

Market environment and competition strategies shape innovation and digitalisation in small and medium-sized enterprises

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Author: Dr Volker Zimmermann, phone +49 69 7431-3725, volker.zimmermann@kfw.de

Digitalisation and innovation are both regarded as key drivers of technological progress and growth. This paper aims to identify the connection between the conducting of innovation and digitalisation activities and the business environment as well as competitive strategies in the SME sector. In a second step, it describes the differences in performance between businesses that innovate and go digital and those without such activities.

Businesses that innovate typically operate in a challenging environment with regard to a number of different aspects. These include short product life cycles, technological uncertainty and competition from foreign suppliers. Companies that exclusively pursue digitalisation projects, on the other hand, operate in markets where these aspects are less critical. However, the product range of businesses with digitalisation activities is easier to replace with competitor products and demand is accordingly more price sensitive than for businesses that exclusively innovate.

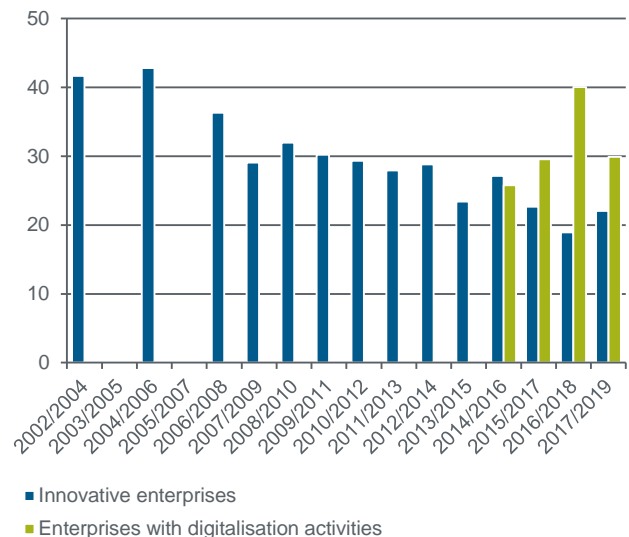
This is consistent with the finding that businesses that only carry out digitalisation activities pursue competition strategies less directed at gaining differentiation from competitors and expansion than those of businesses that innovate. Overall, the competition strategies of businesses with only digitalisation activities are also less focused on the various strategy options. This suggests that digitalisation plays a less important role in the strategic orientation of these businesses than in that of firms that innovate.

SMEs that combine innovation with digitalisation face the most challenging environment and direct their competition strategies most strongly at renewing their product ranges.

Both innovators and businesses with digitalisation activities operate more successfully than businesses without innovation or digitalisation activities. However, the analysis also shows that pure digital transformers generate lower returns and achieve lower growth than innovators. With regard to business productivity, on the other hand, no differences between the two groups could be identified. Businesses without innovation and digitalisation activities achieve poorer scores in all performance indicators measured. This finding highlights the fact that failure to act here is only partly 'justified' by the market environment and, rather, leads to loss of performance. For the overall economy this means leaving valuable potential untapped, which is then lost.

Innovation and digitalisation are generally regarded as key drivers of economic growth and rising prosperity. From a business perspective, digitalisation and innovation activities therefore represent important investments in the future with which companies can position themselves in the market and strengthen their own competitiveness.

Figure 1: Development of the share of SMEs with innovations and completed digitalisation projects



Note: Figures extrapolated to the number of enterprises,; from 2017/2019: Innovative enterprises including marketing and organisational innovations

Source: KfW SME Panel, own calculations

However, innovation and digitalisation activities are evolving with different intensity in the SME sector (Figure 1). Before the outbreak of the coronavirus pandemic, the share of innovators among SMEs fell almost continuously for almost one and a half decades, while the overall share of SMEs with completed digitalisation projects rose noticeably in the past years. The share of enterprises with completed digitalisation projects is now much higher than the share of those with innovations. Innovation and digitalisation activities also continued to drift further apart during the coronavirus pandemic.¹

In order to explain the correlation between innovating and going digital, KfW Research commissioned an extensive study with the Leibniz Centre for European Economic Research (ZEW), Mannheim.² The overall findings were summarised in the Focus on Economics No. 338 entitled 'Innovation and digitalisation in enterprises mutually reinforce each other'.³

Analysis of the business environment, competition strategies and company performance

The present analysis examines in what ways the business environment, strategic orientation and performance differ between businesses with innovation and digitalisation activities. We studied four groups of businesses: SMEs with both innovation and digitalisation activities, pure innovators, pure digital transformers and businesses without any innovation and digitalisation activities.

