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How SMEs fund their innovation and investment expenditure – a comparison

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Many businesses deplore that high costs, high risks and financing difficulties are making it hard for them to innovate. This study explores the question whether differences exist in the financing of capital expenditure and innovation that may be a sign of limited innovation finance opportunities.

The main finding of the study is that innovation finance is very dissimilar to the financing of investment expenditure. Innovation expenditure is 82% financed from internal resources and only 9% with bank loans. The ratio for investment expenditure is 49 vs. 34%.

Another finding is that the share of bank loans in innovation expenditure increases only relatively slowly with growing expenditure intensity. Unlike for capital expenditure, that share drops again from a business size of five to under ten employees. As businesses increase their share of research and development (R&D), the share of bank loans in innovation expenditure falls from 11 to 3%.

These findings are consistent with theoretical considerations that specific characteristics of innovation projects (such as uncertainty about their success, difficulties in assessing them and lack of collateral) are, above all, a barrier to external financing with bank loans. That is a structural problem of innovation finance.

As a consequence, businesses are not spending enough on innovation. They are particularly avoiding sophisticated innovation projects. Overall, they are failing to harness innovation potential because of financing difficulties.

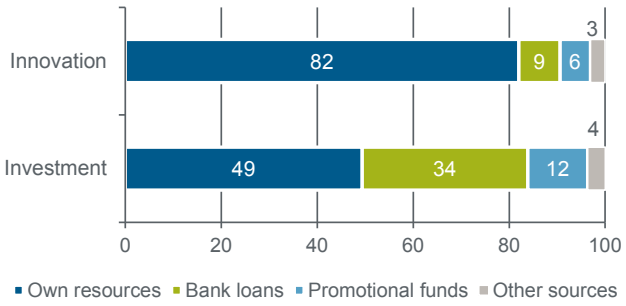
Innovation improves the use of resources, opens up new sales potentials and speeds up structural change.[i] That is why innovation and the resulting technological progress are regarded as the most important determinants of economic growth.[1] Numerous studies confirm the positive impact of innovation on businesses as well.[2] But there is no certainty as to whether innovations will be successful. The most important barriers to innovation for businesses are therefore high costs, high risks and financing difficulties.

These findings may indicate a failure of the market to provide external funding for innovation. This may be due to the particular characteristics of innovation projects. Investment projects, for example, do not exhibit comparable characteristics.

Innovation finance in the SME sector is distinctly dissimilar to investment finance (Figure 1). In the following we explore whether particular financing constraints exist in innovation finance.

Figure 1: Comparison of innovation and investment finance

Proportions of funding sources in the relevant expenditure category in per cent



Note: Extrapolated with the number of employees; investments: only enterprises without innovation expenditure

Source: KfW SME Panel 2017

Uncertainty about success deters external providers of capital

Financing problems may be the result of uncertainty about a project's success. In innovation projects, such uncertainty may revolve around technical viability or commercial success (market acceptance, competitors' response). Uncertainty about success is likely to be highest in research and development (R&D) projects.

What is decisive here is that assessing the likelihood of success of an innovation project is much more challenging for external providers of capital than it is for the innovating business itself. The uneven distribution of information ('information asymmetry') between the enterprise and the potential provider of capital makes external lenders less willing to finance such projects. The consequence is that they either charge an excessive return (including an 'uncertainty surcharge') for providing funds, or even deny financing for innovation projects altogether.[3]

This applies to loan financing in particular. Even though the lender bears the uncertainty surrounding the success, it

[i] This study was conducted in a partnership between Creditreform Rating AG, Neuss, and the economics department of KfW Group.

cannot participate in potentially high profits in the event of success because the interest rate is not tied to the outcome. This makes it more difficult for it to offset defaults against successful exposures and limits the average risk which it can assume in a loan portfolio.

Lack of loan collateral...

Furthermore, innovation projects are largely made up of personnel costs, e.g. for R&D activities, construction or service design, and for preparing the production or sale of innovations. Investment expenditure on equipment, machinery or similar items represents a mere 30% of innovation expenditure.[4] This is particularly true of R&D projects, where investment expenditure accounts for only 8%.[5] Innovation projects thus generate only few assets that could be used to collateralise bank loans.

