



Access-to-finance conditions for **KETs companies**

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Access-to-finance conditions for KETs companies

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Foreword

Innovation has been pegged as the key to reviving the European economy. Yet investment in innovation in Europe lags far behind that of the US and Japan. Europe's incomplete single market goes some way to explaining this, but it is clear that monetary policy alone is not enough to redress the widespread market failure in investors' risk-bearing capacity. Money is still not making its way to the real economy, hindering Europe's ability to claim its position as a global player in the innovation game.

Key Enabling Technologies (KETs) lay the foundations for innovation in a wide range of products across all industry sectors and are important drivers of growth and industrial competitiveness. Some 10,000 small and medium-sized companies in Europe are focused on the development and commercialisation of KETs, and these companies can only flourish with adequate access-to-finance.

Unfortunately, it goes without saying that not all companies benefit from access-to-finance in equal measures. Liquidity is no longer the problem, but the prevailing debt financing "ecosystem" is conservative. Banks lend to low-risk KETs companies with proven business models and strong track records. Many dynamic innovators and research-driven newcomers find it hard to raise growth-capital required to develop and scale-up their businesses.

This is where EIB InnovFin Advisory Services comes into play. As well as advising on existing financial instruments, our experts carry out in-depth studies to pinpoint gaps in the market and help establish financing solutions to fill these. Risk-sharing financial products alone are not enough. KETs companies are often not aware of these and many need expert financial advice to become "investor-ready". Similarly, many bankers lack the understanding of new technologies and of their market potential. As a result, they shy away from such investments.

This report is the result of a study into the financing bottlenecks faced by younger, higher-risk KETs companies across Europe. It gives vital insights into the current situation and lays the ground for the EIB, together with the European Commission, to take concrete action that improves access-to-funding.

We must bring "science to finance" and "finance to science"

It is my priority for the EIB Group to ensure that effective finance solutions and targeted advisory support are available for innovative companies to do just this. Today, the paradigm shift in the use of public funds - away from grants and subsidies, in favour of loans and guarantees -, and the lending and advising products and initiatives available, namely the Investment Plan for Europe and its pillars European Fund for Strategic Investments (EFSI) and European Investment Advisory Hub (EIAH), offer us an historical opportunity to go the extra mile and mobilise more private and public sector funding so that KETs companies thrive and can scale-up their activities to contribute to a more competitive Europe.

Werner Hoyer

President of the European Investment Bank

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European Investment Bank

Executive Summary

Key Enabling Technologies are a cornerstone for innovation in Europe's economy

Key Enabling Technologies (KETs) are important drivers of innovation, growth and industrial competitiveness in Europe. Approximately 10,000 smaller to medium-sized companies in Europe base their businesses on the development and commercialisation of KETs. Adequate access-to-finance is widely considered to be a key precondition to ensure further growth and development of these KETs companies. Recognising the importance of the KETs sector, the European Commission (EC) and the European Investment Bank (EIB) commissioned this study to review access-to-finance conditions for KETs companies and develop approaches to overcome potential shortcomings.

Our study provides a balanced picture of access-to-finance conditions in the KETs market

For our study, we researched and analysed data and expert opinions from KETs companies (borrowers) and relevant financial institutions (lenders). Out of the approximately 10,000 KETs companies in Europe, we pre-selected 249 particularly innovative and financially stable KETs companies (demonstrating revenue growth and debt-financing experience). These companies were initially identified using a patents-based research approach by Roland Berger's consortium partner Fraunhofer ISI, followed by a review of individual KETs companies' business models. We deliberately selected highly innovative and financially strong KETs companies as the sample for our study. We did this to focus on businesses needing financing to fund their research and development (R&D) and growth-related activities. We deliberately excluded financially unstable businesses, i.e. companies seeking debt finance for restructuring purposes. We focused on SMEs and midcap companies with revenues ranging from EUR 3 million to EUR 300 million, as they are the most critical group regarding access-to-finance. Out of the initial sample of 249 KETs companies, 43 CEOs or CFOs representing KETs companies from 15 European countries (including the EU's 10 largest economies) provided insights on their access-to-finance experience in hour-long, semi-structured interviews. On the lending side, we selected 79 financial institutions (commercial banks, public banks or funds) with relevant experience in KETs financing. Out of these institutions, we interviewed 16 senior financing specialists from 10 European countries (including the EU's six largest economies) to gain insights into the lenders' perspective on KETs financing.

Our key insight: many KETs companies struggle or fail to obtain adequate debt financing. Due to its general risk aversion, the banking sector does not cater to the specific needs of many KETs companies

Almost 30 per cent of the KETs companies in our study fail to obtain adequate debt financing. Even more KETs companies (about 50 per cent) find themselves severely struggling to obtain the finance needed to generate further growth and innovation. We conclude that a high capacity for innovation and strong growth figures alone are not guarantees of adequate access-to-finance. Current

conditions on Europe's financial markets are not to blame – the overall lending climate is described as favourable by all market participants.

Europe's conservative financing “ecosystem” is not in favour of the most dynamic innovators. Most R&D-driven businesses find it hard to convince traditional/regional banks to provide the desired level of funding. The prevailing debt financing ecosystem in Europe is very conservative: banks seek to lend to low-risk KETs companies with established business models and strong track records. Most dynamic innovators and research-driven newcomers, lacking adequate assets and guarantees, will need additional support and expert advice to meet their financing needs.

Profound knowledge of KETs and a cash-flow-based lending approach are key for financing decisions but in short supply with many banks. The EIB could leverage its technical and financial advisory capacities and approach to lending in order to catalyse the funding process and secure more financing for innovators. KETs financing is a highly knowledge-driven business. In order to assess investment plans and business outlooks, enhanced technology, market and financial expertise are needed, but not always available. By sharing and leveraging its existing knowledge base, the EIB could significantly improve access-to-finance conditions for KETs companies.

Big is beautiful – smaller KETs companies face more difficulties and require broader support beyond pure finance. The current banking system places smaller KETs companies at a disadvantage. These companies, which are often young and highly innovative, tend to fail in raising adequate finance due to the conservative, asset-based lending approach followed by the smaller banks/regional branches. These are the financial intermediaries that innovative companies interact with. Better preparation of both financial intermediaries and smaller KETs companies, coupled with a higher-risk-taking approach to lending, is needed in order to help innovative KETs companies realise their full potential.

Public support is well-suited to compensate for specific market shortcomings; public financing agencies could play a stronger role in leveraging private money, in addition to “merely” providing funds. Despite a number of innovative approaches available in the market, commercial banks alone fail to cater to the financing needs of many KETs companies. The public sector is required to take the lead initiative in order to significantly leverage the growth and employment potential of KETs companies. The role of public agencies could and should be leveraged even more, focusing not only on providing higher-risk capital but also on providing advisory services and facilitating the encounter between the demand for and supply of capital.

Boosting the growth of the European KETs sector will require smart, well-targeted instruments. With regard to their financing needs, KETs companies can be clustered into three categories:

- > "Post start-ups": typically smaller KETs companies, which have outgrown the R&D phase and are generating profits but have a high business risk (e.g. due to their smaller size, lack of collateral and limited track record)
- > "Quantum leap companies": KETs companies of various sizes, targeting a large scale-up (e.g. production facilities, machinery) requiring large amounts of debt in relation to their company size
- > "Well-established innovators": typically relatively larger KETs companies with a stable market position and a solid revenue base

Each of these three KETs company categories requires a distinct financing strategy, involving targeted public sector initiatives.

High-tech innovation financing worldwide: our review of instruments in "high-potential" KETs countries yielded a number of approaches the EIB should build on

We conducted a broad review of over 150 technology-financing instruments, mainly from "high-potential" KETs economies like Canada, Israel, Japan, Singapore and the United States.

The most promising innovative approaches for KETs financing we found were higher-risk-taking debt instruments, specific equity-based programmes and the combination of financing instruments with advisory services. Furthermore, we consider the ability of financial instruments to attract private co-financing as a key element of successful public support to improve financing conditions for KETs companies.

We do not dispute that well-established instruments like public loan guarantees will continue to be cornerstones of KETs financing. However, such instruments alone are unlikely to make a significant difference to the European KETs sector.

The EIB is already well-positioned in technology financing, with substantial funds available from EU-level programmes and financial instruments under the umbrellas of InnovFin and the European Fund for Strategic Investments (EFSI). The existing programmes, however, do not fully meet the specific needs of many KETs companies. The significant amount of capital and flexibility provided by the currently available instruments should be exploited to better target the specific needs of different types of KETs companies.

Measures to significantly enhance the growth of the European KETs sector need to be simultaneously well-targeted and bold

On the basis of the findings of our analysis and our review of the instruments, we developed nine recommendations on how the EIB and EC can help improve access-to-finance conditions for KETs companies. These recommendations entail different measures, from specific financial instruments targeted at different KETs company types, to additional advisory services and action to improve awareness of existing EIB/EC instruments. The recently established European Fund for Strategic Investments is a powerful lever for the EIB and EC to introduce new market-shaping instruments for KETs financing.

There is a clear need for action to improve access-to-finance conditions for KETs companies

To improve access-to-finance conditions for KETs companies, targeted measures are needed. The EIB and EC should place particular emphasis on two areas: (i) improving "knowledge" in the market on both technology and finance to bring "science to finance" and "finance to science"; (ii) higher-risk-taking products and instruments designed to meet the specific needs of the identified KETs company types. In particular, the identified "Post start-up" and "Quantum leap" companies require support according to their specific needs.

Instruments beyond traditional debt financing are needed. Establishing new financing instruments is not enough to create a significant impact on access-to-finance conditions for KETs companies. Measures

to improve the preparation of financial intermediaries and potential borrowers, as well as targeted networking strategies, are needed to foster collaboration between market participants.

The EIB and EC need to take a lead role in further improving innovation-financing conditions in Europe. As the European Union's long-term lending institution, the EIB is uniquely positioned to shape market conditions in the KETs sector, stimulating further innovation and growth. In a highly fragmented European KETs landscape, the EIB has a unique ability to combine a deep understanding of the market with the necessary boldness to make a significant difference.

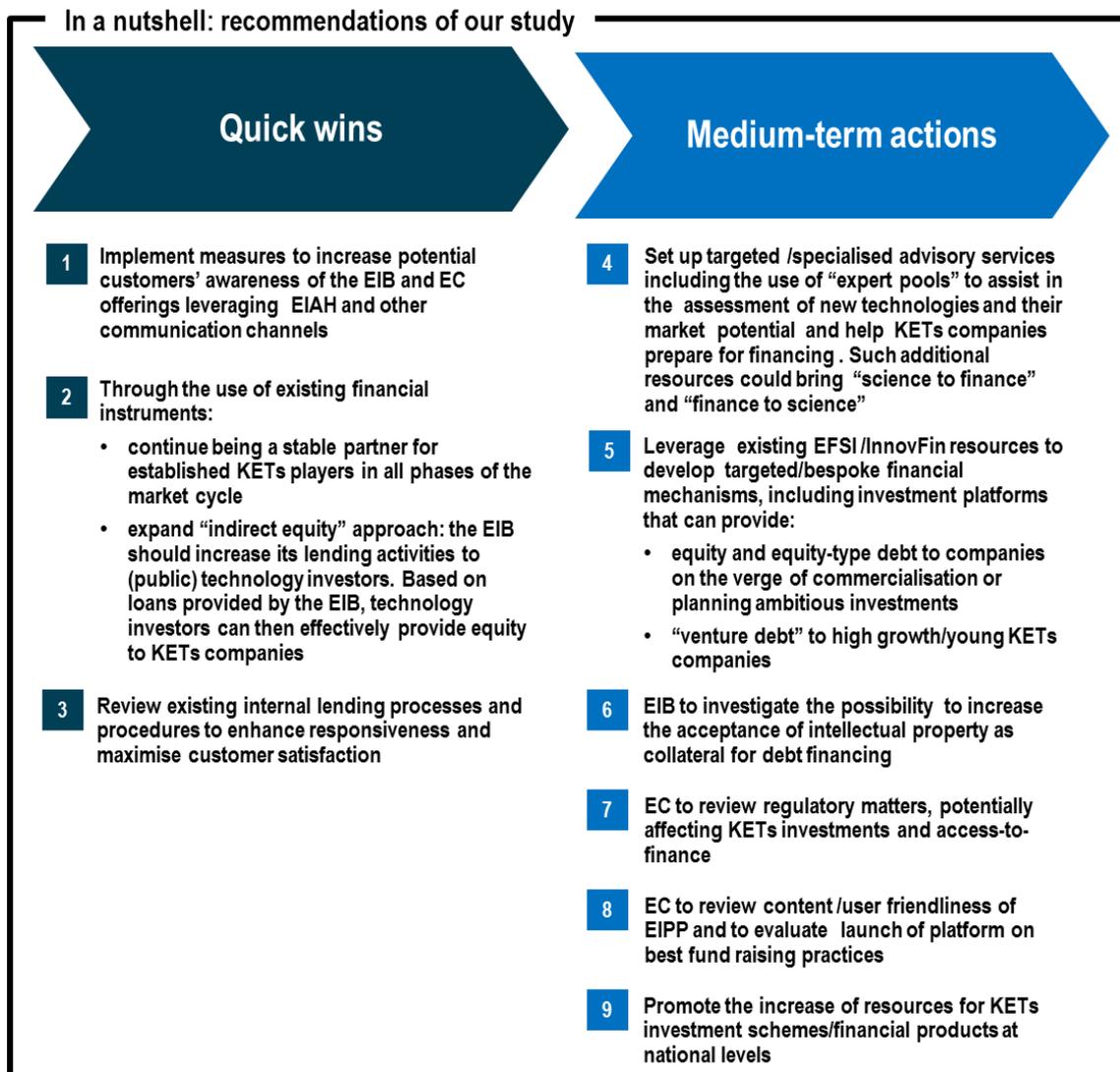


Figure 1: In a nutshell: recommendations to improve access-to-finance conditions for KETs companies.

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Glossary

Asset-based lending	A form of lending where a business loan is secured by collateral (assets) such as inventory, accounts receivable, real estate and/or other balance-sheet assets
Blue chip company	A company selling high-quality, widely accepted products and services; usually larger and more resilient enterprises
CAGR	Compound annual growth rate – in this study, CAGR is used to calculate the average annual revenue growth of KETs companies
Cash flow-based lending	A form of lending that allows companies to borrow money based on the projected <i>future</i> cash flows of their business (compare: asset-based lending)
Covenant	Additional contractual obligation with loan agreements, imposed by the lender. Non-compliance can lead to the loan being called, i.e. the lender demanding the complete sum back immediately, or a renegotiation of lending terms
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest and taxes, depreciation and amortisation
Equity ratio	Common financial ratio in assessing a company's capital structure: the equity ratio is calculated by dividing the total equity of the company by its total assets
First-loss piece	Portion of a loan whose owner (lender) will suffer the first economic loss if the debtor defaults on (parts of) the respective loan
Higher-risk-taking debt	Describes financial instruments charging interest rates above the market average to compensate for the higher risks involved in technology-related investments (see "venture debt")
House bank	Bank preferred by a company for most of its financial transactions over a longer period of time
Innovation pipeline	Describes a firm's products in the research and development (R&D) phase, shortly before commercialisation
IP	Intellectual property
IP-based lending	Lending based on intellectual property as collateral
Intangible asset	A non-physical asset, such as intellectual property or brand recognition
Interest coverage ratio	A ratio used to determine how easily a company can pay interest on outstanding debt. Calculated by dividing a company's EBIT in a given period by the amount of interest to be paid in the same period
Maturity	The period of time for which a financial instrument remains outstanding. At the end of a debt instrument's maturity the principal will be repaid with interest

Mezzanine capital	Hybrid form of equity and debt capital. Mezzanine capital typically counts as equity for accounting purposes, but without transferring residual or voting rights to the capital providers
Net debt/EBITDA	A ratio measuring a company's financial leverage calculated by dividing net financial debt (total financial debt – cash) by EBITDA
Net debt/equity	A ratio measuring a company's financial leverage calculated by dividing net liabilities (total debt – total cash) by the book value of equity
Open innovation	An approach to foster effective research and development activities by sharing risk and rewards with external partners
P&L	Profit and loss – statement showing a company's revenue and expenditure over the course of a year
Post start-up	Type of KETs company identified by this study; typically smaller KETs companies. They have outgrown the R&D phase and generate profits but still have a high business risk (e.g. due to lack of collateral, relatively short historic track record, etc.)
Quantum leap companies	Type of KETs company identified by this study; KETs companies of various sizes, targeting a large scale-up (e.g. production facilities, machinery), requiring large amounts of debt in relation to their company size
R&D	Research and development – common term for practically-oriented research, a business unit combining research and engineering in companies, or the life cycle stage of a product
SME	Smaller and medium-sized enterprises – firms whose annual turnover and headcount fall below certain limits (EU definition: fewer than 250 employees and turnover below or equal to EUR 50 million)
Smart Specialisation Strategy	Strategic aspect of the EC's regional development funds, guiding the allocation of the funds' R&D share. With this strategy the EU intends to promote regional R&D, innovation in competitive sectors and research focused on societal challenges
Tangible asset	Physical asset, e.g. machinery, building, land or inventory
Venture debt	Debt financing model providing for lending to companies with limited track records and/or insufficient collateral, in which investors are compensated for higher risk-taking by higher interest rates, warrants or equity purchasing rights
Well-established innovator	Type of KETs company identified by this study; typically relatively larger KETs companies with a stable market position and a solid revenue base

Access-to-finance conditions for KETs companies

A. Introduction – The importance of KETs for the European economy

Key Enabling Technologies (KETs) are engines of growth, innovation and industrial competitiveness

KETs are fundamental technologies at the heart of an increasingly wide range of goods and services, serving as innovation accelerators for downstream industries. KETs can generate new growth, spur innovation, increase productivity, tackle environmental and climate challenges and give rise to new applications. Thus they have the potential to shift product quality in existing markets to higher levels or open up entirely new markets.