Innovation in enterprises is defined as ‘a new or improved product or process (or combination thereof) that differs significantly from the unit’s previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)’.⁴ This OECD definition has been widely accepted in the EU and many other countries. It is also used in the KfW SME Panel. Since the Oslo Manual was revised in 2018, it has also counted non-technical innovations such as organisational and marketing innovations as innovation.⁵

No uniform definition has yet been established for digitalisation. The Oslo Manual of the OECD defines digitalisation as the application or increase in use of digital technologies by an organisation. The innovation survey conducted by the Centre for European Economic Research specifies digitalisation activities as activities conducted in the area of software and databases (internal or externally sourced programming activities, development and maintenance of databases, systematic analyses of large data quantities), artificial intelligence (use of AI methods) and the use of platforms, open-source software, social networks and crowdsourcing.⁶

Eliminating structural effects

As was already established in previous studies, a number of features distinguish businesses that innovate or carry out digitalisation projects from those that do not do any of this. This applies to size, age or the sector to which they belong, for example.⁷ The influence of these and other structural features was therefore suppressed from the further investigation with the use of regression analyses. This allows observable differences in the business environment, the competition strategies or performance to be attributed exclusively to whether or not a business carries out digitalisation and/or innovation activities.

Innovative businesses: market environment is characterised by short product life cycles, high technological uncertainty and competition from foreign companies

With regard to the competitive environment it was found that the four groups differ particularly with regard to the length of the life cycle of their products and services. Products and services offered become obsolete fastest in enterprises that combine innovation with digitalisation. The offerings of pure innovators have the second shortest product life cycles, followed by businesses that exclusively pursue digitalisation activities. The product range becomes obsolete at the slowest pace in companies without innovation and digitalisation activities (Figure 2).

The competitive environment of businesses that innovate – irrespective of whether they also carry out digitalisation activities – is also characterised by the fact that they also face higher technological uncertainty and competition from foreign companies than businesses that exclusively carry out digitalisation activities.

Businesses with digitalisation activities operate in markets where the product range is easily replaceable and highly price sensitive

In contrast, businesses that combine innovation with digitalisation as well as exclusive digital transformers believe that their own products and services can be replaced about as easily by competitor products. In both groups, the product range is easier to replace than for businesses that exclusively innovate.

This is consistent with the finding that price increases are most likely to lead to a loss of customers primarily for companies that conduct digitalisation projects – whether or not they also innovate at the same time. Price sensitivity is much lower for businesses that exclusively innovate. This finding is likely due to the fact that competition strategies that are based on product differentiation are generally much less common in companies with digitalisation activities (see section on competition strategies).

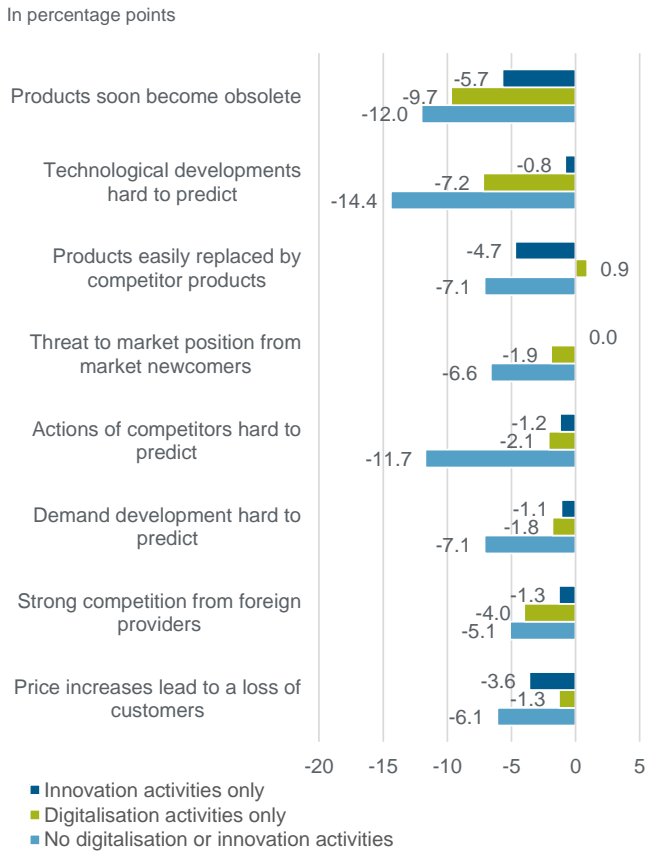
The competitive environment of innovative firms and companies with digitalisation activities, however, does not significantly differ with regard to threats to their market position from market newcomers, the predictability of actions by their competitors and the predictability of the development of demand.

