

KfW Research

KfW SME Innovation Report 2016

»» Innovation is concentrated in
increasingly fewer enterprises

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Innovation is concentrated in increasingly fewer enterprises

The proportion of innovators among Germany's SMEs has dropped by nearly 7 percentage points to 22 %. After the decline paused briefly the year before, the long-term trend to less innovation is continuing again. The proportion of innovators in the SME sector is thus on the lowest level since the KfW SME Panel was started. The number of innovative SMEs dropped to 803,000 businesses, a decline by 237,000 against the previous period.

SMEs spent EUR 36.7 billion on innovation in 2015. Unlike the proportion of innovators, total expenditure on innovation remained steady in the past years. Innovation activity among SMEs is thus not declining overall but concentrated in fewer and fewer enterprises. An analysis by company size shows that large SMEs with 50 or more employees have increased their innovation expenditure while small enterprises have reduced it.

Although the loss of innovators affects all business sectors and enterprise size classes, the businesses that innovated less were mostly service providers and construction firms, as well as SMEs with fewer than ten employees. This also reflects the fact that innovation expenditure places a heavy financial burden on small enterprises in particular.

Several factors are likely to have contributed to the long-term trend towards fewer innovators. Among them are low start-up activity, growing price competition and the higher age of businesses' workforces. Other factors are relatively weak sales expectations, uncertainty resulting from political and economic imponderables, continuing major difficulties in obtaining innovation funding, and lack of competencies and human resources.

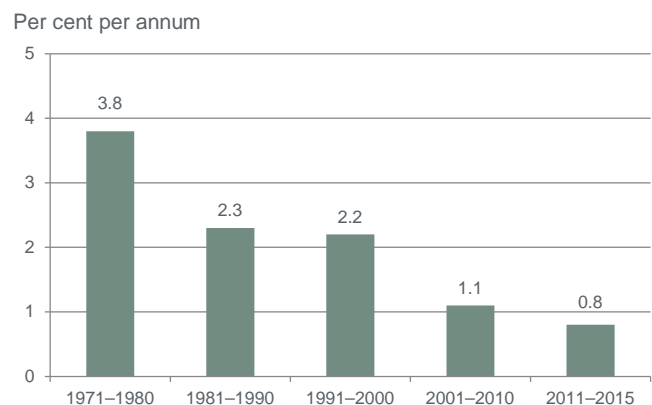
Research and development activities (R&D) as a source of innovation are rather rare in SMEs and also on the decline. At present, 10 % of SMEs conduct their own research and development activities, compared with 16 % in the period from 2004 to 2006.

In order to reverse the innovation slowdown, businesses will have to make better use of their business environment as a source of ideas. They should also improve internal learning processes and their innovation management (which includes employee suggestion schemes, agreed targets, and teamwork) as

well as continuing education activities. Innovation policy should address funding difficulties, lack of information and expertise, as well as regulatory-administrative barriers. In order to ensure an adequate supply of new innovative enterprises, start-up activity will have to be expanded. After all, positive sales prospects are a prerequisite for more innovation. To achieve this, the current economic trend will have to continue and the current political uncertainties will have to be overcome.

A growing economy is the prerequisite for broad income growth and rising prosperity. The decline in productivity growth, the sole durable source of growth, has been observed in Germany for decades and is a cause for concern (Figure 1).

Figure 1: Growth in labour productivity per hour worked



Source: Destatis, own calculations

One aspect that plays a role is that business investment as a percentage of economic output has fallen in a long-term comparison. The demographic trend can hardly be expected to provide any growth impetus either. Rather, the skills shortage already deplored on many occasions is set to increase noticeably in the coming years. This makes it all the more important to invest in intangible capital such as education and innovation expenditure.¹ Innovation improves the allocation of resources, increases productivity and thus accelerates structural change.² This enhances international competitiveness and creates additional employment for as long as the level of qualifications in the potential labour force keeps pace.³ Digitisation is currently regarded as particularly important for securing competitiveness.

Figure 2: Employment growth by economic sector

Growth rates in per cent



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Innovation is a key mechanism for businesses to position themselves in the market and successfully compete with others. Many surveys confirm the positive impact of innovation on business performance.⁴ Positive effects occur not only within an individual innovative business. Since 2001, employment in small and medium-sized businesses has risen primarily in innovative sectors (Figure 2).⁵ This is most apparent in manufacturing. In all the years – with the exception of the crisis year 2009 – R&D-intensive industries (engineering, electronics and chemistry) have created more jobs than the remaining (non-R&D-intensive) industries (such as the food industry, manufacture of metal products, rubber and synthetic products). Knowledge-based services (such as IT and information services, law firms, tax accounting and management consulting services) have also been growing at a faster rate since 2008 than the other (non-knowledge-based) sectors (such as hospitality, transport and storage).

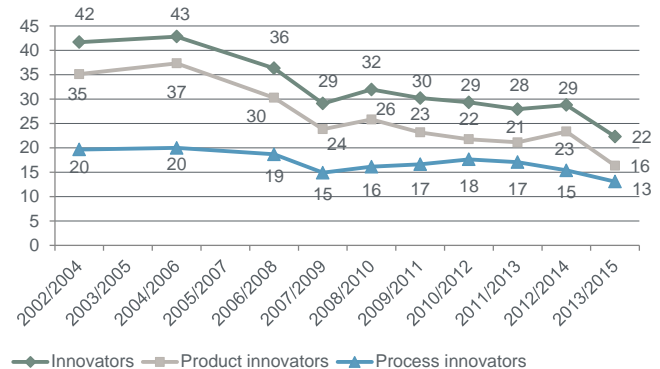
Innovators are declining

New or improved products (including services) and processes are innovations not only when they are based on research activity, such as digital photography or MRI scanner technology. Telephone banking and the launch of a pizza delivery service can also be innovations. A product (including a service) or manu-

facturing process is regarded as an innovation when it is new or significantly improved in essential aspects for the enterprise adopting it.⁶

Figure 3: Development of innovators among SMEs

Shares in per cent



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

The share of innovators in the SME sector fell noticeably by almost 7 percentage points to 22% (2013/2015) (Figure 3).⁷ Currently there are 803,000 innovative small and medium-sized enterprises. That is a decline of 237,000 innovators on the previous year. After the decline in innovators paused last year, the long-term trend to fewer innovators which prevailed since the mid-2000s is continuing again. Compared with the peak of 2004/2006, the share of innovators among SMEs dropped by almost half.