KETs are of critical importance to the EU's ambition to foster a low-carbon, knowledge-based high-technology economy. In particular, they help in restructuring the industrial environment and cluster processes needed to modernise the European industry, increase its competitiveness and secure a vibrant Research, Development and Innovation (RDI) environment in Europe.

A.1 Background

The EC has identified KETs as a priority field to improve European industrial competitiveness. In June 2012, the EC published its KETs strategy¹ and integrated KETs as an essential part of the EU's Horizon 2020 agenda together with Excellent Science, Industrial Leadership and Societal Challenges. Moreover, KETs-related aspects have been or are due to be integrated into various other policy instruments (e.g. the "Smart Specialisation Strategy"). According to the EC definition, KETs include the nanotechnology, biotechnology, advanced materials, advanced manufacturing and processing, micro- and nano-electronics and photonics sectors (see Figure 2). Since this study has been commissioned by the Directorate General (DG) for Research & Innovation, the study focuses only on the KETs areas under this DG's responsibility: nanotechnology, biotechnology, advanced materials, and advanced manufacturing and processing. When referring to KETs on the following pages, we always refer to these four focus areas.

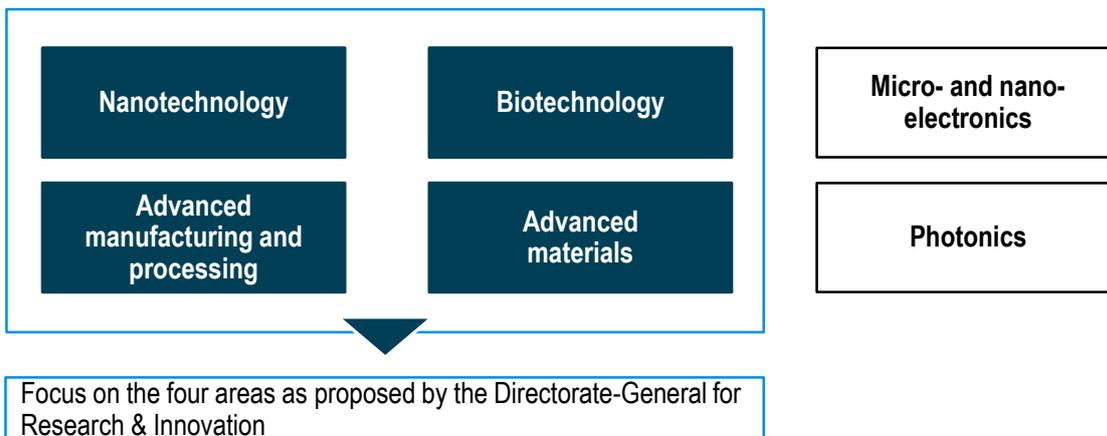


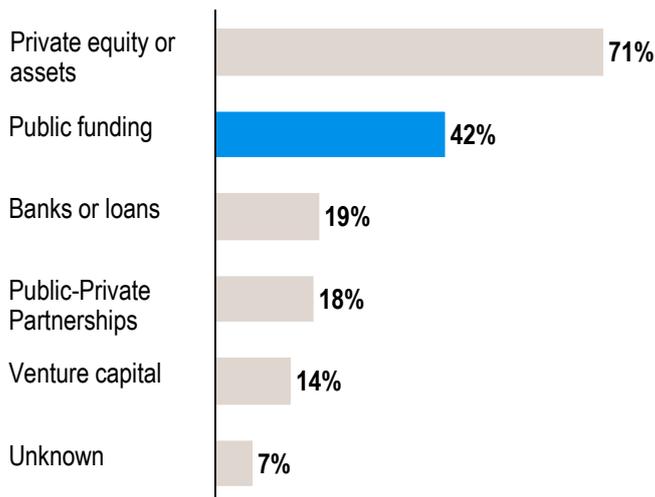
Figure 2: KETs sectors according to the EC definition¹ and sectors focused on in this study.

Due to their pervasiveness in various applications and sectors, the full impact of KETs is difficult to measure. However, the importance of KETs becomes obvious if we look at their effect on the labour market: estimates suggest that the demand for KETs skills in 2013 was equal to about 3.25 million technical professionals and associates in Europe and will increase by 43 per cent by 2025. Consequently, the KETs sector provides employment opportunities and generates significant additional economic impact in downstream industries, derived from innovative products, processes and improved competitiveness.

The EC aims to foster the development of KETs companies given their importance for the European economy. To fully develop the potential of the European KETs sector, Europe needs to ensure a supportive policy framework and to provide instruments to overcome the existing structural gaps. One of the major hurdles for KETs companies in Europe is the observed difficulty in accessing adequate finance. Some of the main drivers of this challenge are the following factors:

- > KETs projects/companies require particularly high capital expenditure due to high R&D and component costs
- > KETs projects/companies constitute high-risk investments, as KETs are early-stage technologies not yet associated with marketable and tested products. In addition, the required highly-skilled labour force is scarce
- > The funding institutions and lenders lack adequate financing instruments for such high-risk investments or require a very high interest rate
- > The policy and financing framework in Europe requires further development to improve structural conditions for KETs projects/companies

The EU needs to further develop overarching strategies to improve access-to-finance for KETs companies. The availability of capital for KETs companies is already low at the early development-focused stages but this becomes even more apparent at later stages, when KETs companies are working on product launches and require large amounts of funding. The combination of technological, manufacturing and market complexity negatively influences the financing situation of KETs companies, as risk is difficult to assess for lenders. Furthermore, the market for KETs companies is often unclear, as products have usually not been launched, nor tested under market conditions. During KETs companies' early development phases, public funding is broadly viewed as a crucial element, but it is not considered to be a main source of funding shortly before commercialisation. This reflects the policy paradigm that public funding should focus on early R&D, as external spill-over effects and technological risks are believed to be higher but diminish for activities closer to the market. Figure 3 depicts the different sources of funding for pilot productions of KETs companies in 2013. The relatively high share of public funding illustrates the importance of public involvement as well as potential interest of the market in additional public funding programmes. Banks, loans and venture capital play only a minor role, underlining a structural



Multiple parallel modes of financing possible

Figure 3: Sources of funding for KETs' pilot production.
Source: KETs-PL survey results 2013¹.

lack of these funding sources for KETs projects in the EU.

Only limited overarching EU-wide initiatives are in place. While individual Member States have developed technology policies to support the development of KETs, the EC's 2012 KETs Strategy is the first EU-level approach to address this issue. Such initiatives are crucial, as KETs will play an important role in securing the future industrial competitiveness of Europe. In several competitor countries, KETs-oriented incentives are in place and attract projects and companies. For instance, in the US the available venture capital per company is currently four times higher than in Europe. Measures applied by other countries to address the insufficient access-to-finance for KETs and the limited availability of highly skilled labour include the following:

- > Research grants, i.e. direct subsidies for R&D activities
- > Loans and loan guarantees, for instance as part of location packages
- > Fiscal incentives, such as tax breaks or customs duty exemptions
- > Provision of equipment, land and services
- > Expansion of university-based training in order to increase the availability of highly skilled labour

If disadvantages in the business environment of the KETs sector remain, the future industrial competitiveness of Europe is at risk. The EU's competitive disadvantage in comparison to countries like the US is apparent in the market development of the KETs sector. Figure 4 shows the market development from 2010 until 2013 in terms of market capitalisation for biotech companies. Whereas the market capitalisation of biotech companies increased by 117 per cent between 2010 and 2013 in the US, it increased by only 46 per cent in the EU. This means that despite a much higher starting level, the biotech market in the US still grew more than twice as fast than in the EU.

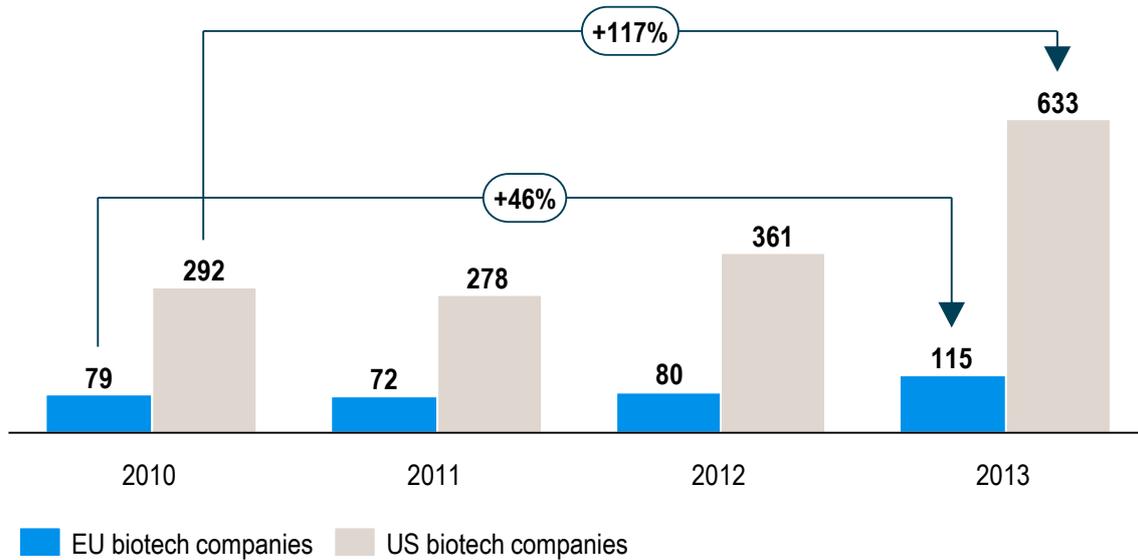


Figure 4: Market capitalisation of biotech companies [USD m].

Source: Statista. The figure shows that when it comes to market capitalisation, US biotech companies, starting from a much larger volume, have grown more dynamically than their EU competitors – leaving Europe far behind at the moment.

Insufficient access-to-finance puts the overall high-tech strategy of the EU at risk and needs to be addressed with the right instruments. The discrepancy between supply of and demand for capital may have adverse effects on the innovative capability of industry players and hinder future developments of new products. Therefore, EU-level instruments must incentivise potential investors to increase investment in KETs projects. This will ensure sufficient funding possibilities for KETs companies and projects in order to maintain Europe's competitiveness.

A.2 Purpose and objectives of this study

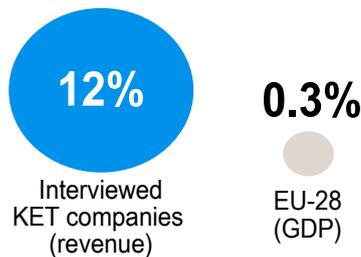
Europe needs a thorough assessment of the conditions that are conducive to increasing the competitiveness of its KETs sector. Against this background, the EIB commissioned this study in order to further analyse the financing constraints KETs companies currently face in the EU, particularly in the KETs areas of nanotechnology, biotechnology, advanced materials and advanced manufacturing. On the basis of the results of this study, the EIB aims to develop approaches to improve access-to-finance conditions for companies in the European KETs sector.

B. Approach

The companies analysed in our study represent fast-growing, robust and innovative businesses in the European KETs sector

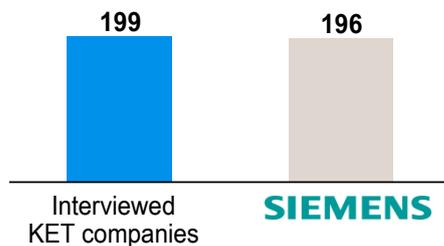
Growth

3-year CAGR (2012-2014)



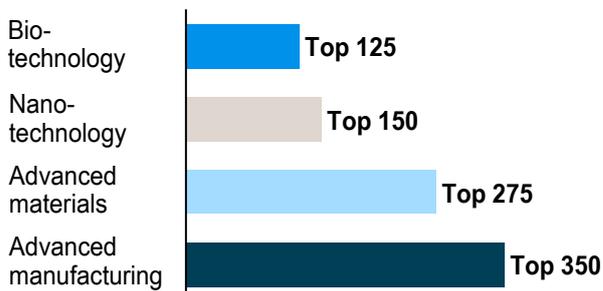
Value creation

Revenue per employee ('000 EUR)



Innovation

Top innovators considered for sample composition



All figures based on latest available information (2014)

Figure 5: Key characteristics of KETs firms from our study sample.

We focused on the best performing companies in the market: highly innovative, with a strong growth record and considerable revenue.

The selected sample for the study consists of high-performing KETs companies. The key aim of our study has been to analyse access-to-finance conditions for KETs companies and to evaluate potential barriers. We therefore focused our sample selection on "healthy" KETs companies with a proven business model, experience of debt finance and a full innovation pipeline. As a result, our sample of KETs companies contains a set of particularly high-performing businesses with respect to a number of KPIs (see Figure 5):

– **Growth:** over the three-year period in question, the KETs companies in our sample grew much faster than the overall EU-28 economy

– **Value creation:** the revenue per employee created by the KETs companies in our sample is comparable to that of high-tech conglomerates (e.g. Siemens)

– **Innovation:** the KETs companies in our sample are recent top innovators in Europe in their respective KETs sector.

When putting our findings into context, the characteristics of our sample need to be considered. In order to ensure that our study focuses on financing conditions in growth and innovation markets, we concentrated on the most innovative companies in each KETs segment (i.e. on companies with the highest number of relevant patents/IP).

- > First, wholly-owned subsidiaries or businesses financing their activities through parent companies
- > Second, purely equity-financed KETs companies without experience in debt financing
- > Third and foremost, companies with structural problems in their business model (i.e. low or negative growth rates). We thus avoided analysing KETs companies in need of rescue or restructuring finance instead of seeking funding for growth

As a consequence of selecting the high performers in the KETs sector, we can assume that average KETs companies face potential challenges and problems in accessing finance to an even larger extent than the companies represented in our sample.

In light of the objectives of the study, we adopted an approach that focused on both the borrowers' and the lenders' perspective. Our methodology ensured a swift identification of relevant companies, good involvement of the required number of study participants on the borrowers' and the lenders' side as well as a targeted in-depth analysis to derive recommendations on how the EIB can support KETs companies in financing their strategic projects. Regarding the borrower's perspective, we conducted an extensive assessment of access-to-finance conditions of KETs companies between May and September 2015. On the investor's/lender's side, we assessed access-to-finance conditions from the perspective of financial institutions between July and September 2015.

In this chapter we present our approach in detail – first regarding the assessment of KETs companies, followed by our approach to the lenders' side. We conclude with a presentation of the challenges that we encountered in the course of the study.

B.1 Assessment of KETs companies

We conducted our assessment of KETs companies in two stages. First, we identified highly innovative KETs ventures with a viable business model and experience of debt financing. This led to a highly relevant sample of 249 KETs companies. Second, we conducted interviews with key decision-makers from selected companies.