Last but not least, long product life cycles, low technological and market uncertainty, low competition from foreign companies and low price responsiveness of demand characterise the markets of enterprises that do not innovate or carry out digitalisation activities. Such a comparably steady market environment helps to explain why these businesses did not innovate or undertake digitalisation activities in the period under review.

Interim conclusion: Enterprises that only conduct digitalisation activities are in a less challenging market environment

In summary, it can be concluded that the competitive environment of businesses that conduct only digitalisation activities can be characterised as having longer product cycles, lower technological uncertainty and less competition from foreign rivals than that of businesses that innovate. Compared with pure innovators, however, the substitutability of own products and, consequently, the price sensitivity of demand is higher for businesses with digitalisation activities.

Figure 2: Characteristics of the competitive environment – deviations compared with enterprises that engage in digitalisation and innovation



Source: Rammer et al. (2021)

Competition strategies of innovators are more likely to focus on developing new products ...

With respect to competition strategies, the analysis found that innovators, in particular innovators that also carry out digitalisation activities, are more likely to focus on renewing their product range than the other groups of enterprises analysed. This applies to both the improvement of their existing product range and to the development of completely new products (Figure 3). Such strategies are therefore less pronounced in businesses that exclusively pursue digitalisation activities. This finding confirms the observation that innovation activities of small and medium-sized enterprises are more likely to focus on product than on process innovations, while digitalisation projects are relatively less likely to target the digitalisation of products and services.⁸

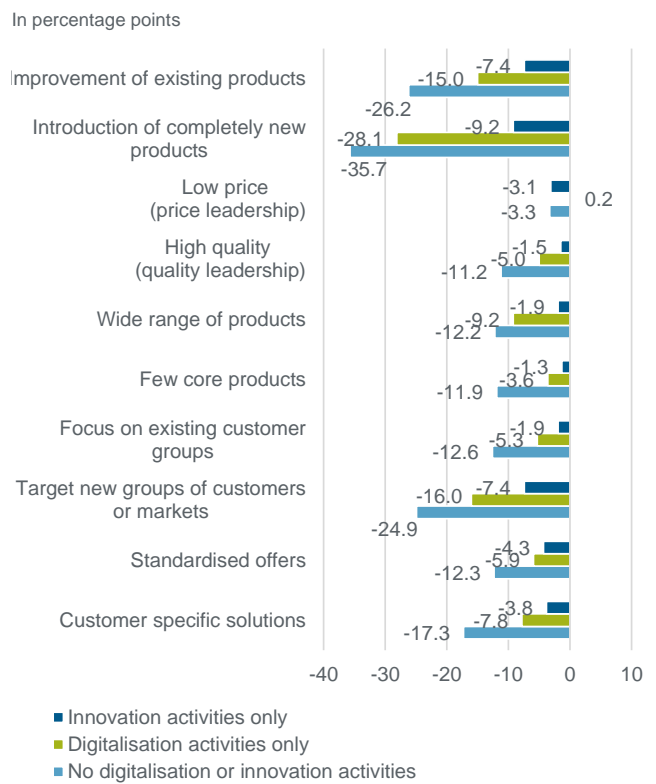
... and are more likely to aim for quality leadership

With respect to distinguishing the competition strategy adopted by businesses into price leadership and quality leadership, we found that innovators and businesses with digitalisation activities are almost equally keen to become price leaders. By contrast, innovators are more intent on pursuing quality leadership than enterprises with an exclusive focus on digitalisation projects. This, too, is likely to at least partly reflect the stronger focus of innovators on product innovations.