The current slump in the share of innovators is due to the trend in both process and product innovators. While the share of process innovators fell by two percentage points as in the previous years, the share of product innovators dropped by a full seven percentage points. The share of both process and product innovators has thus reached a historic low. Both shares are thus even lower than at the time of the financial crisis (2007/2009).

This decline is presumably due to the fact that while many SMEs were operating at high capacity utilisation in the past two years on the back of strong economic development, negative mid-term business expectations often predominated. In fact, between 2011 and 2015 one fifth to one fourth of all SMEs voiced scepticism over their future business situation.⁸

Another likely contributing factor was that public attention increasingly turned to economic and geopolitical uncertainty already before the Brexit vote and the US election. Empirical studies confirm negative impacts of that uncertainty on business investment.⁹

Innovation activity may also have been impacted. Thus it is possible that businesses' innovation activity was also more short-term in past years, and they prioritised the execution of existing contracts without maintaining or even expanding capacity for innovative tasks. An indication of this is that small enterprises and enterprises that bring forth innovations on an irregular basis in particular have not innovated. This behaviour also causes long-term opportunity costs, however, as it fails to harness growth potential.

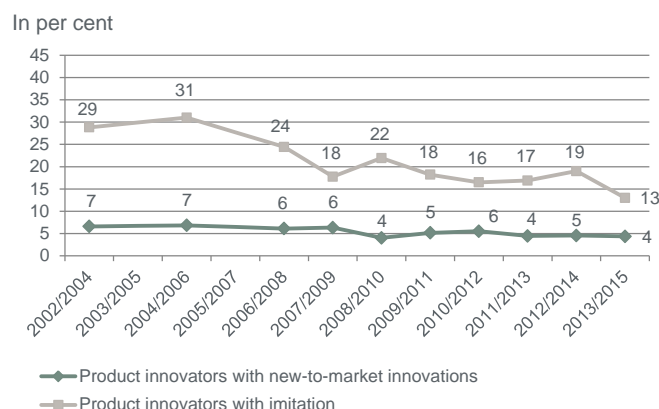
Another possible cause may have been that German SMEs see themselves as well-positioned and therefore currently regard the need to innovate further as less urgent.¹⁰ However, the decline in the proportion of innovators is probably not just due to cyclical developments, as a negative trend has been emerging since 2004/2006 irrespective of the state of the economy.

New-to-market innovations vs. product imitations: imitations dominate

Products and services are often classified as either new-to-market innovations or imitative innovations, or imitations. New inventions such as the smartphone or tablet PC are often marketed by a pioneering company as a 'new-to-market innovation'. However, a new-to-market innovation does not necessarily mean that the product is being offered for the first time in the world. Rather, new-to-market innovation refers to the market that is relevant for the innovator. Particularly for businesses that operate solely on local markets, new-to-market innovation therefore often cannot be equated to 'new-to-world-market innovation'. So for example, a vegan restaurant newly opened in a particular city can be a new-to-market innovation if there have been no vegan restaurants there previously.

Taking over 'inventions' from competitors – in some cases with certain modifications – is referred to as imitation. In order to distinguish between the two types of innovation, innovators are additionally asked whether competitors were already offering a comparable product (including service) at the time it was introduced to the market. Taking over inventions from competitors constitutes the bulk of innovations (Figure 4). The dissemination of new developments is particularly important from a macroeconomic point of view because it ensures both a more efficient use of resources and competitiveness across the overall economy. The benefit of imitative innovations for consumers is that as the number of suppliers (and users) rises, the price of the products usually falls.¹¹

Figure 4: Product innovators – new-to-market innovations and imitations



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Imitative innovations have decreased most of all

The six-percentage point decline in product innovations at the current margin is almost exclusively due to product imitators. The proportion of product imitators generally exhibits rather volatile movements (Figure 4). The share of businesses with new-to-market innovations, by contrast, varies only little across the economic cycle. After the slight decline in the period of 2011/2013, the share of SMEs with new-to-market innovations has remained nearly steady at levels of 4 to 5 %. In absolute figures, some 475,000 SMEs developed imitative product innovations and 146,000 new-to-market (product) innovations in 2013/2015.

The number of innovators is falling in all business sectors

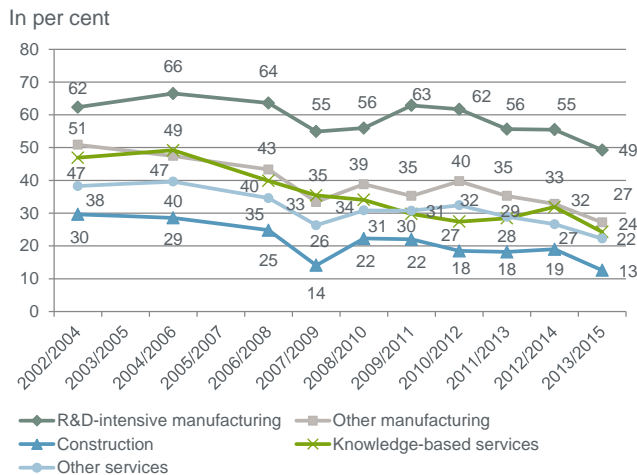
A sector analysis reveals that innovation activity has recently fallen in all business sectors. The values are between -4 and -8 percentage points for the other and knowledge-based service industries (Figure 5).

Long-term decline particularly in construction and services

In a long-term comparison, innovator shares have taken the deepest plunge in the construction industry (minus almost three fifths on 2004/2006) and in the services sector (minus a good half for knowledge-based and a good two-fifths for other services on 2004/2006). These are also the sectors in which the proportion of innovators was already the lowest in 2002/2004. In contrast, the decline in manufacturing was more moderate. In R&D-intensive manufacturing the proportion of innovators fell by 'only' around one fourth. These industries long bucked the general downward trend. With the exception of the slump during the financial and economic crisis, the proportion of innovators in the R&D-intensive manufacturing

industries remained nearly stable up to the period of 2010/2012. It is only in the past three years that innovative activity has also fallen significantly in R&D-intensive manufacturing.