1. Identification of KETs companies

In agreement with the EIB, we conducted the identification of highly innovative KETs ventures in three sub-steps. We adopted a patents-based approach to identify innovative KETs companies within pre-established revenue thresholds. We then analysed the business models of the pre-identified companies in order to ensure that they were commercially viable. Finally, we considered their experience of debt financing with the aim of guaranteeing the relevance of the feedback that these companies could provide. This combined filtering approach resulted in a highly relevant sample of 249 KETs companies across 21 countries.

Firstly, we identified the most innovative KETs companies in our focus fields on the basis of the number of recent patent registrations. Together with our partner Fraunhofer ISI, we used a definition of KETs technology categories based on International Patent Classification (IPC) codes. This classification was approved by the EIB and the EC in previous KETs projects. Figure 6 illustrates this definition for the case of advanced materials. On the basis of this search strategy, we screened relevant databases for KETs patents registered between 2012 and 2014.

However, it is known that the importance of patents varies according to the specific sector. As such, not all KETs companies focus on building up and maintaining a patent portfolio. To also include relevant non-patenting KETs companies, other sources were consulted. These included KETs company databases, associations, networks, clusters and KETs-related publicly funded projects. To ensure that the identified companies are in fact KETs companies, they were qualitatively checked for their KETs relevance by experts from Fraunhofer ISI.

To narrow down the resulting broad sample, we complemented our approach with a focus on mid-sized innovative KETs companies, as these are typically key drivers of growth and innovation in the KETs sector. We therefore established revenue thresholds for the KETs companies that we would assess.

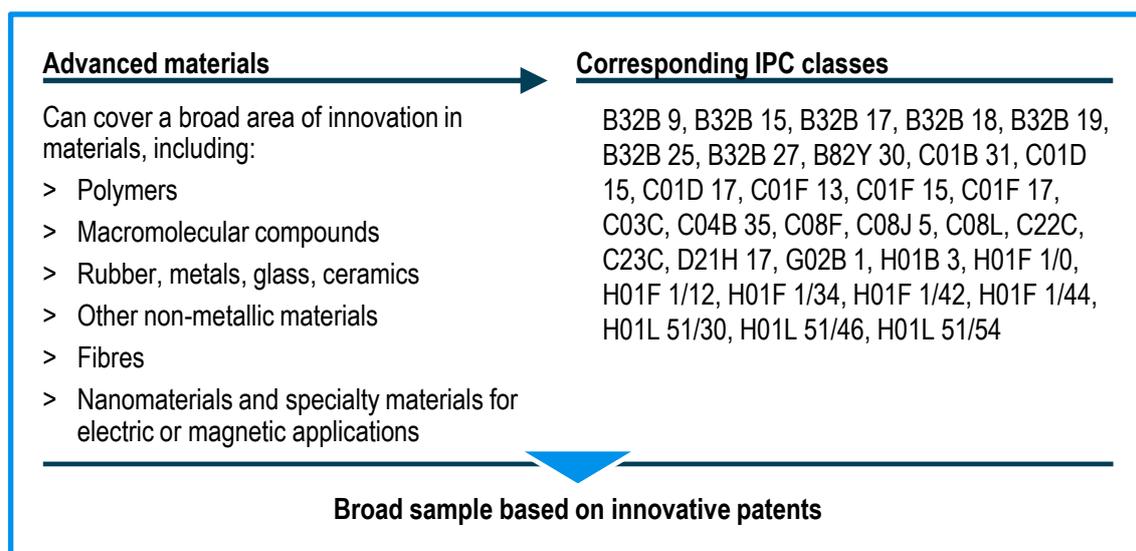


Figure 6: Application of the IPC in the case of advanced materials.

We divided each KETs sector into technology sub-classes and could thereby precisely identify relevant firms using the IPC classes.

After having conducted the first screening to identify the most innovative KETs companies, we focused on companies with revenues ranging between EUR 3 million and EUR 300 million. It was decided to specifically focus on this revenue range because it is already known that companies with lower or even no revenues struggle to raise debt financing due to their very small size and unproven businesses. On the other hand, companies with revenues higher than approx. EUR 300 million are expected to have good access to bank debt, especially under the current very favourable market conditions. Within the examined revenue range, access-to-finance conditions are more uncertain, with initial research suggesting a need for improvement, at least in certain sub-segments. Furthermore, these companies are partially covered by current EIB instruments and thus fall within the Bank's remit.

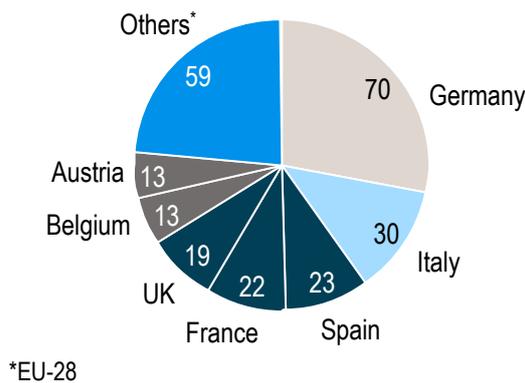
Secondly, we narrowed down the sample size by focusing on the best-performing KETs companies. In order to further increase the relevance of the sample of KETs companies, we assessed their business models, enabling us to identify commercially viable companies. We used proven methods in carrying out this sub-step, including an assessment of revenue and growth based on recent P&L statements as well as a qualitative assessment of the companies' business models.

Thirdly, we excluded from the sample KETs companies without recent experience of debt financing. As a final filter for the identification of relevant KETs companies, we analysed their recent experience of debt financing. In particular, we selected companies that had either raised long-term bank debt in the last few years or tried to do so but failed.

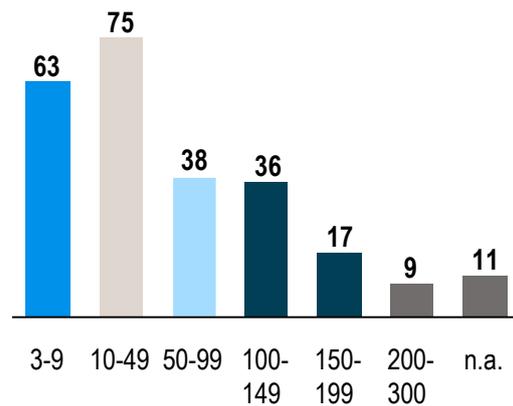
2. Overview of identified KETs companies

Our filtering approach resulted in a highly relevant sample of about 250 KETs companies across 21 countries. Initially, we screened a KETs company universe of about 10,000 companies. Through the first combined filter of patents and revenue thresholds, we narrowed this selection down to some 500 KETs companies. We then applied the second and third filters, which required companies to have a viable business model and experience of debt financing. This further narrowed down the sample to 249 companies. Figure 7 illustrates the overall characteristics of the sample of KETs companies.

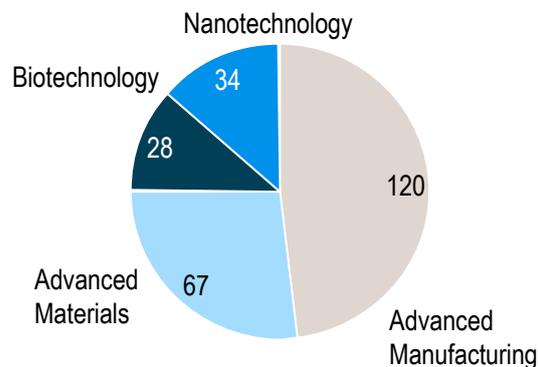
Geographic distribution



Company size (revenues) [EUR m]



KET sector



Targeted interview partner

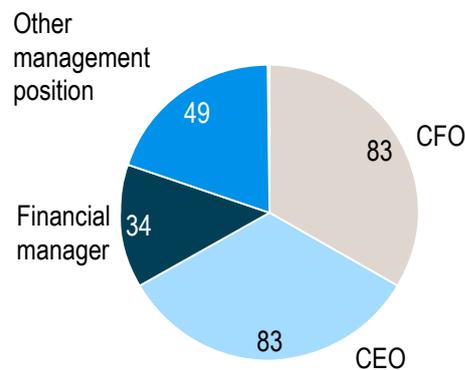


Figure 7: Overview of sample of KETs companies (n=249)².

The geographical distribution of KETs companies in our sample is a result of the patents-based approach we used to identify relevant companies. Germany is strongly represented in the sample. This is not surprising, as it also has the largest share of KETs production within Europe, followed by Italy. The sample thus very well reflects the industrial KETs basis in Europe. Furthermore, Germany has an SME-focused industrial sector, which accounts for approximately 20 per cent of all industrial SMEs in Europe. Advanced manufacturing has the largest share in our sample as this KETs sector covers the broadest range of industries among all KETs sectors analysed. Besides, advanced manufacturing is also the sector in Europe with the highest significance³ of production, followed by advanced materials. In contrast, nanotechnology and industrial biotechnology have a much lower significance of production. All in all, these indicators show that the chosen sample provides an accurate reflection of the industrial sector.

3. Conducting interviews with key decision-makers on the borrower side (KETs companies)

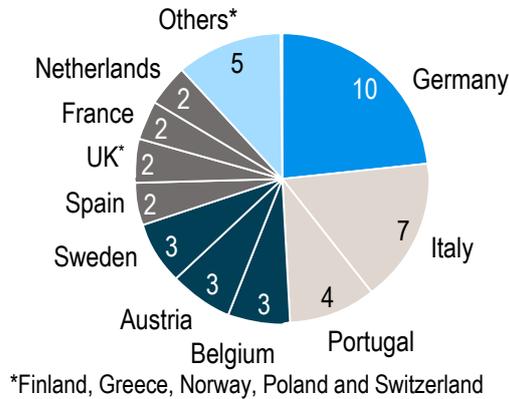
Through semi-structured interviews with key decision-makers, we compiled a broad set of relevant data and expert insights. Our approach consisted of targeting mainly CEOs and CFOs as the most important and knowledgeable decision-makers within KETs companies. We developed semi-structured interview guidelines, which granted interviewers the flexibility to adapt to the course of the interview whenever necessary and created a personal and comfortable interview situation. This allowed interviews participants to discuss sensitive topics, like their company's KPI and borrowing experiences.

The interviews yielded a large amount of quantitative and qualitative data. We developed detailed questionnaires, to gather relevant quantitative data points and qualitative assessments of the overall market environment for lending to KETs (for detailed information, see Appendices A and B). Each interview was then jointly conducted by Roland Berger and a Senior Adviser of the EIB. Besides ensuring coherence, this enabled EIB insights and expertise to be incorporated into the study. The interviews with the borrowers generated 12 categories of quantitative data across three major areas:

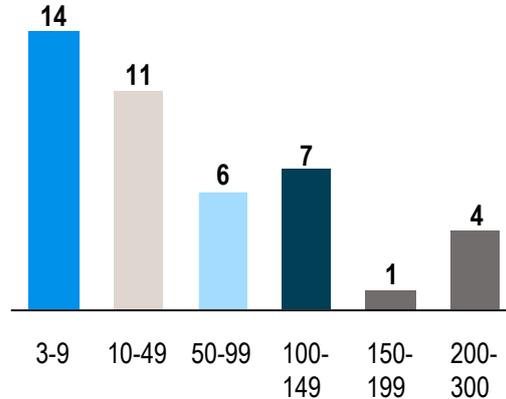
- > Company data: information such as revenue range, EBITDA margin, 3-year CAGR, amount of debt
- > Characteristics of long-term debt: information on typical amounts, maturities and interest rates
- > Relevant ratios as well as covenants and thresholds

The total of 43 interviews with KETs companies we conducted reflects the initial sample outlined above. Among the interviewed KETs companies, 16 represented the advanced manufacturing sector, 11 the advanced materials sector, 9 the nanotechnology sector and 6 the biotechnology sector. One interview was conducted with an executive from a company with cross-sectoral activity. The companies represented a wide revenue range, with 31 KETs companies having annual revenues of less than EUR 100 million and 12 KETs companies with annual revenues of between EUR 100 million and EUR 300 million. The companies interviewed were headquartered in 15 EU/EFTA countries, including the 10 largest EU economies. With these characteristics, the overall distribution of KETs companies in our sample ensured a balanced view of the sector across Europe. Figure 8 illustrates the main characteristics of the companies interviewed. On top of the 43 KETs company interviews, we gained further insights by conducting background discussions with four relevant industry associations. Not only did these discussions validate our findings in the context of a broader market view, but they also provided additional information on sector-wide trends. We conducted these discussions with the Association of European and Industrial Battery Manufacturers (20 regular members and 20 associated members), the European Robotics Association (10 members), the European Composites Industry Association (nine national members and one associated member) as well as with Composites Germany (four members).

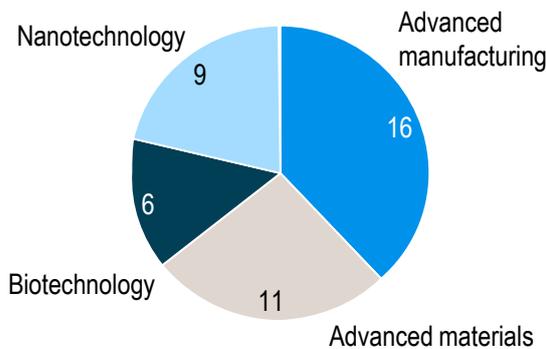
Geographic distribution



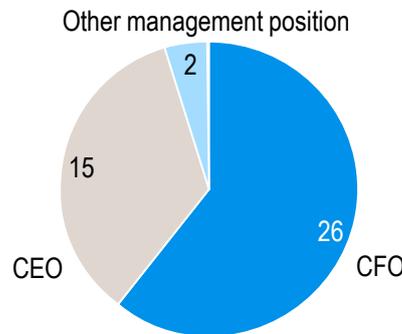
Company size (revenues) [EUR m]



KET sector*



Interview partner



*Does not include one company with cross-sectorial activity

Figure 8: Overview of characteristics of KETs company study sample (n=43).

B.2 Assessment of financial institutions (lenders)

We conducted our assessment of financial institutions (lenders) in two steps, which we present in the following section: as a first step, we identified relevant financing institutions. This led to a broad sample of financial institutions active in KETs financing. As a second step, we conducted interviews with key senior professionals on the lender side.

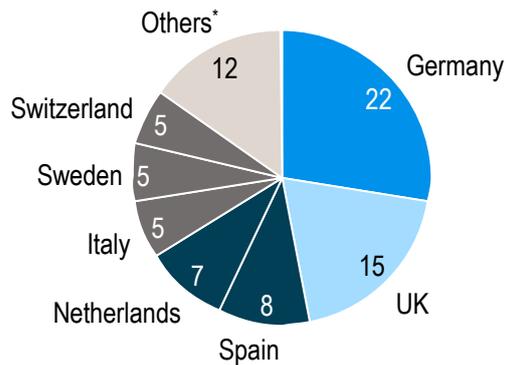
1. Identification of relevant financing institutions

In order to identify institutions and interviewees relevant to the financing of KETs companies, we defined the following selection criteria. First, the institution to be approached needed to be involved in KETs financing activities, such as strategic debt financing. Second, the potential interviewee(s) within the institutions needed to possess up-to-date insights regarding market conditions and maintain close relations with borrowing KETs companies. Third, the institutions needed to offer instruments or programmes for innovative SMEs. We mobilised various sources in order to identify institutions fulfilling our criteria. Important sources were the interviewed KETs companies themselves, which provided relevant contacts. In addition, we selected relevant contacts from the Roland Berger network known to be active in KETs financing. Another set of relevant contacts was provided by the EIB.

2. Overview of identified relevant financing institutions

We identified a sample of 79 relevant financing institutions (see Figure 9). In terms of their **investor type** profile, 55 of these were commercial banks, while another 7 were publicly backed institutions. The remaining 17 institutions included various other investor types (i.e. funds, specialty finance).

