill, P. (2015): Closing the Gap: The Fifth Element and Workplace Innovation, European Journal of Workplace Innovation, 1(1): 55–74.

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[39] Cf. Zimmermann, V. (2022), Types of SMEs in the innovation system: activities, constraints and successes, Focus on Economics No. 394, KfW Research, and Rammer, C. et al. (2022): Drivers and Barriers for Innovation in the German SME sector, study commissioned by KfW Group. ZEW.

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