Figure 5: Innovators by industry



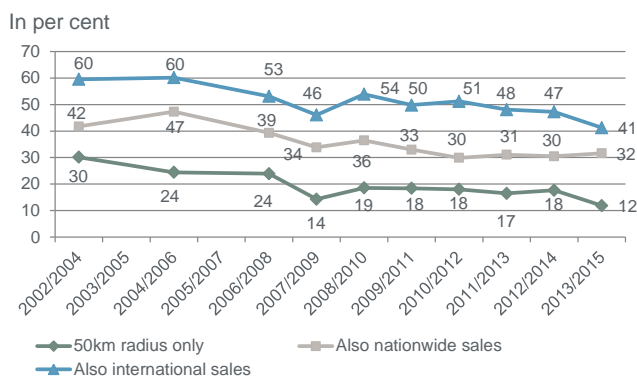
Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Share of innovators has dropped among businesses with regional and international operations

Companies with international business have also reduced their innovation activity further. At -6 percentage points the trend towards less innovation has even accelerated (Figure 6). This is likely due to the generally weak economic performance in the euro area during the observation period 2013/2015. The continuing recovery led to above-average growth in the euro area in 2015, but that did not translate into higher innovation efforts by German SME exporters. Currently, the uncertainty created by the Brexit vote, the election result in the USA and questions over the future development of the European Union is likely to be putting a damper on businesses' drive to innovate.

Figure 6: Innovators by sales region



Note: Figures extrapolated to the number of enterprises.

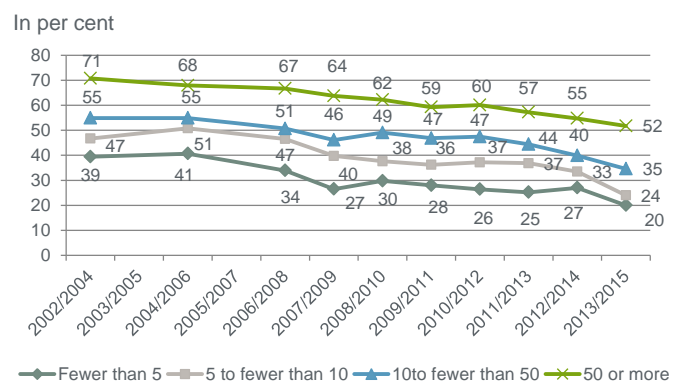
Source: KfW SME Panel, own calculations

In addition, businesses that operate exclusively at regional level have significantly curtailed their innovation activity on the previous period as well. This contrasts with the development of SMEs that sell products across all of Germany. Their share of innovators has actually improved slightly. Thus, the decline among regionally operating businesses is probably caused not so much by weak demand but by the fact that these are usually small enterprises.

Falling innovator shares in all company size classes ...

SMEs' innovation activity has dropped in all size classes since the middle of the last decade (Figure 7). This trend has also continued at the current margin. The smaller a company is, the sharper the drop. The share of innovators among enterprises with fewer than five and enterprises with five to ten employees¹² has more than halved since 2004/2006. The decline in businesses with ten to fewer than 50 and with 50 and more employees, on the other hand, was 'only' a good one third and just under one fourth, respectively.

Figure 7: Innovators by company size



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

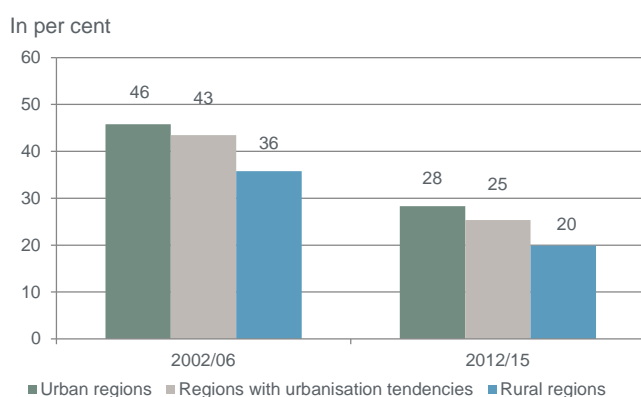
... are affecting productivity

The declining proportion of innovators does not only lead to lower turnover shares with new products.¹³ It also has negative impacts on the development of productivity – measured as turnover per employee in full-time equivalents. A widening productivity gap exists between SMEs and large-scale enterprises. Small businesses with fewer than ten employees in particular have not only been unable to keep pace with developments in large enterprises. The productivity of these enterprises has actually decreased since the first survey conducted under the KfW SME Panel. Although productivity rose among larger SMEs (with more than 10 employees), it did so at a slower pace than in large enterprises.¹⁴

Variations in the share of innovators – few differences between urban and rural areas

The decline in the proportion of innovators may also be attributable to different regional trends. It is conceivable that the departure of skilled workers or consumers from rural areas has reduced innovative activity primarily in these regions. The KfW SME Panel therefore also surveyed whether the proportions of innovative enterprises domiciled in rural areas developed differently to those in urban regions since the mid-2000s.

Figure 8: Innovators by region's degree of urbanisation



Note: Figures extrapolated to the number of enterprises. Averages across the survey waves analysed.