Pure digital transformers have less distinct competition strategies

A similar finding also applies to the breadth of a company's product line and the targeting of existing customers. Businesses that carry out only digitalisation activities are not just less likely to aim for a broad range of products; they are also less likely to focus on few core products. They are also less focused on their existing customers. With respect to reaching out to new groups of customers, the analysis also found that SMEs that combine innovations with digitalisation are particularly likely to target new groups of customers, while pure digital transformers in particular do not do this.

Figure 3: Competition strategies – deviations compared with enterprises that engage in digitalisation and innovation



Source: Rammer et al. (2021)

In regard to whether a business offers a rather standardised product range or customer-specific solutions, those that combine innovation and digitalisation have the most differentiated competition strategies. These companies pursue these two opposing strategies more intensively than pure digital transformers.

Interim conclusion: Businesses that carry out only digitalisation activities are less focused on individual strategy options ...

With regard to the competition strategies pursued by businesses, it can therefore be summarised that enterprises that carry out only digitalisation activities generally focus less closely on the various strategy options. In other words, they pursue a generally less pronounced competition strategy than pure innovators or businesses with both innovation and digitalisation activities. This applies in particular to strategy

options that focus on making their offerings stand out from those of the competitors and creating new sales opportunities. Thus, the greatest difference can be seen in the introduction of completely new products, which is found much less often in this group of businesses. The findings indicate that businesses that undertake only digitalisation activities pursue a competition strategy that is generally less focused on differentiation and expansion.

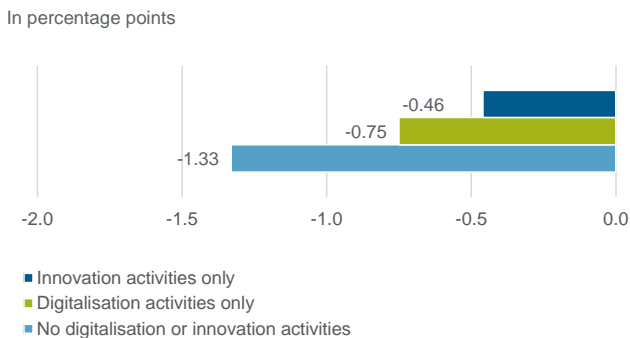
... while pure innovators differ relatively little from businesses with innovation and digitalisation activities

This applies much less often to companies that only innovate. With respect to quality leadership, range of offerings, focus on core products and orientation towards existing groups of customers, they do not differ significantly from businesses that have both introduced innovations and carried out digitalisation activities. By contrast, businesses that conduct neither innovation nor digitalisation activities pursue the least differentiated competition strategies.

Businesses that combine innovation with digitalisation have the highest profit margin and grow the fastest

Finally, the following graphs show key business performance indicators in the four groups of businesses analysed. SMEs that combine innovation with digitalisation have the highest profit margin. They are followed by those that exclusively innovate and by businesses that conduct only digitalisation activities. With a deviation of -0.45 percentage points, the profit margin of pure innovators remains close to that of businesses which combine innovation with digitalisation.⁹ The difference to enterprises with digitalisation activities only is somewhat higher, at -0.75 percentage points. SMEs without innovation and digitalisation activities have a profit margin that is -1.33 percentage points lower, which places them far behind (Figure 4).

Figure 4: Profit margin in 2018 – deviations compared with enterprises that engage in digitalisation and innovation

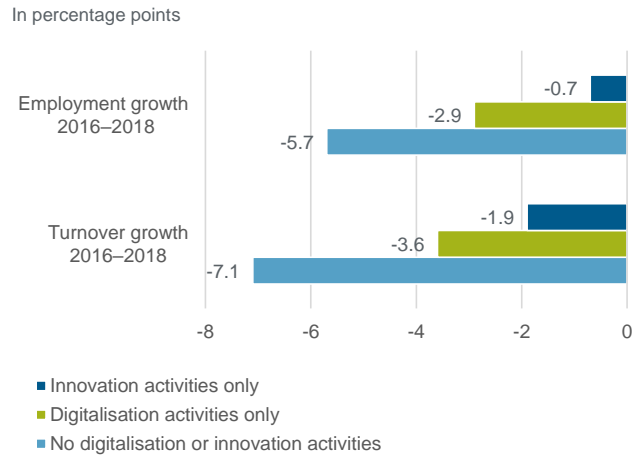


Source: Rammer et al. (2021)

With respect to growth, the analysis revealed that turnover grew slightly more strongly than employment in each of the groups observed during the period under review (Figure 5). Innovators with digitalisation activities top the ladder with regard to both turnover growth and employment growth. Businesses that carry out only digitalisation activities lag far behind this group. SMEs that only innovate, in turn, lie between

these two groups. Their growth rates are relatively similar to those of businesses that combine innovation and digitalisation. The growth of businesses without innovation and digitalisation projects is the slowest by a wide margin.