... and unattractive project volumes make banks less willing to finance

Size is another factor that puts SMEs at a disadvantage when innovating. As they generate only low turnovers, the fixed costs of innovation projects are a particularly high burden for these enterprises.[6] That means they are often unable to spread risks across multiple innovation projects. Failure of a project therefore often jeopardises the survival of the whole enterprise so that, particularly in innovation finance, small businesses represent very risky exposures for external providers of capital.

The loan amounts they apply for are also relatively low from the point of view of external providers of capital. That means an unfavourable ratio of transaction costs to returns, so an exposure is often not worthwhile for them, or only if they charge increased returns.[7]

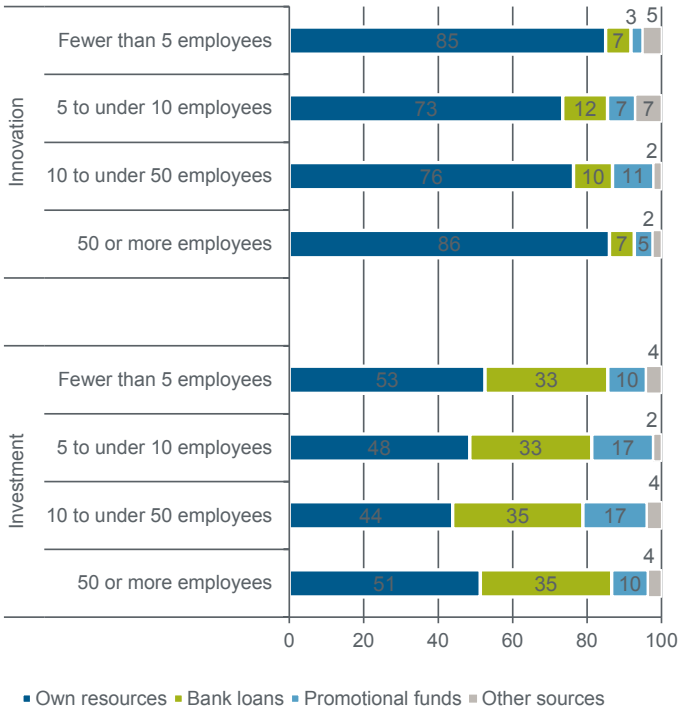
Investment projects, for example, do not exhibit these particular characteristics of innovation projects in such concentrated form. Further factors such as the size or financial situation of the business can also influence the financing of projects. Below we therefore examine the financing of innovations and investments based on different business and project characteristics.[8]

Innovation Finance: firms mainly use internal resources, while bank loans are less common

In line with these considerations, internal resources such as current cash flow, reserves and cash reserves are by far the most important sources of innovation finance. Businesses fund 82% of innovation expenditure in this way (Figure 1). While internal resources make up the largest portion of investment expenditure as well, they are used for investments to a much lesser extent, at 49%, than for innovation expenditure. Besides, enterprises use bank loans to finance 34% of investment expenditure but only 9% of innovation expenditure. Thus, there is a considerable difference between the financing of innovation and investment expenditure.

Figure 2: Innovation and investment financing by company size

Proportions of funding sources in the relevant expenditure category in per cent



Note: Extrapolated with the number of employees; investments: only enterprises without innovation expenditure

Source: KfW SME Panel 2017

Differences are also apparent in the use of promotional funds, such as promotional loans, promoted equity, grants and bonuses. They account for 6% of innovation and 12% of investment expenditure.[9] The remaining 3 and 4% are distributed across ‘other financing sources’, such as mezzanine capital and participations by third parties, as well as ‘other sources’ not specified in more detail.

Businesses prefer to use their own resources

Small and large SMEs in particular use own resources to fund a high proportion of both innovation and investment expenditure (Figure 2). In small businesses that share is 85% for innovation expenditure and 53% for investment expenditure. The fact that businesses with fewer than five employees fund their expenditure from their own resources despite their relatively low internal funding capacity is likely due to their more limited access to external finance.[10] There are many reasons for this. They range from relatively small financing volumes (from a lender’s perspective) through lack of opportunities to diversify in combination with greater difficulty in providing adequate collateral to higher default risks and lower transparency (as a result of lower publication requirements, for example).