Geographic distribution



*EU-28

Company size (revenues) [EUR m]

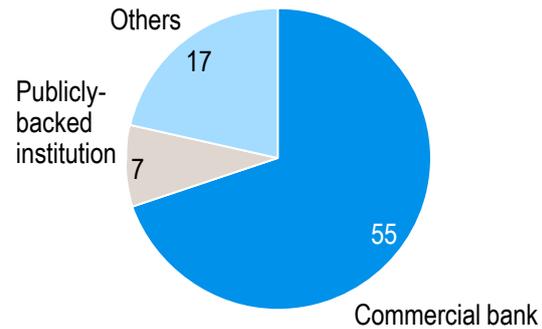


Figure 9: Overview of identified lenders (n=79).

3. Conducting interviews with key senior professionals on the lender side

The main purpose of the interviews conducted on the lender's side was to compile high-quality data and expert insights. Our approach therefore consisted of targeting senior professionals. We focused in particular on innovation-financing business units and dealmakers with hands-on experience in the market. On the basis of our semi-structured interview guidelines outlined above, Roland Berger and a Senior Adviser of the EIB conducted hour-long interviews with targeted specialists on the lending side.

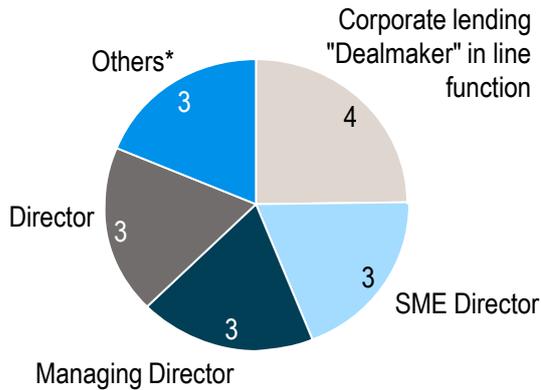
In terms of results, the interviews with lenders yielded relevant quantitative and qualitative information and generated nine categories of quantitative data across two major areas:

- > Company data: information such as balance sheet total, total fund size, company size
- > Characteristics of long-term debt lending: information on the average amount of lending to high-technology companies, as well as the maturity and interest rates of long-term debt

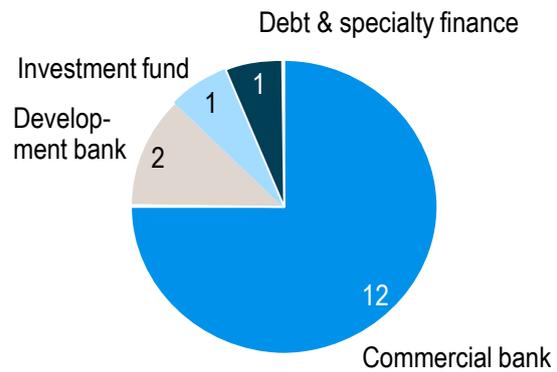
In addition, the interviews with senior lending professionals provided relevant qualitative insights on financing conditions, most notably through the first-hand expert insights on market conditions and their suggestions for improvement.

We conducted interviews with a total of 16 financial intermediaries that broadly reflected the initial sample. These intermediaries were based in 10 countries, including the top 6 EU economies. Their activities jointly covered four focus areas: some interviewees represented "classic" corporate banking specialists with experience in KETs lending; another group consisted of managers of tailor-made programmes for innovation financing; a third group included venture debt experts; while Telecom, Media & Technology (TMT) lending experts constituted the fourth and final group. Figure 10 depicts further characteristics of the institutions interviewed on the lending side.

Interview partner



Investor type



*Head of Export Finance, Product Development SME and Relationship Management EIB/EIF

Figure 10: Overview of interviewed lenders (n=16).

B.3 Challenges

Our starting hypothesis, which presumed that the entire KETs sector would face systemic difficulties in accessing finance, proved not to be viable. We realised this fact upon completion of the first 10 interviews. We mitigated this challenge by adapting our methodology to take a more differentiated approach. In addition, we broadened the scope of the study to include smaller KETs companies with annual revenues ranging between EUR 3 million and EUR 10 million.

With regard to a range of limitations and requirements encountered in the course of the study, we were required to exclude certain KETs sub-sectors. We reacted to this challenge by focusing on the sectors within the scope of the study. Moreover, in order to reach a balanced geographical representation of interviewees, we had to limit the number of interviews to be conducted in well-represented countries. We thus made additional efforts to secure a balanced geographical representation and coverage of additional KETs companies, resulting in a satisfactory response rate of 17 per cent for KETs and a good response rate of 32 per cent for banks. A final challenge in terms of limitations and requirements consisted of an unforeseen second round of patents-based research to identify smaller KETs companies, which we nevertheless completed successfully.

With regard to the motivation of CEOs/CFOs to participate in our interviews, it proved rather time-consuming to gain access to key decision-makers within KETs companies. Also, we faced a high dropout rate of target interviewees who had previously agreed to a meeting. In order to mitigate these two challenges, we mobilised existing networks of the EIB, Roland Berger and industry associations in order to follow up with identified interviewees. We also made repeated use of letters of recommendation issued by the EIB to convince potential interviewees to accept our requests for interview.

C. Analysis and findings

From the analysis of our interviews we derived six key findings, which we present in this section. We arranged the findings in a logical order, starting with a general assessment of market conditions, followed by a more detailed analysis of specific aspects of the access-to-finance environment for KETs companies in Europe. All six findings are closely related to each other. When considering future action in the field of KETs financing, all findings should be equally taken into account.

C.1 Finding 1: Despite very favourable market conditions, many KETs companies struggle to obtain access to adequate finance

KEY TAKEAWAYS

- > Current market conditions create a highly favourable lending environment for borrowers in Europe.
- > Generally, financial institutions do provide debt finance to KETs companies, albeit only within limited financial risk parameters.
- > However, even under the currently favourable market conditions, a significant portion of KETs companies have access-to-finance problems, including innovation leaders with solid growth figures.

The current macroeconomic market environment for lending to KETs companies is perceived to be very favourable. A majority of both financial institutions and KETs companies in our study perceive the current overall market conditions for debt financing in Europe to be favourable. This perception appears to be mainly driven by two factors: low interest rate levels and banks' perceived "appetite to lend". When asked about their perception of interest rate levels, 70 per cent of the study participants considered current interest rates to be significantly lower than in the 2011-2012 period (see Figure 11).

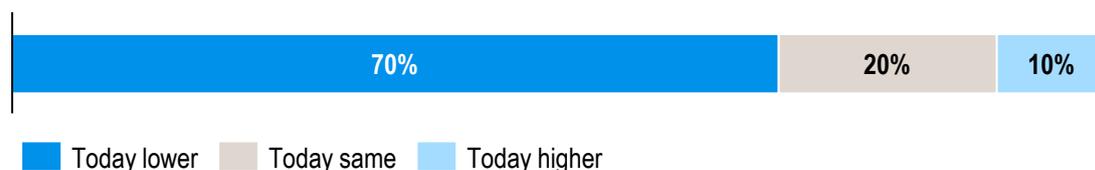


Figure 11: Comparison of interest rates today versus three years ago as perceived by study participants. Most participants perceive interest rates to be lower than three years ago.

This perception coincides with declining key interest rates in the Eurozone: between January 2012 and September 2015, the European Central Bank (ECB) lowered EURIBOR from 0.65 per cent to 0.15 per cent. Apparently, the declining EURIBOR rates positively affected the borrowing conditions set by financial institutions to KETs companies. A majority of both KETs companies and financial institutions stated that the "appetite to lend" of commercial banks across Europe is higher today than it used to be three years ago (see Figure 12).



Figure 12: Banks' "appetite to lend" today versus three years ago as perceived by participants in the study, who mostly see banks' appetite to lend as having grown over the past three years.

In addition, the ECB's policy of "quantitative easing" might be a contributing factor to the favourable market conditions perceived by most of the study's participants: since March 2015 the ECB has been providing the capital markets with additional liquidity worth EUR 60 billion per month. This additional liquidity might incentivise financial institutions to lend more easily to high-tech companies, including KETs businesses.

Related Quotes

Three years ago it was very difficult to receive money; this year the banks are queueing at our door.

CFO of a nanotechnology company

Three years ago, we did not give the money to anybody. There is significantly more lending happening in the market, which can benefit high-tech companies.

Head of Business Unit of a commercial bank

There is a more relaxed atmosphere in the market. Banks are more ready to invest in riskier businesses.

Head of Business Unit of a commercial bank

The [commercial banks'] appetite to lend is three times higher today compared to three years ago.

Director of a commercial bank

Figure 13: Quotes from KETs companies and financial institutions about past and current market conditions for debt finance.

In spite of highly favourable market conditions, many well-performing and established KETs companies struggle or fail to obtain adequate debt financing. This is still the case with companies having a solid revenue base, strong growth figures and a full innovation pipeline. Of the KETs companies interviewed for our study, 72 per cent reported that they had achieved their debt financing targets. However, notwithstanding the favourable market conditions, a significant portion of the market (28 per cent of the KETs companies interviewed) was left without adequate access-to-finance. In our view, it is very likely that the actual failure rates of European KETs companies to obtain debt finance are even higher. Since our sample included some of the most innovative KETs companies with solid business models, it is likely that "average" KETs companies experience even greater access-to-finance challenges. Furthermore, many KETs companies faced significant difficulties during the debt financing process, even if they were able to secure the required funds: 50 per cent of all KETs companies reported access-to-finance to be "difficult" or "very difficult". On the other hand, the financial institutions interviewed (banks, financial intermediaries) reported an even higher level of perceived difficulty: 92 per cent of the institutions interviewed found it "difficult" or "very difficult" to lend to KETs companies (this data refers not only to the companies part of our sample but to any KETs company).

Many companies seeking to launch new products on the market, scale up their existing production facilities or increase their market penetration reported difficulties in obtaining adequate debt financing. Our evidence shows that younger and smaller KETs companies face greater challenges; however, even more established KETs companies showing solid growth figures and a high innovation potential may face

access-to-finance problems for ambitious/scaling-up projects. On the other hand, KETs companies obtaining debt financing on a regular basis without significant fundraising efforts are typically characterised by robust free cash flows, positive EBITDA and a solid past track record.

Has your company received the desired funding outcome?

28%
No

Related Quotes

In Italy it is practically impossible to obtain long-term debt financing as a SME.

CEO of a nanotechnology company

We really would like to have long-term debt finance. Our main problem has always been a lack of guarantees.

CEO of a nanotechnology company

Lack of collateral is a problem for young companies.

CFO of a biotechnology company

Figure 14: Quotes from KETs companies that failed to achieve their desired funding outcome.

Has your company received the desired funding outcome?

72%
Yes

Related Quotes

We are in a very strong position at the moment. I approached a lot of banks and received long-term debt from all of them.

CFO of an advanced materials company

A rejection from a bank has not happened to us yet.

CFO of a nanotechnology company

There was never a problem to raise money. We have proven that we are able to earn money, which makes it easier.

CFO of an advanced manufacturing company

Figure 15: Quotes from KETs companies that achieved their desired funding outcome.

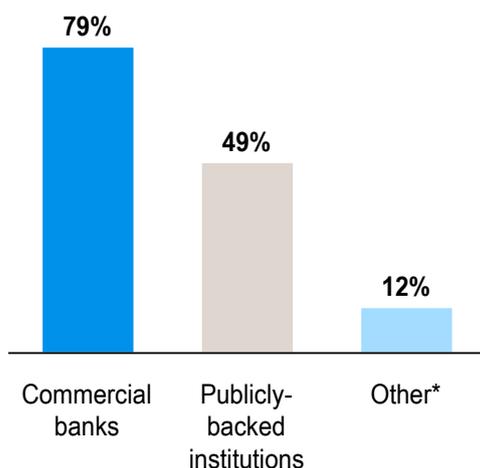
Difficulties in accessing adequate debt financing have different consequences for KETs companies. The complexity and uncertainty of fundraising processes not only impact the companies' development plans and growth due to insufficient financial resources. In addition, especially in smaller KETs businesses, the top management is often busy with fundraising (filing of funding applications, discussions with banks, activities to secure sufficient guarantees, etc.), which leaves little time for other activities like further product development, building client relationships or marketing. Moreover, banks often put KETs companies on a "trial period", watching the development of the KETs business applying for credit lines for an extended period of time (three to up to 12 months) in order to gain more certainty about funding decisions. In a worst-case scenario, such "wait-and-see" approaches can force innovative fast-growing KETs companies out of business due to lack of sufficient liquidity. Consequently, lengthy and uncertain fundraising activities delay the launch of innovative products, slowing down the overall development of innovation in the European KETs sector.

C.2 Finding 2: The conservative financing ecosystem does not favour the most dynamic innovators

KEY TAKEAWAYS

- > Lending to KETs companies takes place in a highly conservative "ecosystem" in terms of market players, instruments in use and financing conditions.
- > The conservative lending approach dominating the market suits established, conservatively managed KETs companies relatively well.
- > Dynamic innovators and less established players find it hard to obtain suitable finance as lending institutions attach great weight to historical performance in their lending decisions and struggle to understand emerging technologies and their market potential.

1. KETs companies show a strong preference for "traditional" lending institutions



Multiple selections possible

*Investment fund, debt and specialty finance

Figure 16: KETs companies' answers about their sources of finance.

Despite their highly innovation-driven business models, most KETs companies use traditional means of debt financing. The KETs companies in our sample are often venturing into innovative product lines and new markets, which frequently involve a high degree of technological and financial risk. Many KETs businesses are relatively young and were often founded in a start-up environment or as university spin-offs, where innovative early-stage financing approaches are needed. Furthermore, over the past years innovative financing instruments have been tried and tested in technology financing, e.g. mezzanine capital (a hybrid of debt and equity finance) or bonds. We would therefore have expected to find a significant number of the KETs companies in our sample pursuing innovative, possibly higher-risk-taking debt financing strategies. However, we did not find this assumption to be true. The financing approaches taken by KETs companies are generally conservative. This is true in terms of the lending institutions involved, the debt instruments used and the key parameters of existing financing deals (i.e. maturity, leverage, guarantees).

Long-standing relationships and geographical proximity to "house banks" minimise complexity and fundraising efforts for KETs companies but tend to discourage high-tech businesses with not much of a track record. We found geographical proximity to be an important factor for lender/borrower relationships in the KETs sector. Many KETs companies prefer "house banks" with which they have long-standing relationships. These "house banks" usually have strong roots in their respective region and tend to have a long-standing banking relationship with the KETs company in question. Apparently, these long-standing relationships enable banks to better assess the risk involved in financing the respective KETs business. A number of study participants indicated that this regionalised KETs financing model is reducing the fundraising efforts for KETs companies and at the same time the complexity of the risk assessment on the lending bank's side. On the other hand, we found no KETs companies seeking to optimise financing conditions by working with banks outside their home country or by raising debt in foreign currencies

because of better financing conditions. At current record-low interest rates, there appears to be little incentive for KETs companies to extensively compare financing conditions between market participants from different countries. As cost of capital does not seem to be a major issue under current market conditions, many KETs companies seem to base their borrowing decisions mainly on the availability of funding and ease of the lending process. The prevailing regionalised financing environment appears to work well for established KETs companies: transaction costs are minimised through geographical proximity and well-established borrower/lender relationships. On the other hand, this established regionalised environment makes it harder for younger KETs businesses with a limited track record to obtain adequate access-to-finance. Indeed, regional banks often lack the know-how to assess emerging technologies and their market potential and are therefore very likely to reject financing requests until the applicants reach a more mature stage and can show adequate collateral and financial track record. Moreover, the often smaller regional banks tend not to have a full overview of available co-financing and risk-sharing instruments offered by public institutions (also at the European level). This circumstance can lead to negative financing decisions for KETs companies, even when appropriate risk-sharing instruments (i.e. guarantees) are available on the market. For this reason one of the “quick win” solutions proposed to improve access-to-finance conditions is to increase activities to create greater awareness in the market about existing EC/EIB risk-sharing instruments.

Public funding often serves to open the door to private sector engagement. A significant portion of the KETs companies interviewed reported that borrowing from “house banks” is often supported by public banks, e.g. regional development banks, or public lending programmes administered by commercial banks or the EIB directly. 49 per cent of the KETs companies we interviewed had made use of funding available through such publicly backed institutions (see Figure 16). Once KETs companies have obtained a funding pledge from a public institution, commercial banks appear to be more willing to top up existing commitments from public banks through commercial loans (see Finding C.5 for a detailed analysis of the role of public sector intervention). KETs companies may also use public funding opportunistically, as in some cases it may provide capital at a lower cost and/or with better conditions.