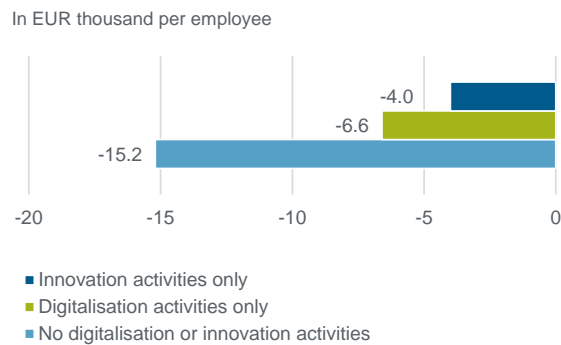
Figure 5: Growth of turnover and employment – deviations compared with enterprises that engage in digitalisation and innovation



Source: Rammer et al. (2021)

Productivity – measured as turnover per employee – is very similar for companies with innovation and digitalisation activities (Figure 6). The differences of -EUR 4,000 for pure innovators and -EUR 6,600 for pure digital transformers are minimal and also not statistically significant.

Figure 6: Productivity in 2018 – deviations compared with enterprises that engage in digitalisation and innovation



Source: Rammer et al. (2021)

The lower profit margin of businesses with pure digitalisation activities and similar productivity may be due to the fact that while these enterprises have similarly efficient processes, they are unable to achieve above-average profit surcharges in the market. The likely reason for this is that their products do not have sufficient unique selling points. The less pronounced strategies for product differentiation suggest this conclusion. SMEs without innovation and digitalisation activities have much lower productivity.

Conclusion

The aim of the analysis was to compare innovative businesses and enterprises with digitalisation activities with respect to their market environment, competition strategies and business performance in order to determine in what ways the business environment, competition strategy and implementation of innovations and digitalisation correlate (see overview table at the end).

With regard to the competitive environment it can be concluded that in several aspects, the environment is less challenging for businesses that exclusively carry out digitalisation projects than for those that innovate. This applies to the short length of product cycles, technological uncertainty and competition from foreign firms, for example. However, the product range of businesses with digitalisation activities is easier to replace with competitor products and demand is accordingly more price sensitive than for businesses that only innovate.

With respect to competition strategies the analysis revealed that pure digital transformers mainly pursue competition strategies that are less focused on differentiation from competitors and less on expansion than those of innovators. The competition strategies of businesses with only digitalisation activities are also generally less focused on the various strategy options. Conversely, the analyses thus suggest that for these businesses, digitalisation plays a less important role in their strategic orientation than for businesses that combine digitalisation with innovation activities. In light of the less challenging environment, businesses that carry out only digitalisation activities may have concluded that they do not need a more explicit configuration of competition strategies that incorporate digitalisation activities.

SMEs that combine innovation with digitalisation operate in the most challenging environment and direct their competition strategies most strongly at renewing their product ranges.

Both innovators and businesses with digitalisation activities are more successful with these strategies than counterparts that undertake no innovation or digitalisation activities. However, the analysis of the various indicators of business performance also shows that enterprises that only carry out digitalisation activities generate lower returns and achieve lower growth rates than innovative businesses. But this does not apply to business productivity, in which enterprises with innovation and digitalisation activities are almost on a par.

The market environment and businesses' corresponding competition strategies thus provide important leads for explaining innovation and digitalisation activities in the SME sector. This goes for implementing innovation and digitalisation projects as much as for omitting such activities in the period under review here.