As an enterprise grows, it can access credit more easily, so the share of bank loans it uses for both innovation and investment expenditure initially increases. At the same time, however, its internal funding capacity grows as well. From a certain size, enterprises are better able to fund their

expenditures from their own resources, which they use for innovation activities in particular. The share of internal funding increases to 86% and, as a result, the share of bank loans in innovation expenditure drops again.

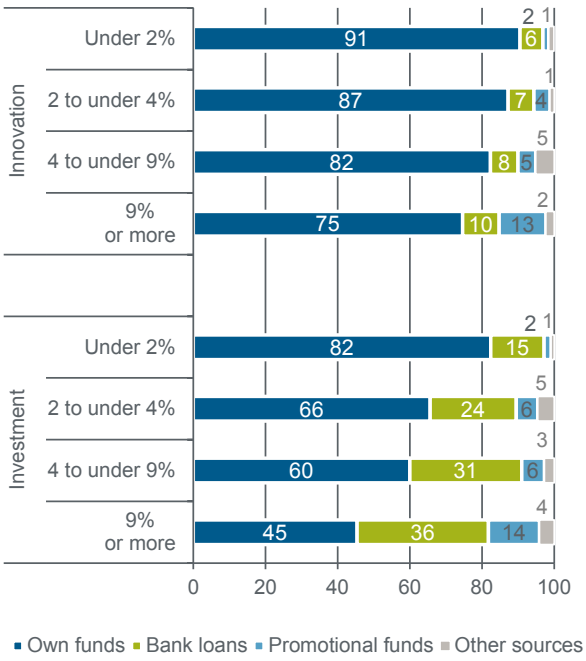
The substitution of bank loans with internal resources is likely due to the particular characteristics of innovation projects, such as greater uncertainty about success and little new collateral, which increases primarily the financing cost of innovation projects – assuming financing offers are available at all. By contrast, bank loans for investment expenditure are likely to be available at lower costs, so that the share of bank loans for investment expenditure actually increases slightly as the business grows.

External sources top up internal resources

The argument that businesses only use external funds when their internal resources are insufficient is also corroborated by the following research findings. Both innovation and investment expenditure is financed to a higher degree with external funds the higher the expenditure is in relation to business turnover (Figure 3). The share of bank loans in innovation expenditure grows by two thirds from the smallest to the largest category. For investment expenditure, the share of bank loans even increases 2.4-fold. The lower increase of this share in innovation finance demonstrates that the particular features of innovation mentioned above are often a barrier to bank finance and that financing offers – if available at all – only exist at disproportionally high costs.

Figure 3: Innovation and investment finance by intensity of expenditure relative to turnover

Proportions of funding sources in the relevant expenditure category
in per cent



Note: Extrapolated with the number of employees; investments: only enterprises without innovation expenditure

Source: KfW SME Panel 2017

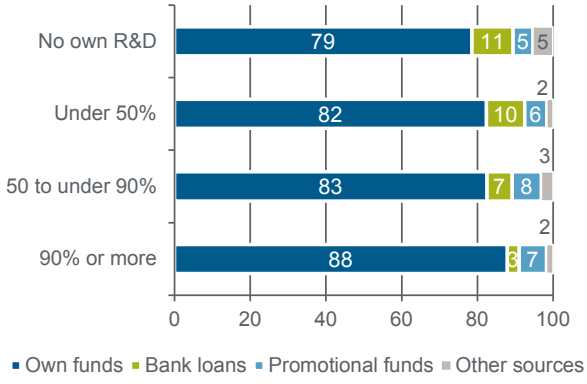
Bank loans with limited risk-bearing capacity

As explained above, the R&D content of innovation projects can be regarded as a barometer for an external lender's uncertainty about project success. Moreover, high R&D intensity stands for a low share of capital expenditure in innovation expenditure and, accordingly, fewer newly generated physical assets that could serve as collateral for bank loans.