Related Quotes

The interest rates were similar for all banks. But players other than our house bank asked us to move the whole business over to them, which would be too complicated and costly.

CFO of an advanced manufacturing company

It is helpful for many companies to have an agreement with the government to get funding from their house banks.

CEO of an advanced manufacturing company

Part of our loans are from [a development bank] with special conditions under an innovation programme. The loans are transferred to us by our house bank.

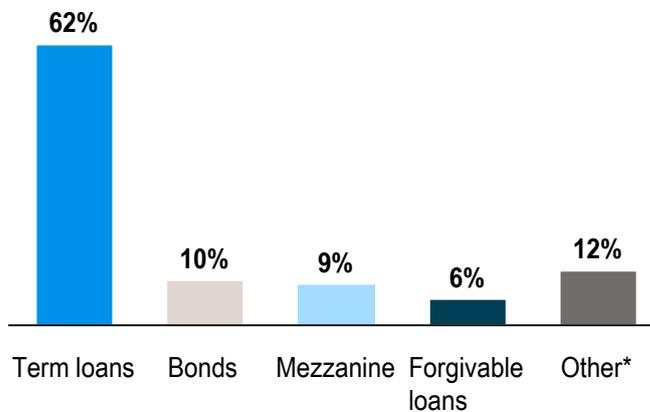
CFO of an advanced manufacturing company

Some banks have agreements with the EIB. But the local house banks do not know how to use the risk-sharing instruments.

CEO of a nanotechnology company

Figure 17: Quotes about KETs companies' experience with their lending institutions.

2. Conventional term loans are the dominant financing instrument in today's lending market



Difference to 100% due to rounding

*Shareholder loans, bonded loans, research grants

Figure 18: Type of debt instruments used by KETs companies.

Because the current market conditions discourage the use of alternative approaches, conventional term loans are the dominant financing instrument for KETs companies. The types of loans used by KETs companies usually have fixed interest rates and durations, with a pre-agreed set of covenants. Such loans account for 62 per cent of the debt instruments used by the KETs companies interviewed (see Figure 18).

Our analysis indicates that term loans dominate the debt financing approaches used by KETs companies because these instruments are cost-efficient and

flexible. In the current interest rate environment there appears to be little incentive to optimise the cost of capital. In contrast, other instruments such as mezzanine appear to be too complicated or expensive. KETs companies' overall focus on growth and innovation instead of sophisticated financing strategies possibly explains their preference for easy-to-handle financial instruments.

Related Quotes

For our company, we only use bank loans at the moment. We checked other financing sources, but it was more expensive and the potential lenders asked for more covenants, which disqualified them.

CFO of an advanced manufacturing company

For all investments, there was enough financing power coming from our shareholders and our bank loans.

CFO of an advanced manufacturing company

We negotiated with several banks over a EUR 20 m loan. Regarding securities and covenants, the discussions were not easy. We need to be flexible. If a banking partner insists on the covenants, we do not want a relationship with that bank.

CFO of a nanotechnology company

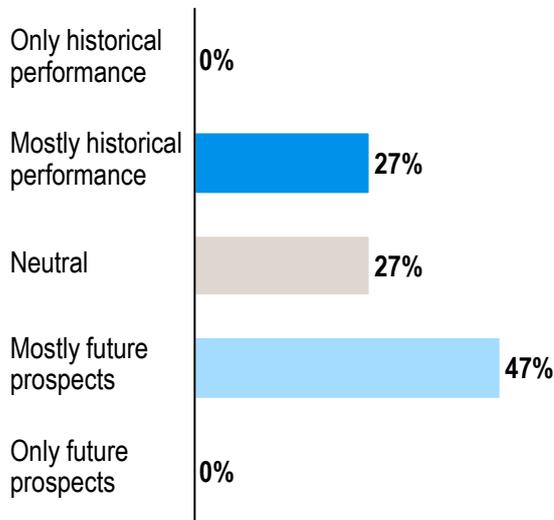
We had mezzanine, but it was so expensive that we got rid of it as fast as possible.

CFO of an advanced manufacturing company

Figure 19: Quotes about KETs companies' financing preferences.

3. KETs' past performance is always important for commercial banks when assessing debt applications from KETs companies

A solid past performance is the core criterion for most banks when assessing KETs companies' debt applications, despite the fact that banks report using mixed approaches. In the assessment of future performance banks tend to focus on risk management rather than the upside potential. This approach tends to discourage newly established KETs and disruptive innovators, where the value is embedded in the future market potential. Most financial institutions report that they use mixed



Difference to 100% due to rounding

Figure 20: Financial institutions' basis for lending decisions

approaches in making their lending decisions, taking into account both the historical and future performance of KETs companies (see Figure 20).

With respect to the financial ratios used in the appraisal process, the majority of banks appear to base their lending decisions on a set of commonly used debt ratios. By definition, metrics such as net debt/EBITDA and interest coverage ratios are ways of assessing the past performance of KETs companies. These ratios reflect a thorough risk management approach on the banks' side, such as consideration of whether the equity base of a company is strong enough to carry debt or how comfortably interest rate and capital repayments could be covered from existing cash flows. Our analysis points out that a strong equity base is a key prerequisite for lending. Finally, banks are cautious when a KETs company shows a high net

debt/EBITDA ratio, although we found no clear cut-off point. Under these conditions KETs companies with a limited track record or businesses targeting a steep growth path requiring bold financing solutions often have little chance of obtaining adequate access-to-finance.

Banks focus very much on minimising risk in valuing KETs companies' future development prospects. When assessing a KETs company's future outlook, banks often ask for firm mitigants and guarantees, such as:

- > Security on the company's assets (e.g. land, buildings, etc.)
- > Offtake agreements by third party clients to buy the goods produced by a new production line that is to be financed
- > Guarantees or additional equity commitments by the KETs company's shareholders
- > Guarantees by public sector banks or government institutions

KETs companies frequently find it very hard to fulfil these often demanding preconditions and requirements by commercial lenders. The preconditions for lending to KETs companies outlined above come on top of a range of rather standardised covenants that are usually agreed by the bank with the borrower. We found no specifically used ratio or cut-off point for covenants. The metrics used (i.e. net debt/EBITDA, equity ratio, net debt/equity, interest coverage ratio or a combination of them) favour companies with a strong equity basis and/or a strong past and current performance.

Related Quotes

The historical performance [of KET companies] is particularly important [for lending decisions]. It is more measurable than future performance.

CEO of an investment fund

We prefer strong collateral like mortgages and do not accept technology.

Manager of a commercial bank

We can lend to KET companies that are unprofitable due to depreciation, but it is almost impossible to lend to companies with negative EBITDA.

Manager of a commercial bank

If they can prove that cash flows will be positive in the future, I could lend to a KET company with a negative EBITDA.

Senior Manager of a commercial bank

Figure 21: Quotes from financial institutions about their lending strategies for KETs companies.

Only a few financial institutions cautiously started to offer unconventional financing instruments. Most banks have conservative lending strategies based on financial metrics, as described above, which are not suitable for financing technologically-driven companies with a limited track record or none at all, yet possibly significant market potential. Exceptions are programmes offered by Barclays Capital and ABN Amro. The "Barclays Fast Growth Technology Fund" provides early-stage debt funding for technology firms, which can be pre-profit and without a proven track record. Barclays lends based on assessments of the future potential of such firms. Similarly, ABN Amro provides term loans to SMEs for early-stage commercialisation projects. While such approaches are certainly innovative, it must, however, be noted that their reach and impact on the market is relatively limited at the moment. For example, the Barclays Fund is limited to GBP 100 million (EUR 142 million)⁴.

Related Quotes

Our basis of evaluation for KET companies is the assessment of future cash flows. [...] A company needs to be able to demonstrate a sales model where you can see future earnings. You also want a management with a track record. But you also want to have an idea about the past performance of a company to set up a funding model.

Head of Business Unit of a commercial bank

We want to see sustainable growth rates and patented IP, but no specific number of months/years of operations are required. We have quite high standards, but we do negative EBITDA lending [to KET companies]. For our lending, we do not seek collateral, but we look at the strength of a KET company, its business plan and future prospects.

Head of Business Unit of a commercial bank

Figure 22: Quotes from financial institutions with innovative lending strategies.

4. Debt parameters are indicative of a conservative financing strategy

The maturity levels for credit lines indicate standardised lending approaches instead of flexible models. Maturities for loans have a range of between two and 12 years, with the vast majority of credit lines having a maturity of five years. Lending to KETs companies over periods longer than five years is rare (see Figure 23). The large number of five-year loans could indicate that commercial banks use standardised lending approaches instead of customised instruments. But while desired by some of the KETs companies interviewed, more flexible financing tools such as very short-term "bridging loans" or very long-term subordinated debt seem to be insufficiently available.

It seems that higher-risk lending in conjunction with higher interest rates rarely occurs. It might have been expected that higher risk KETs companies would use financing deals with higher interest rates, reflecting higher-than-average business and technology risks. However, our analysis indicates that the interest rates paid by KETs companies do not appear to be significantly higher than in other sectors. As indicated by both KETs companies and lenders, the interest rates paid by KETs companies ranged from 0.5 to 5.5 per cent, with the median interest rate being 3 per cent. Financing deals with interest rates higher than the median were often closed when interest rate levels in the Eurozone were much higher (2005-2010).

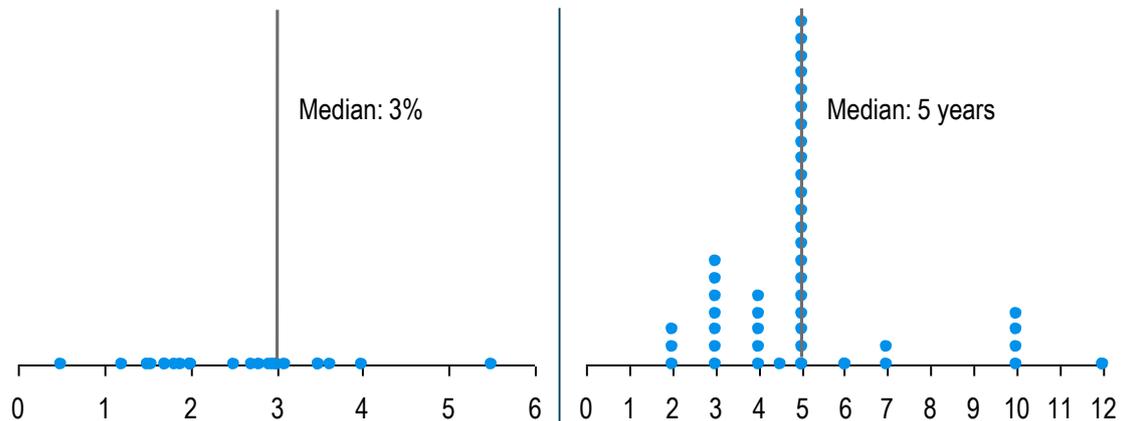
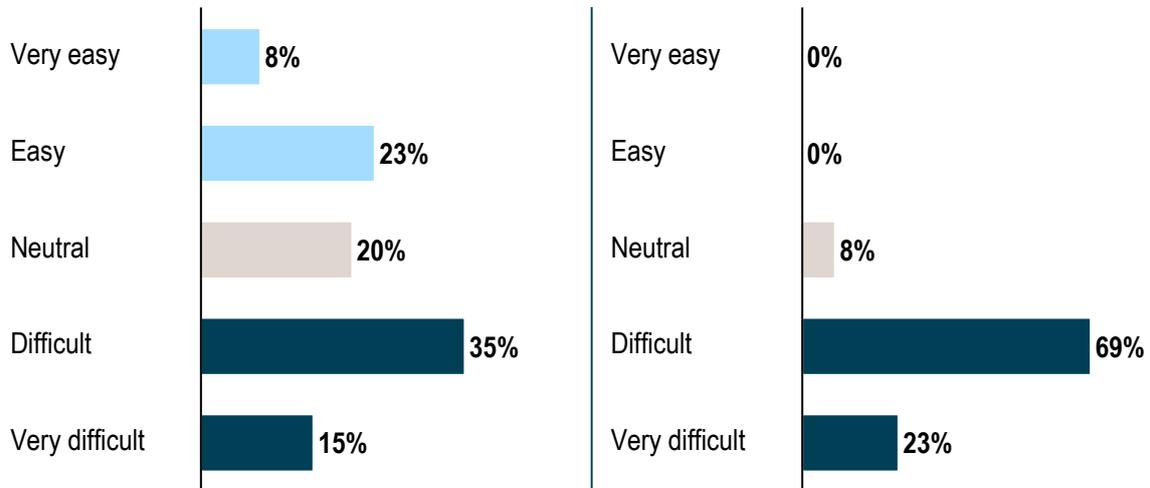


Figure 23: Interest rates [in per cent, left] and maturities of debt financing agreements [in years, right] reported by the participants in our study.

The low leverage of KETs companies further indicates a conservative borrowing/lending environment. We might have expected to find at least a few KETs companies that were heavily leveraged in order to finance large-scale investments for commercialisation and production scale-up projects. However, we found the majority of KETs companies to be rather conservatively leveraged: their total debt/EBITDA average was 2.42⁵, a sign that the majority of financial institutions did not seem to be willing to use higher-risk-taking approaches. As a consequence, the low leverage suggested by the net debt/EBITDA ratio might not necessarily reflect the financing targets of KETs companies. A number of KETs companies indicated a need for greater amounts of debt but found the conditions for accessing additional finance too difficult.

5. A difficult sector to finance: both KETs companies and banks find it hard to enter into transactions

While a majority of KETs companies receive the desired level of funding, they generally find access-to-finance hard. When asked, 72 per cent of the KETs companies interviewed reported that they had received the desired funding outcome. On the other hand, half of the KETs companies interviewed perceived access-to-finance to be "difficult" or "very difficult". In their view, the complexity of the technology-driven sector was the main reason for this situation (see Figure 25). KETs companies also often believed that financial institutions considered innovation-based companies to be too risky an investment to finance.



Difference to 100% due to rounding

Figure 24: KETs companies' perceived ease of borrowing (left) and banks' perceived ease of lending (right). 50 per cent of the KETs companies perceive it to be difficult or very difficult to borrow from banks. Banks, on the other hand, overwhelmingly think it is difficult or very difficult to lend to KETs companies (92 per cent).

Banks mostly have conservative lending strategies and no specialised expertise for assessing KETs companies and hence consider the KETs sector to be too difficult to finance. None of the banks interviewed perceived lending to KETs companies as “easy” or “very easy”, while 92 per cent found it “difficult” or “very difficult”. These results are consistent with the finding that financial institutions are focused on “traditional” financial metrics, which KETs companies often score poorly on. The banks interviewed, echoing the KETs companies interviewed, as mentioned before, stated that the main reason for their perceived difficulty in lending was technology risk (see Figure 25). Other reasons cited were the lack of tangible assets as collateral or of a proven track record (see Finding 3 for more details).

Related Quotes

KET companies' perceived difficulty to access debt finance

European banks are not investing in companies as they should. The governments are helping, but the banks are not following.
CFO of a biotechnology company

Local banks want collateral. They give money when you have money.
CEO of an advanced manufacturing company

Italian banks only consider buildings as guarantees. Historical turnover, technology patents, trade names, reputation in the market and R&D have no value.
CEO of a nanotechnology company

Banks are quite hesitant to take risks or bad debt, also because of their public image.
CFO of a biotechnology company

We had difficulties meeting the covenants [of our banks] every year because of the volatility of our financial performance.
CFO of an advanced materials company

Financial institutions' perceived difficulty to lend to KET companies

The banking system is shy lending to businesses they do not understand.
CEO of an investment fund

KET companies are high-risk companies. For investment other than equity, you need collateral and guarantees.
Director of an investment bank

[Banks] do not have the knowledge about a technology. You need to ask someone for help. It is much more difficult than the assessment of an established company.
Vice President of a development bank

There are no tangible assets, which can be valued as collateral. R&D often has uncertain outcomes.
Senior Manager of a commercial bank

We can only make judgments for the next 1 or 2 years, because of the shorter life cycles [of KET companies].
Head of Business Unit of a commercial bank

Figure 25: Quotes from borrowers (KETs companies) and lenders (financial institutions) about their perceived difficulty in accessing and providing debt financing.

