

B 3-3 The contribution of SMEs to research and innovation in Germany

Innovation activities of SMEs

In all industrialised countries, the majority of employees work in companies with fewer than 250 employees – so-called small and medium-sized enterprises (SMEs). In Germany these represent about 61 percent of employees working in the private sector.¹⁶⁷ German SMEs are often regarded as highly innovative without further differentiation. In fact, they are heterogeneous with regard to their innovation activities. Between 2013 and 2015, only 42.6 percent of SMEs were involved in innovation activities – i.e. activities aimed at the development and introduction of product or process innovations.

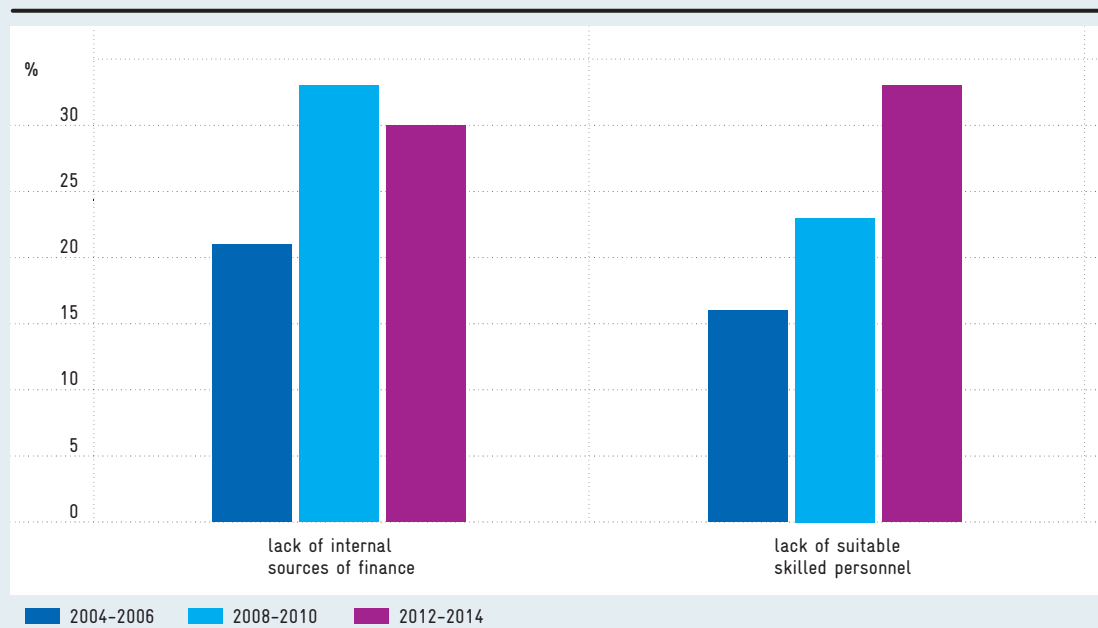
International comparisons lead to varying results, depending on the indicator used.¹⁶⁸ When it comes to the frequency of product or process innovations, German SMEs are leaders compared to important European competitor countries.¹⁶⁹ In terms of patent-intensity and the share of turnover generated with new products, on the other hand, German SMEs only rank around mid-table.¹⁷⁰

The innovation intensity of SMEs – i.e. innovation expenditure as a percentage of total turnover – has declined over the last ten years. This is a cause for concern, especially as it means that Germany is not in a leading position compared to important Euro-

Fig. B 3-3-1

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Percentage of innovation-active SMEs (5 to 249 employees) with a lack of internal sources of finance and a lack of suitable skilled personnel in Germany, 2004 to 2014



Source: Mannheim Innovation Panel. Calculations by ZEW in Rammer et al. (2016).

pean reference countries.¹⁷¹ The innovation intensity of SMEs fell from 1.7 percent in 2006 to 1.3 percent in 2014. The increase to 1.5 percent in 2015 is good news. However, it is currently too early to conclude that there has been a sustainable trend reversal. R&D intensity, i.e. R&D expenditure in relation to total turnover, remained constant during the same period at 0.6 percent. This means that the changes in innovation intensity are the result of a change in innovation expenditure that is not allocated to R&D expenditure (cf. Box 3-3-2 and Infochart B 3).

There are several factors that influence the level of SMEs' reported expenditure on innovation and R&D.¹⁷²

- The group of SMEs changes as a result of start-ups and firm closures, as well as movements of companies above and below the threshold values. In the period under review, this led to an overall reduction in both innovation and R&D spending by SMEs. The decisive factor for the negative balance is the transition from SMEs that are active in innovation and R&D to the group of large companies. The question is why this is not offset by the innovation and R&D expenditure of young companies. There are two reasons for this. On the one hand, innovation expenditure per young SME has fallen significantly, while R&D expenditure has remained stable. On the other hand, the number of young companies has decreased overall against the background of declining start-up activity in Germany.
- The innovation expenditures of SMEs with continuous R&D and SMEs with no internal R&D have recovered following a decline during the crisis year of 2009. However, the number of companies occasionally engaging in R&D is still declining. On balance, therefore, there has been a fall in the innovation expenditure of SMEs.

Innovation barriers for SMEs

Corporate innovation activities can be delayed, cancelled or prevented when obstacles to innovation crop up.¹⁷³ Three quarters of the innovation-active SMEs in Germany reported that their innovation activities were hindered by one or several obstacles in the period from 2012 to 2014. The most widespread obstacles to innovation in this period were excessive innovation costs and a high economic risk (40% respectively). These factors were followed by a lack

R&D expenditure versus innovation expenditure

The OECD's Frascati Manual¹⁷⁴ defines R&D expenditure as expenditure on systematic, creative work aimed at expanding knowledge – also with the objective of developing new applications. The definition of innovation expenditure in the OECD's Oslo Manual¹⁷⁵ is broader. Apart from R&D expenditure, it includes the acquisition of machines, equipment, software and external knowledge (e.g. patents or licences), expenditure on construction, design, product development, conceptual design, training and further education, market launches and other preparations for the production and distribution of innovations.¹⁷⁶

of suitably skilled personnel (33 percent) and a lack of internal sources of finance (30 percent).

When it comes to removing obstacles to innovation for SMEs, education, research and innovation policy can have a direct effect above all on the fields of skilled personnel and innovation finance.¹⁷⁷

- Whereas a lack of suitably skilled personnel only constituted a barrier to innovation for 16 percent of the innovation-active SMEs between 2004 and 2006, the figure had risen to 23 percent between 2008 and 2010 and to as much as 33 percent in the period from 2012 to 2014 (cf. Figure B 3-3-1).
- From 2004 to 2006, the lack of internal financing sources impeded the innovation activities of 21 percent of the innovation-active SMEs. The figure rose to 33 percent during the financial and economic crisis (from 2008 to 2010). Thereafter, it fell again, but at 30 percent still remained well above the pre-crisis level in the period from 2012 to 2014 (cf. Figure B 3-3-1).

Box B 3-3-2