Consequently, the share of bank loans in innovation expenditure decreases as R&D intensity increases (i.e. R&D expenditure relative to innovation expenditure). While SMEs that conduct no R&D of their own finance 11% of their innovation expenditure with bank loans, that share falls to just 3% for enterprises that have a high R&D share of innovation expenditure (90% and more) (see Figure 4). This finding is consistent with the consideration that bank loans in particular have limited risk-bearing capacity.

Figure 4: Innovation finance by intensity of R&D in innovation expenditure

Proportions of funding sources in the relevant expenditure category
in per cent



Note: Extrapolated with the number of employees

Source: KfW SME Panel 2017

The influence of key financial indicators on the financing mix

Importantly, a company's ability to finance innovation and investment expenditure depends on its financial situation. Positive key financial indicators stand for high internal funding capacity. At the same time, the financial situation determines whether and on what terms it can use bank loans.[11]

Creditworthiness determines the level of expenditure

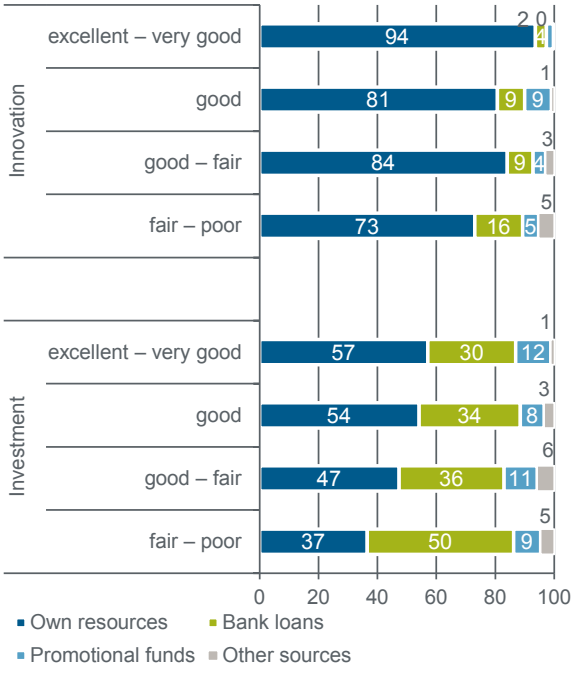
A broad-based cooperation with Vereine Creditreform e. V. enabled us to include the businesses' creditworthiness in the analysis. The creditworthiness rating issued by Vereine Creditreform is based on a total of 15 criteria that cover financial status and liquidity (information reported in the annual statements), structural risks (sector, size and age of enterprise, productivity) and soft factors (payment history, volume of existing orders, order intake, management quality).[12]

In both innovation and investment expenditure, the share of expenditure funded from internal resources is lower when the company's credit rating is lower. The share of bank loans increases at the same time (Figure 6). For innovation expenditure, the share of bank loans increases fourfold in the group with the lowest rating compared with the group of companies with the best credit rating. At first glance, this is a surprising finding. As creditworthiness is the key indicator for the credit decision, the opposite trend could have been expected.

The finding that the share of bank loans increases as the credit rating decreases, however, does not contradict the notion that a good credit rating improves a company's access to credit and an enterprise with a good credit rating therefore can resort to more extensive debt financing. On the contrary: It is apparent that the volume of both innovation and investment expenditure decreases as the credit rating drops. Average innovation expenditure falls from EUR 150,000 in the category with the highest rating to EUR 28,000 in the lowest rating category. This confirms the findings of Gerstenberger et al. (2016)[13], according to which enterprises with a low credit rating can carry out innovation and investment projects less often, invest lower volumes or incur more frequent delays.

Figure 5: Innovation and investment finance by credit rating

Proportions of funding sources in the relevant expenditure category in per cent



Note: Extrapolated with the number of employees; investments: only enterprises without innovation expenditure.