Most innovative businesses find it hard to convince traditional and/or regional banks to provide adequate debt financing. The main reason for this is the prevailing very conservative debt financing "ecosystem": banks seek to lend to low-risk KETs companies with conservative business models and strong track records. Under these market conditions, the most dynamic innovators and research-driven newcomers in the KETs sector will need support to meet their financing needs.

C.3 Finding 3: Knowledge of KETs is key for financing decisions – and in short supply with many banks

KEY TAKEAWAYS

- > KETs companies are driven by highly specialised expert know-how and the development of sophisticated product innovations
- > Financing institutions often struggle to understand the value and commercialisation potential of KETs companies' product innovations
- > "A bird in the hand is worth two in the bush" – banks tend to shy away from financing unproven hard-to-understand KETs ventures
- > In this environment the EIB could use its reputation for financing such innovative technologies by employing its sector and financial structuring expertise to improve access-to-finance conditions for KETs companies

KETs companies are engineering-driven, with technology and innovation at the heart of their businesses. When asked about the keys to their success, 79 per cent of the KETs companies in our study sample mention technology and knowledge-driven factors (see Figure 26). Strikingly, the products of KETs companies often seem to be built on highly specialised innovations as a result of sustained R&D efforts. On the other hand, non-technological factors such as cost leadership, economies of scale or marketing seem to play only a subordinate role. In their overall business strategy, only 21 per cent of the KETs companies interviewed consider those factors to be crucial to their success.

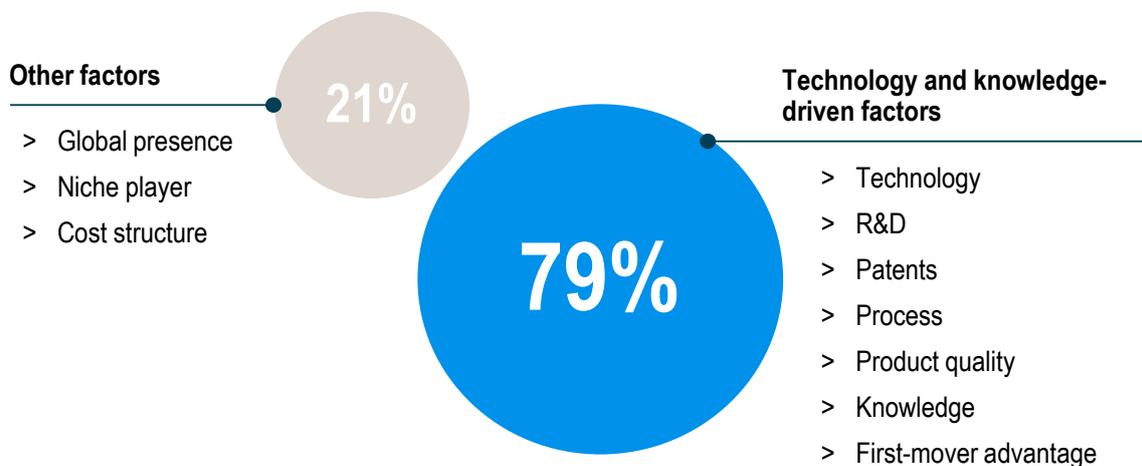


Figure 26: Self-described key factors in the success of the KETs companies interviewed.

Technology is at the core of most KETs companies' financing activities. New production lines, business development and R&D are the main reasons for raising debt financing:

- > Sixty per cent of the KETs companies interviewed stated that debt would be required to finance activities leading to further revenue growth, i.e. for expanding or launching new production lines, acquiring new machines or building new production facilities
- > Some 20 per cent raised debt to finance R&D activities, often for later-stage product development and pre-commercialisation efforts such as pilot lines
- > Only some 20 per cent required debt financing for non-technology-related activities such as management buyouts as a consequence of ownership changes or M&A activities

Related Quotes

The reason [for raising debt] is growth. We want to open a lot of new factories all around the world.

CEO of a nanotechnology company

We are currently looking to raise money to finance the equipment for a scale-up of our production and increasing our revenues.

CFO of an advanced materials company

The main purposes [of our debt financing] are new market opportunities, R&D costs, and shortening the life cycle of the products.

CFO of an advanced manufacturing company

[We need debt for] investments into plants, machinery, installations, and also a small part into our R&D.

CEO of a nanotechnology company

Figure 27: Quotes from KETs companies about their reasons for raising debt.

KETs companies encounter a largely risk-averse financial sector with difficulties in understanding the potential of KETs innovations. KETs companies' main drivers for their financing needs – technology and innovation – are often complex and previously untested on the markets on a larger scale. While KETs companies often approach lending institutions to finance cutting-edge proprietary products and processes, they usually understand such innovations far better than their respective lenders. Many KETs companies report difficulties in getting lenders to understand product innovations (see Figure 28). At the same time banks report difficulties in evaluating the technology investments proposed by KETs companies in terms of financial returns. Such a "knowledge asymmetry" between borrowers and lenders is thus likely to make their financial transactions more complex and the associated risks harder to assess than in more established markets. Advisory services, addressing both the knowledge gaps with some financial institutions and less sophisticated KETs companies, could play an instrumental role in facilitating certain financing transactions.

Related Quotes

KET companies

Banks understand M&A or construction activities way better than R&D.

CFO of an advanced manufacturing company

Finding people [in financial institutions] understanding what we talk about is not easy. We have to deal with intermediaries, which are not very knowledgeable.

CEO of a nanotechnology company

There is a mismatch in the perception of time between innovative companies and banks: Our investments have a lifetime of up to 20 years, but banks want us to repay very quickly.

CEO of a nanotechnology company

Financial institutions

When you invest in a KET company, you invest in the people developing a technology. Those companies do not have anything to collateralise.

Director of an investment bank

Technology is key, because these KET companies are so specific that we usually don't have the know-how to do a sobering risk analysis.

Managing Director of a commercial bank

The problem that we frequently encounter is that cash flows are not evident and that it is not clear how the financing will be repaid.

Head of Business Unit of a commercial bank

Figure 28: KETs companies' and financial institutions' opinions about borrowing and lending.

Because the knowledge-intensity of KETs companies leads to financing hurdles, advanced technology and market expertise are needed to assess investment plans and business outlooks.

However, such expertise is often lacking, especially in smaller banks and regional offices. By using its existing knowledge base, its reputation for technical due diligence and its understanding of innovative technology, the EIB could significantly improve access-to-finance conditions for KETs companies.

The EIB's unique technical capacities could be used to catalyse access-to-finance for KETs companies. KETs financing is a highly knowledge-driven business. In order to assess investment plans and business outlooks, enhanced technology and market expertise is needed but not always available. By sharing and leveraging its existing knowledge base, the EIB could significantly improve access-to-finance conditions for KETs.

C.4 Finding 4: Big is beautiful – smaller KETs companies face more difficulties

KEY TAKEAWAYS

- > Larger KETs companies find it far easier to raise debt financing than smaller ones.
- > Smaller companies tend to look for finance in regional financing institutions or local subsidiaries of larger ones, which often have a limited understanding of KETs and their financing models.
- > The lending climate for KETs companies appears to be slightly more favourable in Northern European economies than in Southern European ones.
- > Access-to-finance conditions for biotechnology and nanotechnology companies appear to be more difficult than for those in the advanced manufacturing and advanced materials sectors.

Access-to-finance conditions differ across company size, KETs sector and geographical location.

Within the scope of our study, we analysed whether there are structural differences concerning access-to-finance within the KETs sector. We particularly assessed possible correlations between access-to-finance conditions and

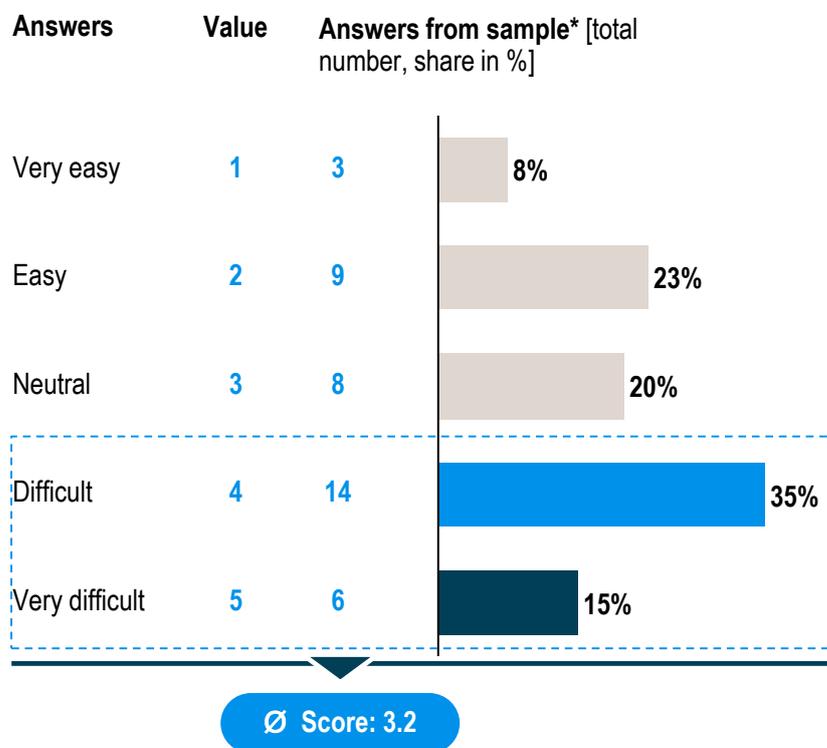
- > Size (in terms of revenue) of the KETs companies in our sample
- > Individual KETs sectors
- > Geographical location (company headquarters) of KETs companies

Methodology box

Our analysis is based on the perceived difficulties to access finance as reported by KETs companies and on the perceived difficulty to lend as reported by financial institutions. To make such perceptions comparable, we use a "difficulty score" for accessing finance, calculated as follows:

1. We asked KETs companies: "How difficult has it been for your company to receive the needed debt financing?" We also asked financial institutions: "How difficult is it for your institution to provide high-tech companies with debt financing?" The interviewees could choose from the following answers: "very easy", "easy", "neutral", "difficult" and "very difficult".

2. We then converted the answers into values between 1 and 5 and calculated the score as the average of the values:



Difference to 100% due to rounding

*Difference to sample size of 43: no answer provided

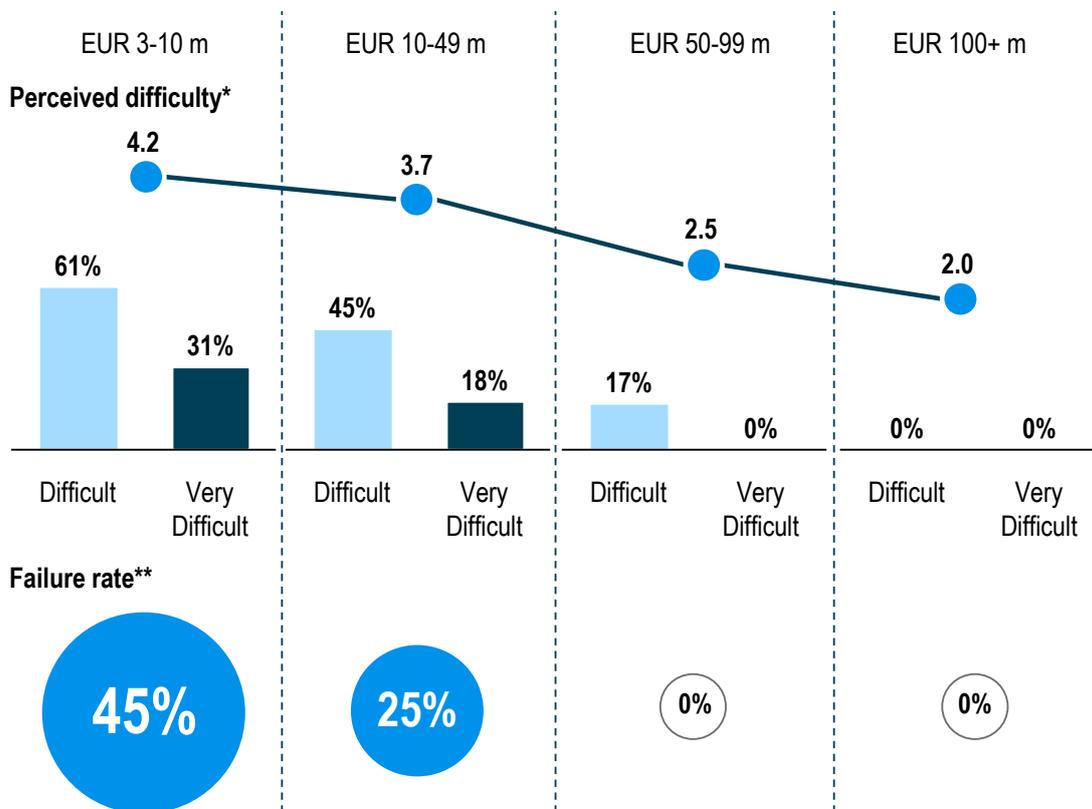
Figure 29: Our approach to calculate the "difficulty score"; results for the full study sample of KETs companies.

The higher the score, the higher the perceived difficulty of accessing finance for KETs companies. The overall "difficulty score" for all KETs companies in our study sample is 3.2, i.e. on average KETs companies find access to debt finance slightly harder than "neutral" (3.0).

"Big is beautiful" – The current banking system puts smaller KETs companies at a disadvantage. To analyse whether access-to-finance conditions and the size of the KETs companies under review are correlated, we grouped the sample of KETs companies into four clusters.

- > Smaller KETs companies: revenue between EUR 3 million and EUR 10 million
- > Medium-sized KETs companies: revenue between EUR 10 million and EUR 50 million
- > KETs companies above medium size: revenue between EUR 50 million and EUR 100 million
- > Larger KETs companies: revenue above EUR 100 million, with EUR 300 million as the cut off-point for our study

KET company revenue range



*Average per revenue cluster [1 = Very easy, 2 = Easy, 3 = Neutral, 4 = Difficult, 5 = Very difficult]

**Companies not having received the desired funding outcome

Figure 30: Results of analysis on perceived difficulty for KETs companies to access debt financing.

Smaller companies find it hardest to access finance. Such companies reported an average score of 4.2, meaning "difficult" with a tendency to "very difficult". The failure rate among smaller KETs companies is much higher than among larger ones, which implies that a significant portion of smaller companies was not able to secure the required funding despite all possible efforts. On the other hand, larger KETs companies, especially those with more than EUR 100 million in revenue, report a much lower average score of 2.0, which means "easy".

Related Quotes

It is very easy to get financing once a company is big enough. A company too small and unproven won't get money. The first steps are very difficult to take.

CFO of an advanced manufacturing company

When we talked to banks to see what we can get from the market, one in three said we were too small.

CFO of an advanced materials company

For [funding by] the EIB, our company is just too small. We cannot fulfill their selection criteria.

CEO of a nanotechnology company

Banks are not supporting young, innovative businesses. The banks are not approaching you; you have to go to the banks.

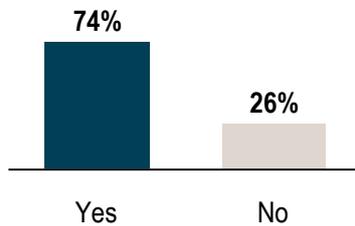
CFO of a biotechnology company

Figure 31: Quotes from KETs companies about the relationship between access-to-finance and company size.

The actual failure rate of access-to-finance for "normal" European KETs companies is expected to be even higher than the score indicates. The results of the score need to be considered in the context of our study sample of KETs companies. We deliberately chose high-performing KETs companies: innovation leaders with a viable business model and rapid growth (see chapter B). Because the 249 KETs companies selected (out of approximately 10,000 KETs companies in Europe) were not randomly selected but represent some of the best performing KETs companies, we expect the vast majority of less innovative and less well performing KETs companies to face greater access-to-finance challenges than has been highlighted in this study. For this reason, it is also unlikely that larger KETs companies have an actual failure rate of zero per cent, as the rate among the high-performing companies in our study sample suggests. A considerable number of less well performing larger KETs companies could also be expected to have failed to access debt.