Source: KfW SME Panel, own calculations

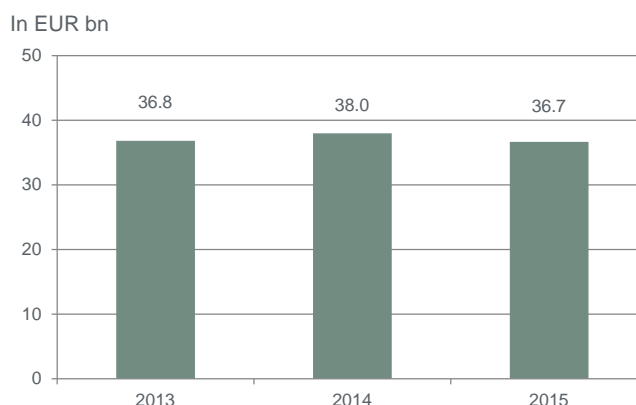
The finding of the survey was that the proportions of innovators among SMEs differed significantly according to the degree of urbanisation of the spatial planning region in which they were domiciled. SMEs from urban regions exhibit the highest proportion of innovators, followed by businesses from regions with urbanisation tendencies. The lowest rates of innovators exist among enterprises in rural regions.¹⁵ However, a drop in the proportions of innovators can be observed in all three types of regions.¹⁶ The rate of decline is similarly high in all types of regions as well, with rates of around two fifths (Figure 8).

But innovation expenditure is almost unchanged

In contrast with the sharp decline in the proportion of innovators, innovation expenditure by SMEs has remained relatively steady in the past three years (Figure 9).¹⁷ Innovation expenditure includes all expenditure including personnel costs and capital expenditure related to developing innovations and bringing them into the market.¹⁸ SMEs' innovation expenditure totalled EUR 36.7 billion in 2015, roughly as much as in 2013. In 2014 it was almost EUR 38 billion. A comparison with the development of the rate of innovators shows that while innovation expenditure has remained at almost the same level in

nominal terms, it is concentrated in increasingly fewer SMEs.

Figure 9: Aggregate innovation expenditure



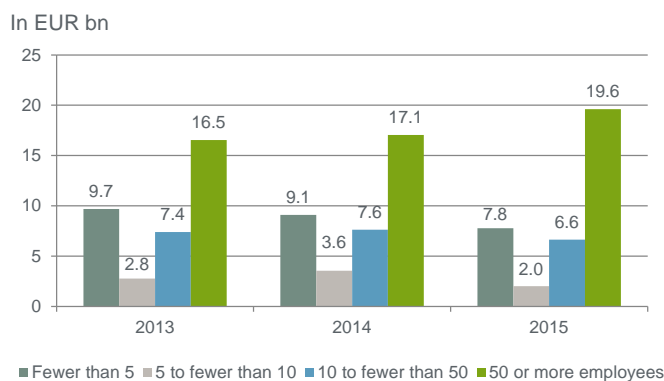
Note: Values extrapolated from the number of employees.

Source: KfW SME Panel, own calculations

Large SMEs are increasing their innovation efforts

Innovation expenditure has developed at different rates across enterprise size classes. Innovation expenditure by large SMEs (50 and more employees) has risen in the past three years from EUR 16.5 billion (2013) to EUR 19.6 billion. Innovation expenditure developed negatively in all other size classes (Figure 10).

Figure 10: Aggregate innovation expenditure by enterprise size



Note: Values extrapolated from the number of employees.

Source: KfW SME Panel, own calculations

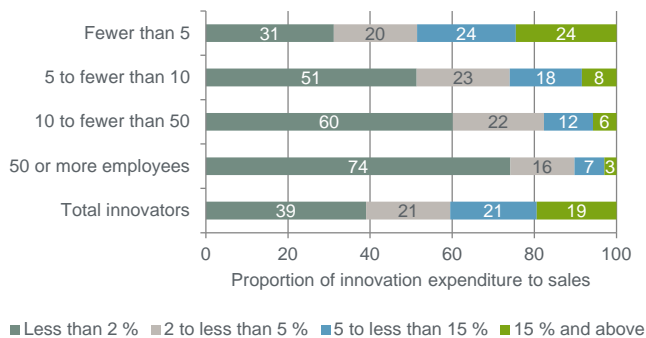
Innovation projects put more pressure on small enterprises

The generally stronger innovation activity of large firms can be explained by the fact that innovation projects cannot be subdivided at will. Minimum project sizes and high fixed costs mean that innovation projects put more pressure on small businesses than on large ones.¹⁹ Evidence of this is that 24 % of innovators with fewer than five employees spend 15 % or more of their annual turnover on innovation. By contrast, the share of

innovation expenditure is less than 2% in only 31% of small SMEs (Figure 11). The corresponding values for large SMEs (50 or more employees), on the other hand, are 3 and 74%, respectively.

Figure 11: Innovation expenditure by enterprise size in 2015

In per cent



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Besides, large enterprises have additional advantages in bringing forth innovations. They have broader market coverage, are able to minimise risk by pursuing several innovation projects at the same time, and have size advantages from the multiple use of new developments.²⁰

R&D activities in the SME sector tend to be rare ...

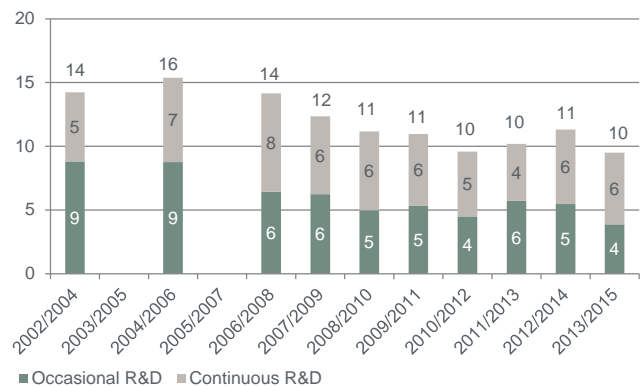
Innovation projects are often equated with R&D. But small and medium-sized enterprises often develop innovations out of the normal production process or in cooperation with customers and suppliers.²¹ Because of their limited financial resources, it is rare for SMEs to conduct their own R&D, i.e. systematic creative work aimed at expanding existing knowledge and using it with the objective of finding new potential applications.²² In 2013/2015, 4% of SMEs conducted their own R&D continuously and 6% occasionally. That means a total of 70% of innovative SMEs bring forth new products and processes without conducting their own R&D.