Source: KfW SME Panel 2017

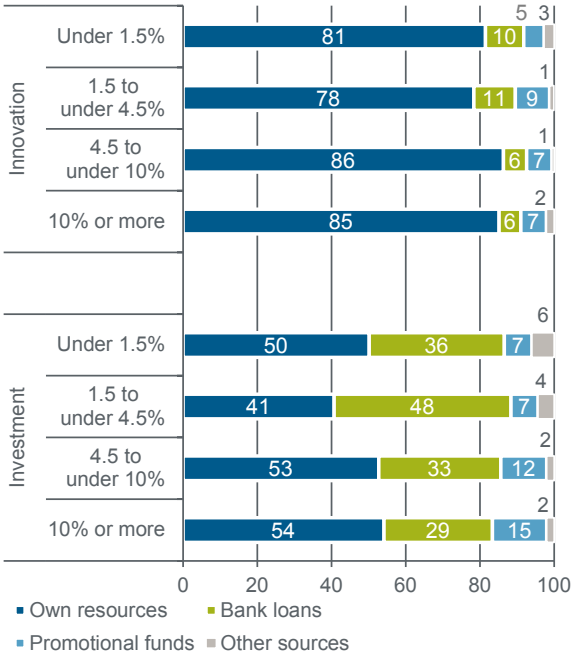
The declining share of internal funding and the rising share of bank loans therefore likely mask the fact that credit rating also reflects an enterprise's internal funding capacity at least to some degree. Given the high fixed costs of innovation projects, lower internal funding capacity means that, for these kinds of projects in particular, lower internal resources must be supplemented from external sources. Not all enterprises are likely to be able to do this, particularly when innovating, and those that do must then accept higher financing costs. As a consequence, the volume of these enterprises' innovation expenditure declines.

High profit margins enable companies to avoid bank loans

Profit margin, too, can be a reflection of both internal funding capacity and creditworthiness. It is defined as profit in relation to annual turnover.

Figure 6: Innovation and investment finance by profit margin

Proportions of funding sources in the relevant expenditure category in per cent



Note: Extrapolated with the number of employees; investments: only enterprises without innovation expenditure.

Source: KfW SME Panel 2017

The share of internal funding initially decreases with growing profit margin and then rises both for innovation and investment expenditure. At the same time, the share of bank loans initially increases and then drops to the lowest level. This is due to the fact that rising profits make access to credit easier and more affordable. From the category of enterprises with a profit margin of 1.5% to those with less than 4.5%, however, increasing internal funding capacity predominates in the financing mix. These enterprises are increasingly able to fund expenditure with internal resources. Enterprises make use of this option and, accordingly, use fewer bank loans (Figure 6). This finding confirms enterprises' preference for funding their expenditure from internal resources.

Conclusion

SMEs fund innovation activity from external sources to a much lesser extent than investment expenditure. Apart from that, various common financing patterns are apparent but so are further differences. For example, the share of bank loans in innovation expenditure grows only relatively slowly as expenditure intensity rises and drops again from a company size of five to under ten employees. By contrast, in investment expenditure that share grows with company size. Furthermore, the share of bank loans in innovation expenditure decreases with increasing R&D intensity.

These findings are consistent with theoretical considerations that specific characteristics of innovation projects are, above all, a barrier to external financing with bank loans. This is particularly true of R&D projects, which combine the specific features of innovation projects in concentrated form.

As a result of these limitations, SMEs' innovation activity is heavily dependent on the availability of internal funds. This has serious disadvantages as enterprises invest less in innovation because of limited internal funds than would be desirable from an economic perspective. They avoid, reduce, delay or even abandon innovation projects. Another consequence is that long-term innovation projects are tackled less often while projects that can be realised in the short term are more common. Thus, enterprises mainly refrain from entering new market segments and realising technologically sophisticated projects because of financial difficulties.[14]

Overall, the problems in financing innovation mean innovative potential remains unharnessed and even vanishes altogether in the long term because of market imperfections. Counteracting this is a permanent task of economic policy. ■

[1] Cf. Ulku,H. (2004): R&D, Innovation, and Economic Growth: An empirical Analysis, IMF Working Paper 04/195, 2004 or Bravo-Biosca, A.;Martson, L.; Mettler, A.; Mulgan, G. and Westlake, S. (2013): Plan I – Innovation for Europe, Nesta and the Lisbon Council.