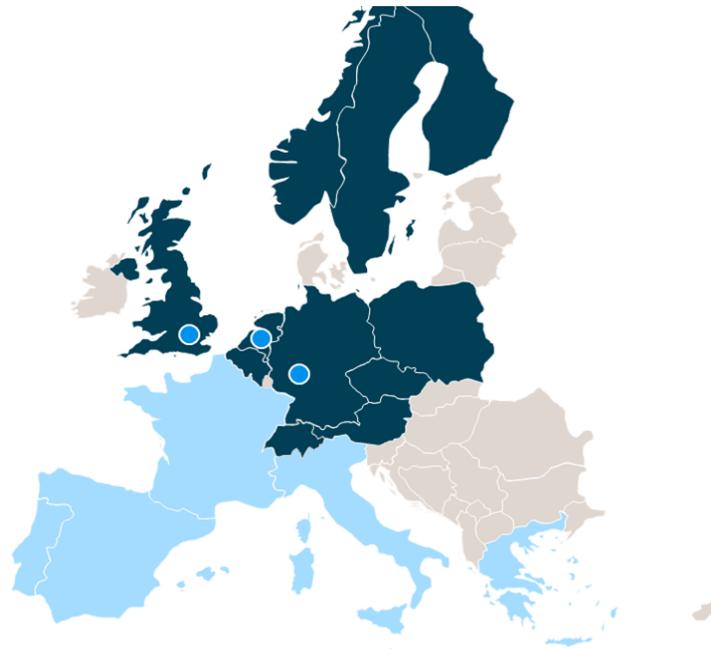
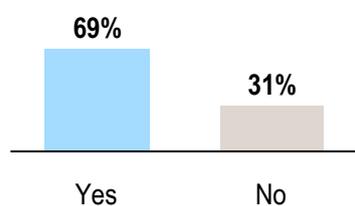
Northern Europe*

Successful achievement of financing target [%]



Southern Europe**

Successful achievement of financing target [%]



- Locations of banks identified offering innovative or higher risk-taking instruments

*UK, Germany, Belgium, Netherlands, Poland, Czech Republic, Austria, Norway, Sweden, Finland and Switzerland

**France, Spain, Portugal, Italy and Greece

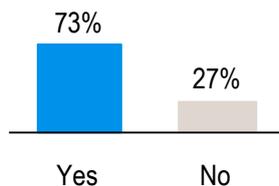
Figure 32: Answers from KETs companies about their access-to-finance conditions according to their geographical location.

Access-to-finance conditions appear to be slightly better in Northern European countries than in Southern European ones. However, despite the financial crisis, which disproportionately hit the Southern European countries, the difference is surprisingly small, suggesting that banks in Southern Europe are not significantly more rigid in their financing decisions than their Northern counterparts. One reason explaining the slightly easier access-to-finance conditions in Northern Europe might be the stronger presence of financial institutions offering innovative or higher-risk-taking instruments to KETs companies, which we could mostly identify in Northern Europe.

Biotechnology and nanotechnology companies seem to experience greater difficulties in access-to-finance than those in other sectors. A possible reason could be company size. The biotechnology and nanotechnology companies in our sample are significantly smaller, with annual average revenues of EUR 36 million and EUR 39 million respectively, compared to their counterparts in advanced manufacturing and materials with EUR 86 million and EUR 88 million respectively. Another reason could be that biotechnology and nanotechnology are generally perceived to be riskier industries. In light of these results, further analysis of those sectors may help to better understand sector-specific challenges.

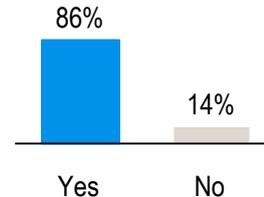
Advanced manufacturing

Perceived difficulty*:	2.8
Average company revenue [EUR m]:	86
Achievement of financing target [%]	



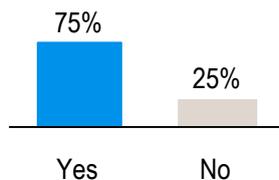
Advanced materials

Perceived difficulty*:	2.8
Average company revenue [EUR m]:	88
Achievement of financing target [%]	



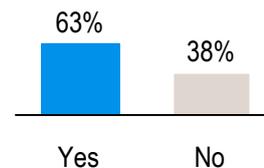
Biotechnology

Perceived difficulty*:	4.0
Average company revenue [EUR m]:	36
Achievement of financing target [%]	



Nanotechnology

Perceived difficulty*:	4.3
Average company revenue [EUR m]:	39
Achievement of financing target [%]	



Difference to 100% due to rounding

*Average per industry sector [1 = Very easy, 2 = Easy, 3 = Neutral, 4 = Difficult, 5 = Very difficult]

Figure 33: Perceived difficulty in accessing finance for KETs companies, by industry sector.

Market structures need to improve in order to help innovative and especially smaller KETs companies to realise their full potential. As the current market environment especially fails to cater to the financing needs of smaller KETs companies, many young and highly innovative businesses fail to raise adequate finance. In the next chapter, we shall analyse the potential impact public sector institutions can have in systematically improving access-to-finance conditions for KETs companies.

As a consequence, smaller KETs companies require broader support than pure finance. The current banking system fails to properly sustain smaller KETs. This often results in the failure of young highly innovative companies to raise adequate financing. Market structures need to be improved in order to help innovative KETs companies to realise their full potential. This includes broader measures to support growth and approaches to increase the visibility of promising KETs companies to potential financiers.

C.5 Finding 5: Public support well-suited to compensate for specific shortcomings

KEY TAKEAWAYS

- > Being largely risk-averse, commercial banks alone fail to cater to the needs of young innovative KETs companies in particular
- > Public sector financing can be useful as a "door opener" to improve KETs companies' access to commercial debt finance since the pre-lending due diligence conducted by public banks in combination with their risk-taking approach is valued by commercial lenders
- > Should the current low-interest rate high-liquidity market environment change, the EIB's instruments could become even more necessary

"Lack of past performance" is the major "show-stopper" for lending, often leaving young and innovative KETs companies planning ambitious investments without access-to-finance. As previously noted, the debt financing market for KETs companies is challenging, as both lenders and borrowers find it hard to achieve their targets. Fifty per cent of the participants in our study (KETs companies and financial institutions) stated that the lack of past performance of KETs businesses was the most important obstacle for access-to-finance. "Lack of past performance" includes situations characterised by weak financial metrics, insufficient financial resources and/or lack of collateral. Furthermore, 21 per cent of the interviewees saw risky commercial prospects and 17 per cent saw technological risk as the key "show-stopper" for lending. Typical challenges for the KETs sector are a lack of market certainty, client structures and established supply chains. This is because high-technology products often have a disruptive nature – creating new markets, tapping market niches or modifying supply chains. Consequently, financial institutions find it hard to assess the market and growth potential of products and processes developed by many KETs companies (see C.3). As a result, banks focused on traditional risk assessment models fail to cater to the financing needs of many KETs companies. This especially impacts young KETs companies with a limited track record, lacking an established business model, and highly innovative ones, lacking established markets for new products or processes.

Related Quotes

The financial track record is a major show-stopper. The banks are reactive and make historical assessments. They are not very good at evaluating technologies.

CFO of an advanced manufacturing company

If they [the KET companies] have no proven track record, it is hard to receive funding.

Head of Business Unit of a commercial bank

We are often approached for bridge funding, which is gapping the financing during a risky next step. We usually decline those requests.

Managing Director of a commercial bank

If you ask for a substantial investment into innovation, the lack of collateral is the first blocking point for banks, as the risk is not covered.

CEO of a nanotechnology company

Figure 34: Quotes from KETs companies and financial institutions about key "show-stoppers" for lending.

Few commercial lenders offer higher-risk-taking ("venture debt") instruments, despite many KETs companies' willingness to bear a higher capital cost in exchange for access-to-finance. Banks predominantly decide not to lend if they perceive the risk of financing a KETs project to be beyond pre-established limits. Charging higher interest rates to compensate for the greater risk and effort involved in carrying out a customised due diligence for a KETs company is an approach hardly ever used, especially for smaller borrowers. This is surprising, because many of the KETs companies interviewed for our study indicated that they would be willing to use such higher-risk-taking "venture debt" instruments in order to have access to debt financing (see Figure 35).

Related Quotes

The ultimate criterion is the amount of debt the bank is comfortable with, much more important than the interest rate. Having 60% debt instead of 50% would be far more important than the interest rate being 7% or 8%.

CFO of an advanced manufacturing company

I do not care about interest rates. The availability of debt is the key requirement.

CFO of a biotechnology company

We need [an instrument, which] is more long-term-oriented with a bit of a higher interest rate. Something between venture capital and senior debt.

CFO of an advanced manufacturing company

It is not about interest rates, but about creating instruments that focus on the future outlook of the company.

CFO of an advanced manufacturing company

Figure 35: Quotes from KETs companies about their key criteria for making borrowing decisions.

Public institutions play an important role as "door openers" for commercial lending, mostly due to their trusted risk assessment process. A large number of KETs companies in our study seek co-financing from public institutions on a regular basis (i.e. regional or national development banks, SME support or guarantee schemes, EIB programmes). This is surprising, considering that under the current low-interest rate high-liquidity market environment, KETs companies might easily get funding on the commercial markets. However, our analysis suggests that credit lines and guarantees from public lending institutions often serve as "door openers" for commercial lending. In many cases, when seeking finance for a project, KETs companies approach public lending institutions first. Equipped with a funding pledge from a public institution, many KETs businesses obtain better financing conditions from commercial lenders, mostly their "house banks". Consequently, a vast majority of the KETs companies interviewed view public sector involvement in debt financing as helpful or very helpful (see Figure 36):

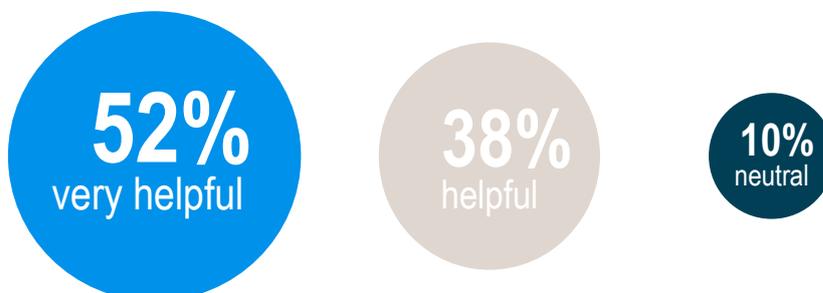


Figure 36: KETs companies' perceived helpfulness of funding by public institutions.

There are two main reasons why public involvement is appreciated by commercial lenders:

- > **Risk sharing:** the public institution covers part of the risk on a loan, compensating for potential show-stoppers such as a lack of collateral. For example, a public institution may guarantee

- 50 per cent of the loan in the event of the company's defaulting, significantly lowering the risk for commercial banks
- > **Due diligence:** the usually thorough risk assessment process that is conducted by public banks (such as the EIB) as a precondition for lending is often highly appreciated by lenders as a "seal of quality"

Related Quotes

KET companies

Public funding convinces the banks too. They feel more comfortable to provide financing. It is also a reason why we are currently in such a strong position.

CFO of an advanced materials company

Public lending is very helpful. It is good for the banks as it limits their risks.

CEO of a nanotechnology company

Financial institutions

A loan or guarantee by the EIB would have a strong impact on our decision.

Manager of a commercial bank

The risk-sharing instruments [by the EIB], definitely help us making the decision; they definitely facilitate lending.

Senior Manager of a commercial bank

Figure 37: Quotes from KETs companies and financial institutions about the perceived helpfulness of public funding.

Public engagement in KETs financing is not always targeted at those companies that have the greatest need. A number of KETs companies indicated that they use public sector financing mainly on an opportunistic basis in order to optimise their cost of capital. Another important reason for well-established KETs companies to use public loans is diversification of funding sources. Indeed, in the event of financial market turbulence, loans from public institutions can be a more stable source of funding than commercial options. However, even though public loans are appreciated by well-established KETs companies, especially in difficult market situations, higher priority should be given to those KETs companies in greater need of support, i.e. those which would otherwise not be able to finance their growth activities (see C.6).

Related Quotes

We work with public grants for applied R&D, pilot lines and parts of a building. The conditions were better than the offers we received from commercial banks. We do not only use it opportunistically, but it is also an important part of our financing mix as we have a lot of R&D.

CEO of an advanced manufacturing company

We needed money to finance our R&D projects. We could have asked our banks, but this would have been more expensive. Instead, we received funding from the EIB, which was very helpful because there were no covenants on loans.

CFO of an advanced manufacturing company

Figure 38: Quotes from KETs companies about their use of public funding mechanisms.

Under current market conditions the core function of public sector involvement in KETs financing is to take a "first mover" role, by declaring a willingness to take and share risk. If a thorough due diligence conducted by a public bank proves the investment proposal to be viable, commercial investors view the risk of lending to the KETs companies in question as considerably lower. Another frequent approach by public banks, offering access to capital at preferential, below-market interest rates is an approach that appears not to be urgently needed in today's low interest rate market conditions.

As a consequence, public financing agencies need to play a strong role alongside commercial banks in order to provide adequate access-to-finance to KETs companies. Despite a number of innovative approaches, commercial banks alone fail to cater to the financing needs of many KETs companies. Lead initiatives by the public sector are required in order to significantly leverage the growth and employment potential of KETs companies.

C.6 Finding 6: Boosting growth will require smart well-targeted instruments

KETs companies can be aggregated into clusters depending on their growth stage, business model, investment plans, etc., thus making targeted recommendations possible. The analysis conducted so far has revealed a considerable amount of information, both quantitative (financial KPIs, growth figures) and qualitative (quotes from industry leaders). To obtain a more targeted view of the access-to-finance situation of KETs companies, we further aggregated our data into three clusters, providing valuable insights into what kind of financial support is needed to boost the European KETs sector. In the following pages we describe these three types of KETs companies in detail.

Methodology box

We have clustered the KETs companies in our sample into groups based on a number of common patterns.

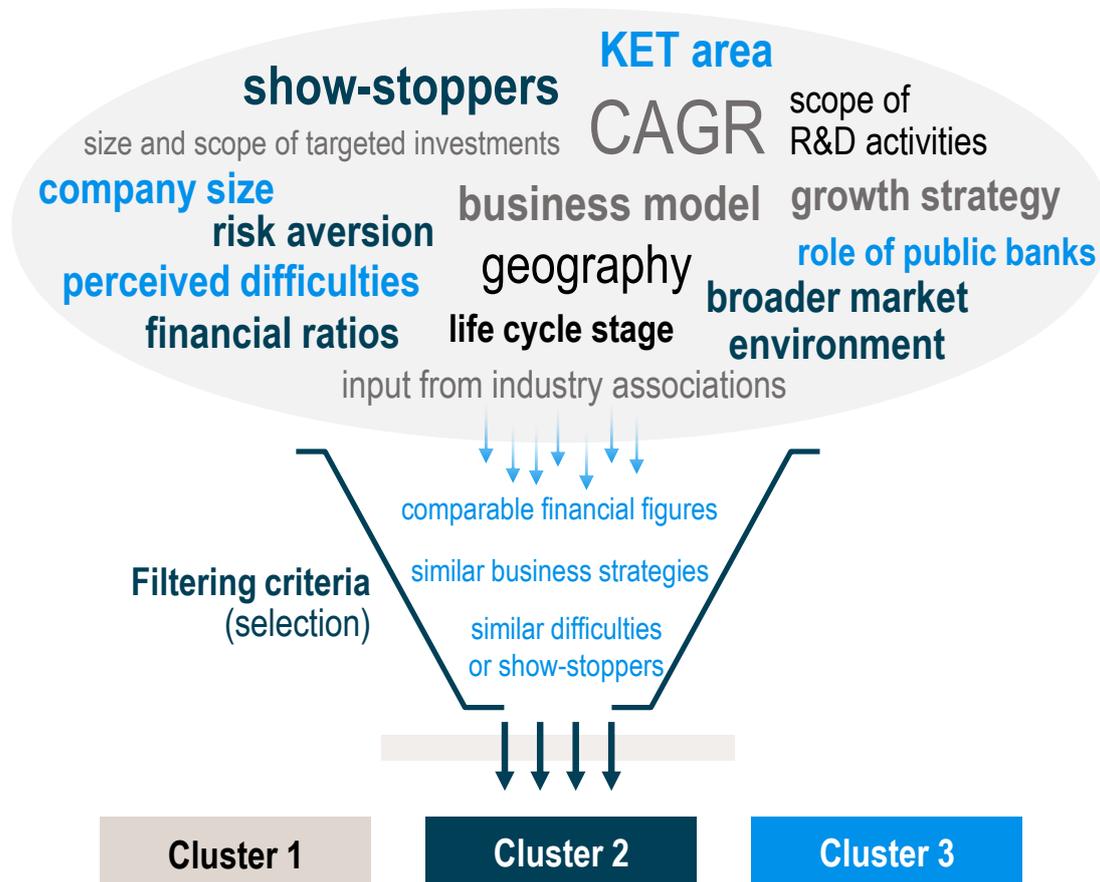


Figure 39: Illustration of the clustering methodology applied to the KETs companies study sample.