Businesses with R&D of their own are characterised by the fact that they innovate more regularly and pursue innovation strategies aimed at taking a pioneer role more frequently.²³ A decline in SMEs conducting R&D

should therefore be a cause for concern even if studies demonstrate that the choice not to conduct own R&D can be an interesting alternative for an enterprise and not a necessity.²⁴

Figure 12: Enterprises with research and development activities of their own

Shares in per cent



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

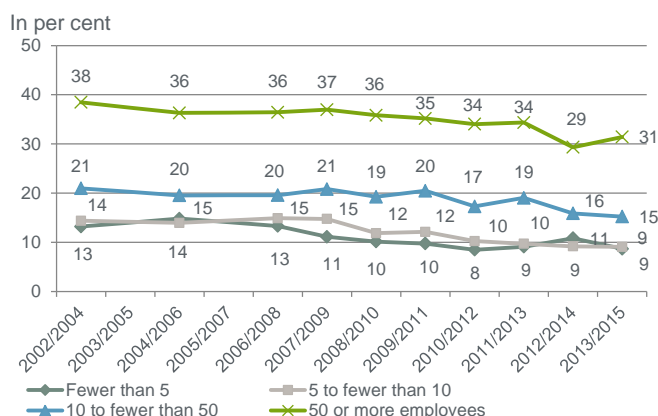
... and are falling

The proportion of enterprises conducting R&D has been on the decline since the middle of the last decade. Whereas the share of SMEs that conducted R&D occasionally or continuously still totalled around 16% during the period 2004/2006, it declined to around 11% in the wake of the 2008/2009 financial crisis. Since then it has hovered between 10 and 11% (Figure 12).

All size classes show declining shares of businesses engaged in R&D. In the past two years, larger SMEs with more than 10 employees in particular have discontinued own R&D activities.

These are precisely the groups that have the highest share of companies undertaking R&D: Large SMEs (50 or more employees) conduct around twice as much R&D, at 31%, as enterprises with 10 to fewer than 50 employees. Compared with even smaller enterprises, the share of large SMEs was even more than three times higher (Figure 13).

Figure 13: Enterprises with own (occasional or continuous) R&D by size



Note: Figures extrapolated to the number of enterprises.

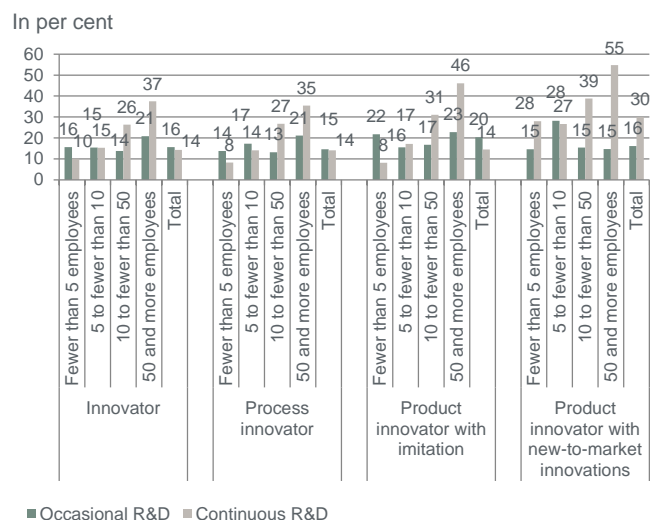
Source: KfW SME Panel, own calculations

This is an indication that innovation processes are more constant in larger enterprises. The larger an enterprise is, the more likely it is to develop innovations systematically with the aid of R&D activities, thus bringing forth innovations more regularly than other enterprises. The proportion of businesses conducting R&D on a continuous basis in particular increases with size regardless of the type of innovation they bring forth. For example, only 8 % of product imitators with fewer than five employees conduct R&D continuously. That share is 46 % among large product imitators (Figure 14).

It also means the larger the enterprises are, the steadier the proportion of innovators remains across boom-to-bust economic cycles. Another factor that likely plays a role is that larger enterprises more often bring forth process innovations that are less cyclically sensitive.

The sector comparison shows that since 2004/2006 the share of businesses conducting continuous or occasional research has decreased primarily in R&D-intensive manufacturing and the knowledge-based services sector (Figure 15). Furthermore, the share of SMEs conducting R&D of their own has fallen on the previous year in other manufacturing as well. Other service providers and construction firms have the fewest businesses with R&D activities. The relevant shares are – sometimes significantly – below 10 % across almost the entire period.

Figure 14: Regularity of innovators' R&D activities by number of employees and type of innovation in 2013/2015



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Conclusion

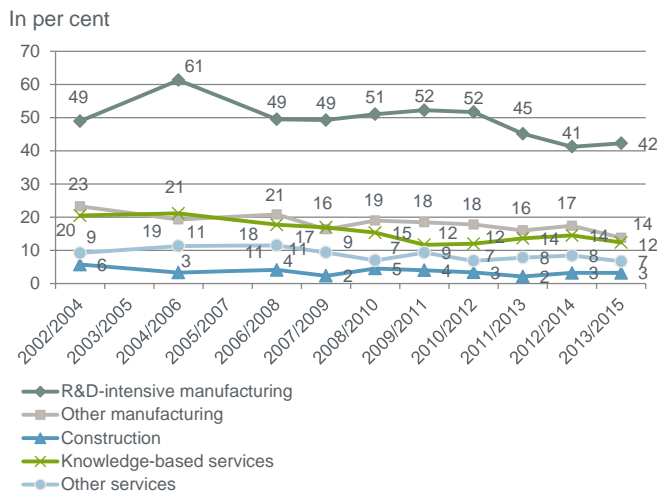
Long-term trend towards fewer innovators in the SME sector is continuing. Product imitations in particular have been brought to market less often compared with the previous year. In contrast, new-to-market innovations are developing almost steadily. The number of innovators has fallen across all economic sectors and company size classes. The decline is most pronounced in small enterprises with fewer than 10 employees, however.

In contrast, innovation expenditure among SMEs has remained steady overall in the past three years. Thus, innovation activity among SMEs is not declining overall but taking place in increasingly fewer enterprises.