However, the weaker performance particularly of businesses without innovation and digitalisation activities also illustrates that omission is only partly 'justified' by the market environment and, rather, leads to loss of performance even in less dynamic markets. For the overall economy this means leaving valuable potential untapped, which is then lost. In order to more effectively develop this potential there is a need first of all to continue highlighting the advantages which innovation and digitalisation provide for businesses. Second, it is also urgently necessary to tackle barriers that hamper the two activities, such as skills shortages or difficulties in obtaining finance.¹⁰

Table: Comparison of characteristics of the groups surveyed

	Innovator with digitalisation activities	Pure innovator	Pure digital transformer	Does not innovate nor have any digitalisation activities
Competitive environment	<p>Shortest product life cycles</p> <p>High technological uncertainty, strong competition from foreign rivals</p> <p>Products are highly replaceable, demand is highly price sensitive</p>	<p>Fewer short product life cycles</p> <p>High technological uncertainty, strong competition from foreign rivals</p>	<p>Even fewer short product life cycles</p> <p>Products are highly replaceable, demand is highly price sensitive</p>	<p>Long product life cycles</p> <p>Low technological and market uncertainty, low competition from foreign companies</p> <p>Products are not readily replaceable, demand has low price sensitivity</p>
Competition strategies	<p>Renewal of product range very widespread</p> <p>Quality leadership is common</p> <p>Tapping into new groups of customers and markets very widespread</p>	<p>Renewal of product range common</p> <p>Quality leadership is common</p> <p>Tapping into new groups of customers and markets widespread</p>	<p>Less focused competition strategies, product range is rarely differentiated from competitors</p> <p>Tapping into new groups of customers and markets rare</p>	<p>Least differentiated competition strategies</p>
Performance	<p>High return</p> <p>High growth</p> <p>High productivity</p>	<p>Similar performance as innovators with digitalisation in all performance indicators</p>	<p>Lower return and weaker growth than innovators</p> <p>Similar productivity as innovators</p>	<p>Weaker performance than innovators and digital transformers</p>

¹ Cf. Zimmermann, V. (2021): [KfW SME Digitalisation Report 2020. Digitalisation activity fell before Corona, ambivalent development during the crisis](#), KfW Research and Zimmermann, V. (2021): [KfW SME Innovation Report 2020: Coronavirus crisis is slowing down innovation](#), KfW Research.

² Cf. Rammer, C. et al. (2021): [Zusammenhang zwischen der Durchführung von Digitalisierungs- und Innovationsvorhaben im Mittelstand](#) (Correlation between digitalisation and innovation projects in the SME sector – our title translation, in German only). Report to KfW Group.

³ Cf. Zimmermann, V. (2021): [Innovation and digitalisation in enterprises mutually reinforce each other](#), Focus on Economics No. 338, KfW Research.

⁴ Cf. OECD and Eurostat (2018) (publishers), Oslo Manual 2018. Guidelines for collecting, reporting and using innovation data. OECD Publishing.

⁵ The new definition has been used in the KfW SME Panel since the 2019 survey. Cf. Zimmermann, V. (2021), [KfW SME Innovation Report 2020: Coronavirus crisis is slowing down innovation](#), KfW Research.

⁶ The concept of digitalisation is thus much more closely and stringently geared to information processing and data use than the one used in the KfW SME Panel, while aspects of information and communication technology hardware procurement and the use of digitalisation technology in production, communication and administration are not explicitly captured.

⁷ Cf. Zimmermann, V. (2018): [Determinants of digitalisation and innovation behaviour in the SME sector](#), Focus on Economics No. 236, KfW Research.

⁸ Cf. Zimmermann, V. (2021): [KfW SME Digitalisation Report 2020. Digitalisation activity fell before Corona, ambivalent development during the crisis](#), KfW Research and Zimmermann, V. (2021): [KfW SME Innovation Report 2020: Coronavirus crisis is slowing down innovation](#), KfW Research.

⁹ Profit margins do not differ significantly in a statistical sense between businesses that combine innovation and digitalisation and those that only innovate.

¹⁰ Cf. Zimmermann, V. (2020): [Financing of digitalisation and capital expenditure in SMEs – a comparison](#), Focus on Economics No. 280, KfW Research; Zimmermann, V. (2019): [How SMEs fund their innovation and investment expenditure – a comparison](#), Focus on Economics No. 237, KfW Research; Zimmermann, V. (2019): [Business Survey 2019. More and more businesses have firm plans for digitalisation, hurdles also more widely acknowledged](#), KfW Research and Zimmermann, V. (2017): [SME Innovations: Seven reasons for the decline in the share of innovators](#), Focus on Economics No. 185, KfW Research.