[2] Cf. Lachenmaier, S. and Rottmann, H. (2007): Employment effects of innovation at the firm level, Jahrbücher für Nationalökonomie und Statistik 2007, p. 254–272; Coad, A.; Segarra, A. and Teruel, M. (2016): Innovation and firm growth: Does firm age play a role?, Research Policy, p. 387–400 or D'Attoma, I. and Pacei, S. (2018): Evaluating the effects of product innovation on the performance of European firms by using the generalised propensity score, German Economic Review, p. 94–112.

[3] Cf. Czarnitzki, D. and Hottenrott, H. (2010): Financing constraints for industrial innovation: What do we know?, Review of Business and Economics, p. 346–363 or Kerr, W. R. and Nanda, R. (2015): Financing innovation, Annual Review of Financial Economics, p. 445–462.

[4] Cf. Rammer, C. et al. (2017) Indikatorenbericht zur Innovationserhebung 2016 (*Indicator report on the 2016 innovation survey* – our title translation, in German only), Centre for European Economic Research (ZEW), Mannheim.

[5] Cf. Stifterverband (2017) ˌɑ:r ən ˈdi: Zahlenwerk 2017. Stifterverband für die deutsche Wissenschaft e.V., Essen

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

[7] Private equity providers in particular therefore often make their involvement conditional on relatively high funding volumes and strong growth prospects, which are rather uncommon in innovative SMEs.

[8] Besides these barriers, many innovation results can be protected only inadequately from use by third parties. Competitors often find ways to exploit the knowledge newly obtained at a low cost for the development of their own ideas or to imitate the innovation (knowledge spillover). The consequence is that the proceeds are distributed between the original innovator and the imitator while the original innovator has to bear the bulk of the costs. The spillover thus generates an unfavourable cost-benefit ratio for the original innovator so that the cost of innovation may appear excessively high for the enterprise, which then opts to abandon the innovation. Cf. Zimmermann, V. and Thomä, J. (2012): Innovationsschutz im Mittelstand: Strategien und deren Bestimmungsfaktoren (*Protecting innovations in SMEs: Strategies and their determinants* – in German only), Points of View No. 16, KfW Economic Research.

[9] At first glance, it seems surprising that promotional funds have a higher share in investment finance than in innovation finance. At the same time, however, it must be considered that investments are often promoted with the aid of promotional loans. These loans have lower promotional intensity. Innovation promotion, on the other hand, usually means grants for R&D activities with comparatively high promotional intensity.

[10] Cf. Zimmermann, V (2016): **Access to credit varies considerably depending on the purpose**, Focus on Economics No. 148, KfW Research.

[11] In order to rule out impacts from a company's current financing behaviour on key financial indicators, the analysis used creditworthiness and profit margin values from the time preceding the survey period.

[12] Creditworthiness is indicated on a scale of 100 to 600, with 100 representing the best achievable creditworthiness score, 500 a massive default in payment and 600 the suspension of payments. In order to exclude enterprises that were already experiencing massive payment difficulties, the analysis only included enterprises with a credit rating not worse than 400.

[13] Cf. Gerstenberger, J., Zimmermann, V. and Bretz, M. (2016), Unternehmensbonität – eine nicht zu vernachlässigende Größe (*'A company's credit rating – a factor not to be neglected'* – our title translation, in German only). In: Bundesverband Credit Management e.V. (eds.): Verlässliches Credit Management in turbulenten Zeiten (*Reliable credit management in times of turmoil* – our title translation, in German only), p. 25–48, Credit & Finance Verlag, Kleve.

[14] Cf. Rammer, C. and Peters, B. (2015): Documentation on the 2014 innovation survey. Innovationen mit Bezug zur Energiewende, Finanzierung von Innovationen (*Innovations relating to the energy transition, financing of innovation* – our title translation, in German only), Documentation No. 15-02, Centre for European Economic Research, or Behrens, V. et al. (2017): Innovation Activities of Firms in Germany – Results of the German CIS 2012 and 2014. Documentation No. 17-04, Centre for European Economic Research.