The current decline in the proportion of innovators is probably due in part to the fact that – despite Germany's healthy economy – many enterprises in the period under review have remained sceptical with regard to their prospects and therefore likely have put off innovation decisions. Continuing uncertainty resulting from various political and economic imponderables may have been a factor, and numerous other factors have contributed to the declining trend for innovation in the SME sector:

For years there have been too few innovative start-ups to offset the departure of innovative companies from the SME sector.²⁵ The start-up rate has dropped from 2.84 to 1.50 since 2003.²⁶ This decline also impacts on the number of innovative start-ups.

Figure 15: Enterprises with own (occasional or continuous) R&D by sector



Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Ageing workforces also have an adverse impact on businesses' innovation activity. The share of over 54-year-olds in the workforce has risen from 12 to 19 % since 2005. The correlation between declining innovation output and higher share of older employees can be empirically demonstrated. This problem is likely to only get worse in the coming years as workforces will continue to age as a result of the demographic trend.²⁷

It is also apparent that increasing price pressure does not automatically lead to more innovation but is increasingly hampering innovation activity.²⁸ Besides, generally weaker growth in Europe has probably also had an adverse impact on innovation activity during the period under review (2013/2015).

Funding problems remain the most frequent barrier to innovation among SMEs. This primarily affects small enterprises and those with ambitious innovation targets.²⁹ For the second consecutive year, rising loan denial rates can be observed for small enterprises seeking funding for investments.³⁰ It merits close observation whether access to credit is becoming systematically more difficult for these enterprises and hampering their innovation activity – due to regulation, cost pressure or credit institutions' general risk sensitivity. Small enterprises represent the bulk of businesses in Germany and need adequate access to funding.

Insufficient competencies and human resources as well as regulatory-administrative hurdles also pose a problem for many small and medium-sized enterprises. Insufficient competencies and human resources are a particular problem for SMEs because they often have

only a few knowledge-holders with innovation-relevant expertise. Meeting this need on the external labour market is also difficult because these enterprises tend to focus on niche markets and align their product development with customers' desires.³¹

Not least, the question arises whether SMEs are increasingly turning to other activities to strengthen their competitiveness. Traditional innovation reporting may not capture these because it focuses on product and process innovations. Such activities include 'non-technical' innovations such as organisational and marketing innovations.³² KfW Research also plans to examine in what ways the comparatively frequent digitisation measures³³ being adopted by SMEs correlate with their declining product and process innovations.

What should be done?

Small and medium-sized enterprises need sufficient innovation competence and qualified staff. Active worker recruitment and qualification can help to retain scarce skills within the business. Lack of IT competencies, for example, is a key obstacle to digitisation for many SMEs.³⁴

At the same time, many businesses should improve their learning processes and innovation management. Incentives such as employee suggestion schemes, relevant agreed targets or different types of teamwork are recognised as helpful and relatively easy measures to implement.³⁵ Especially with a view to ageing workforces, mixed-age teams and continuing education are deemed to be important measures for harnessing and expanding existing skills within enterprises and thus for maintaining their capacity to innovate.

In order to ensure an adequate supply of new enterprises and business successors, start-up activity must be expanded. To achieve this, more people need to be encouraged to start a business. Important measures include teaching business skills at school and removing bureaucratic barriers.

Despite the generally good funding climate, problems in funding innovation are the most frequently cited obstacle. Improving credit access for small and medium-sized enterprises, supporting the funding of innovation and further developing promotional instruments are a permanent task of economic policy. The introduction of tax incentives to promote R&D and expand the available set of instruments is currently being debated more intensely again (box: benefits and drawbacks of tax incentives to promote R&D expenditure).

Benefits and drawbacks of tax incentives to promote R&D expenditure

Even if tax incentives often have the reputation of not being very efficient, scientific studies have proven the high effectiveness of tax incentives for R&D expenditure.³⁶ In addition, tax incentives for R&D expenditure are easy to apply for and implement, have a broad impact and provide liquidity fast. Critics decry their high fiscal costs and the limited range of options for ensuring that the research is conducted at the right level of technology and in areas that merit particular support.

The innovation system as a whole also plays an important role for the innovative capabilities of small and medium-sized enterprises. Public investment in research and innovation has increased noticeably in Germany since 2005. This has benefited universities and public research facilities in particular, but also the business sector.³⁷ Germany must keep up its efforts to further increase investment in research and innovation. It should set itself ambitious goals and not rest on its

achievements. One of them is the ratio of R&D expenditure to GDP. In the past years Germany has nearly met the 3.0% target determined in the Lisbon process, but as many OECD countries are pursuing more ambitious goals, this has not been sufficient to recover ground lost to other countries. In particular, the cooperation of small and medium-sized enterprises with research facilities and the transfer of technology from the scientific sector hold potential for growth.³⁸ Although a number of approaches exist, there is no silver bullet that would improve cooperation on a broad basis. Most important, however, would be to create awareness within the SME sector, as 71 % of innovative SMEs see no need to further intensify their cooperation.³⁹ Last but not least, a favourable sales outlook would be necessary for investment in new products and processes to appear worthwhile from the enterprises' perspective. Political imponderables – particularly the uncertainty surrounding the further development of the European Union and US trade policy – threaten to thwart any expansion of innovation activity in 2017 as well. ■

The structure of innovative SMEs in 2013/2015

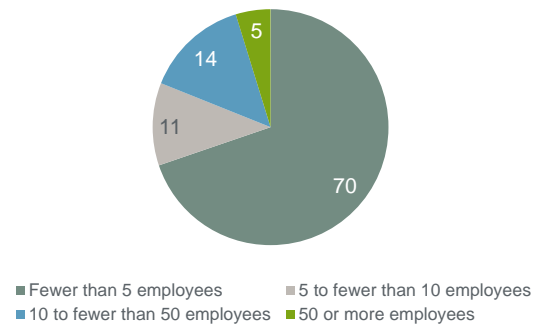
The SME sector covers all enterprises in Germany whose annual turnover does not exceed EUR 500 million. According to this definition, around 3.65 million SMEs exist in Germany. The SME sector thus accounts for 99.95 % of all enterprises in Germany. Of these, 803,000 are innovators.

The majority of innovative SMEs are small enterprises. Most innovative SMEs (562,000 enterprises, or 70 %) have fewer than five employees. This high proportion of small innovative SMEs is due to the overall structure of small and medium-sized enterprises, as 82 % of all SMEs have fewer than five employees. The manufacturing industry accounts for 10 % of innovators while the services sector represents 86 %.

Seventy per cent of innovative SMEs do not conduct any R&D of their own. Only 14 % perform research continuously while 16 % undertook some R&D activities occasionally in the past three years.

Figure 16: Innovative SMEs by company size

In per cent

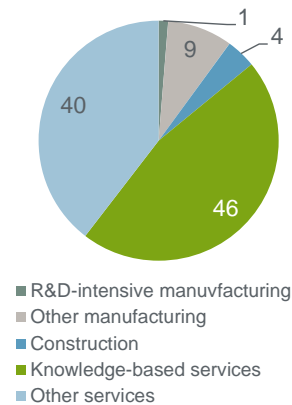


Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Figure 17: Innovative SMEs by industry

In per cent

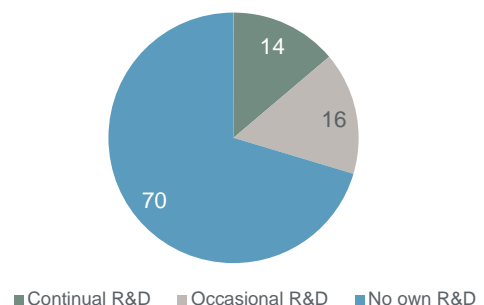


Note: Figures extrapolated to the number of enterprises.

Source: KfW SME Panel, own calculations

Figure 18: 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 postal tracking survey of small and medium-sized enterprises in Germany with annual turnovers of up to EUR 500 million.

With a database of up to 15,000 companies per year, the KfW SME Panel is the only representative survey of the German SME sector and thus the most important source of data on issues relevant to the SME sector. As it is representative of all SMEs of all sizes and across all industries in Germany, the KfW SME Panel offers the possibility to conduct projections for micro-businesses with fewer than five employees as well. A total of 10,535 SMEs took part in the recent wave.

The KfW SME Panel provides the basis for analyses of long-term structural developments in the SME sector. The KfW SME Panel gives a representative picture of the current situation and of the needs and plans of SMEs in Germany. It focuses on annually recurring information on companies' performance, investment activity and financing structure. This tool offers the unique opportunity to determine quantitative key figures for SMEs such as investment spending, demand for credit and equity ratios.

The KfW SME Panel covers a parent population consisting of all SMEs in Germany. This includes private-sector companies from all industries with annual turnovers of up to EUR 500 million. It does not include the public sector, banks and non-profit organisations. Currently there are no official statistics that adequately capture the number of small and medium-sized enterprises 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.

The KfW SME Panel sample is designed in such a way that it can generate representative, reliable and very precise statements. The sample is split into four stratification groups: type of promotion received, industry to which the enterprise belongs, company size class by number of employees, and region. The results of the survey are weighted or extrapolated in order to be able to make inferences from the sample to the parent population. The four main stratification criteria are used to determine the extrapolation factors. These factors set the distribution of the net sample (in accordance with the four group characteristics) in relation to their distribution in the parent population. 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 Bankengruppe. The project received expert advice from the Centre for European Economic Research (ZEW) in Mannheim. The main survey of the 14th wave of the KfW SME Panel was conducted in the period from 12 February 2016 to 10 June 2016.

¹ Cf. Borger, K., Lüdemann, E., Zeuner, J. and V. Zimmermann (2013): Deutschlands Wachstum in der Demografiefalle: Wo ist der Ausgang? (*Germany's growth in demographic trap: Where is the way out?*) KfW Economic Research. Papers and Proceedings, November 2013 (in German).

² Cf. Ulku, H. (2004): R&D, Innovation, and Economic Growth: An empirical Analysis, IMF Working Paper 04/195, and Dachs, B., Hud, M. Koehler, C. and Peters B. (2016): Innovation, Creative Destruction and Structural Change: Firm-level Evidence from European Countries. ZEW Discussion Paper No.16-077.

³ Cf. Autor, D. H. (2015): Why Are There Still So Many Jobs? The History and Future of Workplace Automation. Journal of Economic Perspectives 29(3), p. 3–30 or Gregory, T. Salomons, A. and U. Zierahn (2016): Racing With or Against the Machine? Evidence from Europe, ZEW Discussion Paper No. 16-053.

⁴ Cf. e.g. Zimmermann, V. (2015): What are the hallmarks of consistently successful businesses? KfW Research. Focus on Economics No. 113, 10 December 2015; Zimmermann, V. (2015): KfW SME Innovation Report 2014. Standstill in Europe is slowing down innovation. KfW Research or Zimmermann, V. (2013): Innovation und Beschäftigung. Die Beschäftigungswirkung verschiedener Arten von Innovationen in expandierenden und schrumpfenden mittelständischen Unternehmen (*The employment effect of different types of innovation in expanding and contracting SMEs - our title translation*), Journal of Business Economics, ZfB-Special Issue 4/2013 (in German): p. 131–149.

⁵ This finding is noteworthy as it demonstrates that employment effects are not a zero-sum game in which the employment gains of one business equal the employment losses of others.

⁶ Cf. OECD (2005) (ed.): Oslo Manual. Guidelines for collecting and interpreting innovation data.

⁷ The KfW SME Panel captures the proportions of innovators for a three-year period using the method commonly applied across Europe. Initially the KfW SME Panel surveyed innovative activity only every two years.

⁸ Cf. Schwartz, M. (2016): KfW SME Panel 2016 – Businesses are using their financial strength, but not boosting investment, KfW Research.

⁹ Cf. Heymann, E. and Rakau, O. (2017): Uncertainty is slowing capital expenditure. Germany Monitor, DB Research.

¹⁰ Cf. Abel-Koch, J. (2016): KfW Competitiveness Indicator 2016. German SMEs must defend their competitiveness – and continue improving their energy efficiency. KfW Research.

¹¹ A rapid spread of innovations can also have negative effects, however. It can reduce the profitability of new-to-market innovations, so that the earnings they generate may be insufficient to recoup the (usually high) development costs. That can lower the incentive to develop new-to-market innovations. Patent laws and other intellectual property rights (e.g. models, copyrights) should therefore provide adequate protection for the interests of pioneer businesses.

¹² The number of employees is calculated including the active owners but excluding trainees and apprentices. Two part-time employees are counted as one full-time employee.

¹³ Cf. Zimmermann, V (2016): KfW SME Innovation Report 2015. Germany's innovation performance remains low despite slight increase. KfW Research.

¹⁴ Cf. Schwartz, M. (2016): KfW SME Panel 2016 – Businesses are using their financial strength, but not boosting investment, KfW Research.

¹⁵ The classification is performed by the Federal Office for Building and Regional Planning (BBR) based on the population share living in large and medium-sized towns and population density. Cf. (<http://www.bbr.bund.de/BSR/DE/Raumbeobachtung/Raumabgrenzungen/Regionstypen/regionstypen.html?nn=443270>), retrieved on 19 January 2017.

¹⁶ More in-depth surveys of how a region influences innovative activity are planned for the current year.

¹⁷ Owing to changes in the structure of the questionnaires, older surveys of innovation expenditure under the KfW SME Panel are not directly comparable with current figures.

¹⁸ 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.

¹⁹ Cf. Cohen, W. M., Levin, R. C. and D. Mowery (1987): Firm Size and R&D Intensity. A Re-Examination. Journal of Industrial Economics 35, p. 543–563.

²⁰ Cf. Galbraith, J. K. (1952): American Capitalism. The Concept of Countervailing Power. Boston, Houghton Mifflin, p. 92 or Cohen, W. S. and S. Klepper (1996): Firm Size and the Nature of Innovation within Industries: The Case of Process and Product R&D. Review of Economics and Statistics 78(2), p. 232–243.

²¹ Cf. Zimmermann, V. and J. Thomä: (2016) SMEs face a wide range of barriers to innovation activity – support policy needs to be broad-based. Focus on Economics No. 130, 16 June 2016, or Zimmermann, V. (2016): KfW SME Innovation Report 2015. Germany's innovation performance remains low despite slight increase. KfW Research.

²² Cf. OECD (2015) (ed.): Frascati Manual 2015. Guidelines for collecting and reporting data on research and experimental development.

²³ Cf. Zimmermann, V. (2012): To be the Leader of the Pack? Innovation strategies in the German SME sector. KfW Economic Research. Focus on Economics No. 11, November 2012.

²⁴ Cf. Rammer et al. (2011): Innovationen ohne Forschung und Entwicklung. Eine Untersuchung zu Unternehmen, die ohne eigene FuE-Tätigkeit neue Produkte und Prozesse einführen. (*Innovation without research and development. A survey of enterprises that introduce new products and processes without own R&D activity* – our title translation, in German). Studien zum deutschen Innovationssystem No. 15-2011.

²⁵ Cf. Rammer et al. (2016): Die Rolle von KMU für Forschung und Innovation in Deutschland (*The role of SMEs for research and innovation in Germany* – our title translation, in German). Studien zum deutschen Innovationssystem 10-2016.

²⁶ Cf. Metzger, G. (2016): KfW Start-up Monitor 2016. Labour market greatly lowers appetite for self-employment, innovative founders hold their own. KfW Research.

²⁷ Cf. Zimmermann, V. (2016): SMEs and innovation - enterprises innovate less as their workforce ages. KfW Research. Focus on Economics No. 125, 12. May 2016, or Schubert, T. and M. Andersson (2015): Old is gold? The effects of employee age on innovation and the moderating effects of employment turnover, in: Economics of Innovation and New Technology 24(1-2), p. 95–113.

²⁸ Cf. Zimmermann, V. (2015), KfW SME Innovation Report 2014: Standstill in Europe is slowing down innovation. KfW Research, or Rammer, C. and C. Köhler (2012), Innovationen, Anlageinvestitionen und immaterielle Investitionen (*Innovation, investment in plant and equipment and immaterial investment* – our title translation, in German), Wirtschaftspolitische Blätter 3/2012, p. 425–448.

²⁹ Cf. Zimmermann, V (2016): KfW SME Innovation Report 2015. Germany's innovation performance remains low despite slight increase. KfW Research.

³⁰ Cf. Schwartz, M. (2016): KfW SME Panel 2016. Volume of tables. KfW Research.

³¹ Cf. Zimmermann, V (2016): KfW SME Innovation Report 2015. Germany's innovation performance remains low despite slight increase. KfW Research.

³² A survey of organisational and marketing innovations in the SME sector is planned for this year.

³³ Cf. Saam, M., Viète, S. and S. Schiel (2016): Chancen und Herausforderungen der Digitalisierung der Wirtschaft (*Opportunities and challenges of digitising business operations* – our title translation, in German). Research project on behalf of KfW Group. Centre for European Economic Research (ZEW), Mannheim.

³⁴ Cf. Saam, M., Viète, S. and S. Schiel (2016): Chancen und Herausforderungen der Digitalisierung der Wirtschaft (*Opportunities and challenges of digitising*

business operations – our title translation, in German). Research project on behalf of KfW Group. Centre for European Economic Research (ZEW), Mannheim.

³⁵ Cf. Rammer, C., Czarnitzki, D. and A. Spielkamp (2009): Innovation success of non-R&D performers: substituting technology by management in SMEs. *Small Business Economics* 33(1), p. 35–58.

³⁶ Cf. Appelt, S. Bajgar, M., Criscuolo, C. and F. Galindo-Rueda (2016): R&D Tax Incentives: Evidence on design, incidence and impacts. OECD Science, Technology and Industry Policy Papers No. 32.

³⁷ Cf. Zimmermann, V. (2015): An international comparison of R&D: Germany benefits from industrial research strength. KfW Research. Focus on Economics No. 105, 25 August 2015.

³⁸ Cf. e.g. Commission of Experts for Research and Innovation (2009): Report on Research, Innovation and Technological Performance in Germany, 2009 Report.

³⁹ Cf. Zimmermann, V (2016): KfW SME Innovation Report 2015. Germany's innovation performance remains low despite slight increase. KfW Research.