Three types of KETs companies with distinct characteristics emerge when their access-to-finance situation is analysed. Companies in each cluster usually have similar overall business strategies, are in similar phases of their organisational life cycle and face similar challenges regarding adequate access to debt financing. On the other hand, we found financial metrics or the respective KETs sector not to be the key driver for a KETs company's access-to-finance situation. We have grouped all the KETs companies in our study into the following three clusters:

1. "Post start-ups"
2. "Quantum leap companies"
3. "Well-established innovators"

1. Post start-ups

Typical set-up, background and business strategy: start-ups are smaller and relatively young companies that have managed to outgrow the critical start-up phase. Such KETs companies are revenue-generating and in most cases profit-generating. The CEO of the company is often one of the founders of the business and still heavily involved in the development and launch of new products. During their development phase, post start-ups have usually financed their business activities through a mix of equity, public grants or guarantee schemes and have only recently moved into the field of debt financing or at least only recently increased the use made of it. Typically, this type of KETs company follows a strategy of continuous business development and incremental growth by gradually developing new product lines and processes out of an existing knowledge base.

Post start-ups	
Typical company revenue	< EUR 25 m
Revenue growth	10-20% p.a. (actual)
Total debt in relation to EBITDA	Low to moderate: 1-2 times EBITDA
Reason for seeking debt financing	R&D; pilot lines or pilot plants; often not yet cash-generating investments
Perceived difficulty of receiving debt	High to very high; often no offers attainable on the commercial banking market
Perceived show-stoppers	Lack of collateralisation, unclear commercial prospects

Figure 40: Typical characteristics of post start-up companies at a glance.

Related Quotes

We are not planning to make use of long-term debt financing again. It is difficult to receive it and requires a huge effort. Banks want securities and the conditions imposed on us are tough. Therefore, we prefer equity finance.

CFO of a nanotechnology company

We need buildings with enough space, especially for the pilot projects. Before you sell the product, you need such a pilot to show that the products are proven.

CEO of an advanced manufacturing company

We have no loans in the company. We are looking into long-term debt, but it is really difficult. We would like to have some. We are definitely not lacking projects, which need such financing.

CEO of a nanotechnology company

We need to invest in our commercialisation and industrialization. We need heavy investments and hence debt-financing to commercialise our product.

CFO of a biotechnology company

Figure 41: Quotes from Post start-up companies about their financing situation.

Financing situation: Typically, post start-ups are looking for debt financing as the next step of their business development. This may be a production line for a new product that has passed the R&D stage, at a cost-competitive level. It may also be a pilot line to test the feasibility of large-scale production before full commercialisation. Young post start-ups often have two main problems in terms of raising debt: the first one is an insufficient track record of growing revenues and free cash flows. They also lack sufficient guarantees and tangible assets that can be used as collateral. The second problem that post start-ups face is that, due to the relatively limited amount of debt they need to raise, they need to deal with smaller banks or regional offices of larger banks. These banks are not staffed with the industry experts present at, for example, the headquarters of investment banks and follow a very traditional approach to lending, i.e. asset-based lending. These factors make the financing situation for post start-up companies very difficult (see Figure 42). KETs companies often reported that they were not able to get the amount of debt required for the development of their business from the commercial lending market. Without adequate access-to-finance, Post start-up companies are forced to rely on their existing business and revenue streams. This may keep those companies afloat, but it prevents them from reaching their planned growth trajectories (CAGRs of 10-20 per cent in terms of revenue), reducing their potential contribution to the growth of the European KETs sector.

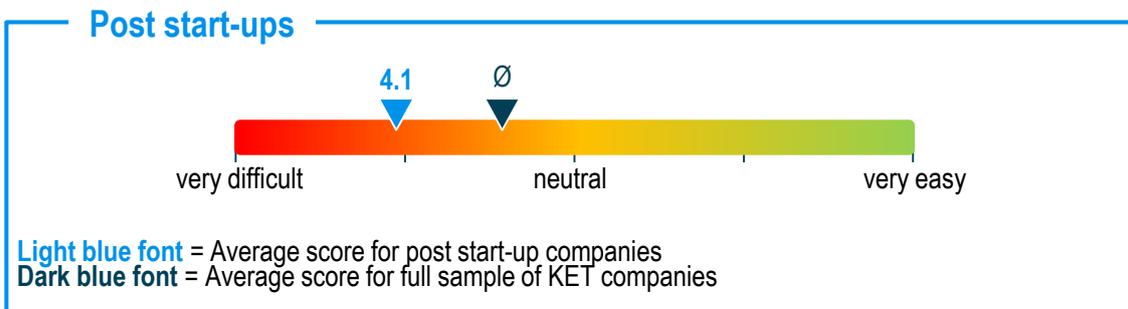


Figure 42: Score of perceived difficulty in accessing finance from the perspective of post start-up companies.

2. Quantum leap companies

Typical set-up, background and business strategy: At first sight the group of KETs businesses we describe as quantum leap companies looks very diverse. Quantum leap companies can be found across all revenue ranges. Some of these businesses are rather large (above EUR 100 million revenue), others are among the smallest companies in our sample. Some quantum leap companies are very mature, having more than 100 years of business history, while others are newly established ventures with only very few years of business activities. They are usually strong on the equity side, as their main investors and shareholders are global blue chip companies or private equity funds.

Quantum leap companies

Typical company revenue	In all revenue ranges
Revenue growth	Above 20% p.a. (expected)
Total debt in relation to EBITDA	Targeting high-very high leverage: 2-5 times EBITDA
Reason for seeking debt financing	Large scale commercialisation of innovative processes or products; high to very high marketization risk
Perceived difficulty of receiving debt	High to very high; often no offers attainable on the commercial banking market
Perceived show-stoppers	Weak/non-existent financial track record, risky commercial prospects

Figure 43: Typical characteristics of quantum leap companies at a glance.

The key common denominator of all quantum leap companies is their similar business and financial strategy: they make a very material investment, relatively large compared to their size, to introduce a completely new, highly innovative product or process on a large scale. Examples include a new generation of highly efficient batteries for high-tech appliances, barely visible solar films in windowpanes that can be used for electricity generation in buildings, or an entirely new bio-based plastic that can be used in packaging, with a carbon footprint close to zero. Quantum leap companies often plan to launch products that have completed the R&D phase and are already in small-scale production. As a next step, these companies intend to make a "quantum leap": accelerating their business from the pre-commercialisation phase to become a market leader in their segment within a short period of time. Naturally, such a strategy involves enormous technology, business and financial risks. Unsurprisingly, quantum leap companies are the smallest group of the three clusters represented in our sample. However, we believe that due to their extraordinary potential for growth, innovation and employment for European industry, these companies deserve particular consideration and targeted measures to help to improve their access-to-finance conditions.

Related Quotes

We have a huge project right now. Our long-term target is not only doing R&D, hence we plan to set up a production line. The amounts would be in the hundreds of m EUR for such a manufacturing facility.

CFO of an advanced manufacturing company

We are currently looking to raise money to finance equipment for a scale up of our production. From our experience, there is no chance to get any debt financing at the moment.

CEO of a nanotechnology company

Figure 44: Quotes from Quantum leap companies about their financing situation.

Financing situation: Quantum leap companies describe their financing situation as difficult (see Figure 44). Such companies are looking for high-risk debt financing schemes, offering amounts in the double to triple-digit million range. Quantum leap companies often obtain the greatest amount of equity finance, which their investors are willing to fund, with the remaining amount needed for the intended large-

scale commercialisation of the new product line to be financed by debt. However, banks usually view the combination of the high amount of funding required and the new technology involved as a significant risk. Consequently, banks demand additional equity contributions, guarantees by investors or offtake agreements for the future output of the new production facility. Quantum leap companies are often not able to meet these conditions. Some of the CEOs and CFOs interviewed reported that after having successfully achieved their targets in product development and pre-commercialisation testing, their time is fully taken up in securing the necessary funding to launch commercial-scale production. This unsatisfactory situation may make them consider moving their entire business to a new market outside Europe in, for instance, North America or Southeast Asia, where they hope to find stronger public support for their business idea. As a consequence, Europe would lose out on high-potential businesses, which could significantly weaken its global market position concerning KETs.

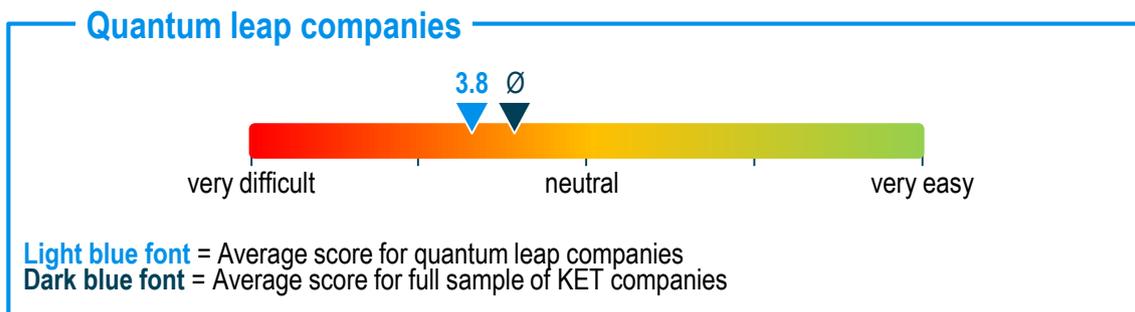


Figure 45: Score of perceived difficulty in accessing finance from the perspective of quantum leap companies.

3. Well-established innovators

Typical set-up, background and business strategy: Well-established innovators are often relatively large companies that have had decades of successful business operations. Such companies usually benefit from established supply chains and client relationships, enabling them to bring innovative new products and processes to the market while mitigating the risks involved. Well-established innovators are often family-owned or held to some extent by a parent company. Senior managers of well-established innovators often have an engineering background, have built their careers within the company in question and consequently have decades of experience in the sector. The business strategy of such companies is usually focused on moderate growth, the generation of stable free cash flow and maintaining profitability targets. Therefore well-established innovators can be considered to be the stable backbone of the European KETs sector, as their growth level is far above that of the overall economy. On the other hand, they are unlikely to significantly stimulate the growth of the KETs sector beyond their current trajectory because they are rather averse to taking significant additional risks.

Well-established innovators

Typical company revenue	> EUR 25 m
Revenue growth	Between 10-15% p.a. (actual)
Total debt in relation to EBITDA	Moderate: on average 2 times EBITDA
Reason for seeking debt financing	Broad scope: growth and innovation financing, changes in ownership structure, opportunistic, M&A
Perceived difficulty of receiving debt	Very easy to neutral; debt funding targets are usually achieved
Perceived show-stoppers	None, rather focus on best available conditions

Figure 46: Typical characteristics of well-established innovators at a glance.

Related Quotes

We are not planning to use debt in 2016, since we are economically extremely successful. We have enough cash to invest and make development efforts.

CFO of an advanced materials company

The contacted banks wanted to see track records. Once we could supply that, the banks were happy to provide funding.

CFO of an advanced materials company

Within the last years, we have been growing organically, with a CAGR of about 10% between 2005 and 2014, having invested EUR 150 m.

CFO of an advanced materials company

With a strong balance sheet and good current results, it is easy to get loans.

CFO of an advanced materials company

Figure 47: Quotes from well-established innovators about their financing situation.

Financing situation: Well-established innovators report little, if any difficulty in obtaining debt financing from commercial lenders (see Figure 47). Typically, their strong balance sheet, a solid track record of revenues and profits as well as substantial free cash flow make well-established innovators the preferred borrowers in the high-technology sector for commercial banks. Well-established innovators often take a highly conservative approach to financing, with many of them relying on free cash flow from the operating business alone to finance R&D and expansion of product lines, only resorting to commercial debt for selected ventures or acquisitions of smaller companies. Well-established innovators use public financing schemes, if at all, on an opportunistic basis to lower their cost of capital and/or diversify their funding sources.

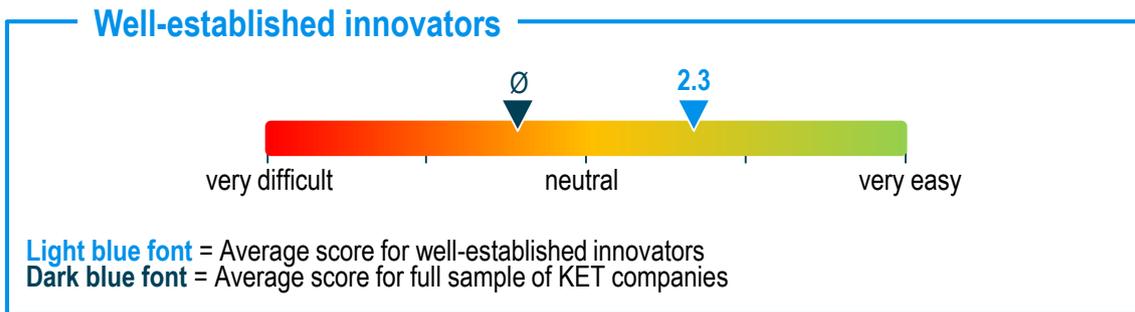


Figure 48: Score of perceived difficulty in accessing finance from the perspective of well-established innovators.

In summary, our findings suggest that there are two types of KETs companies that are currently left without adequate access-to-finance: post start-ups and quantum leap companies. Both types of companies require higher-risk-taking instruments than those currently available in the EIB portfolio. Post start-up KETs companies require equity or higher-risk-taking debt instruments to finance growth-related investments and pre-commercialisation projects, e.g. pilot lines. Quantum leap companies, on the other hand, require additional equity or higher-risk-taking, possibly equity-like debt. Also, in contrast to post start-ups, quantum leap companies typically require larger amounts of finance to facilitate large-scale development and commercialisation of new products. However, we see little need for action to further support well-established innovators.

As a consequence, boosting the growth of the European KETs sector will require smart, well-targeted instruments. Support measures should be tailored to meet the needs of post start-up companies and quantum leap businesses and address the particular needs of those groups in terms of the amount of debt, risk-sharing and non-financial support.

D. Review of innovative financing instruments

D.1 Background and approach

In order to give focused recommendations, we have reviewed a broad range of existing financing instruments that could serve as examples for new, KETs-targeted tools. In the previous chapter, we provided an in-depth analysis of the KETs financing landscape and identified potential fields for action. Our analysis also covers financing instruments aimed at high-tech companies and innovative SMEs, as these types of companies have characteristics comparable to our KETs company sample (smaller or medium-sized, innovation-driven). Consequently, the review of access-to-finance solutions for high-tech companies and innovative SMEs can also offer valuable insights applicable to the KETs sector.

With this review, we pursued three goals:

- > **To identify international best practices** for facilitating access-to-finance for high-tech companies and innovative SMEs
- > **To identify first movers and innovative approaches in technology financing** applicable to KETs companies
- > **To gain a deeper understanding of factors critical to the success** of impact-generating technology financing

We reviewed approximately 150 relevant instruments designed to promote high-tech. We focused in particular on economies with high potential for KETs development outside Europe, such as Canada, Israel, Japan, Singapore and the United States, but in total included instruments from 30 countries. The range of instruments reviewed does not only cover public support programmes. We included innovative instruments and financing programmes offered by private investors and commercial banks as well, since the private lending market is a key driver of KETs financing featuring debt and equity-like instruments. We regard these instruments as important to the EIB's funding approach.

In order to identify the most relevant instruments, we relied on a range of sources:

- > A review of the literature: relevant studies on KETs financing (e.g. UN, OECD)
- > Targeted research by our consortium partner Fraunhofer ISI
- > Instruments described as particularly effective by KETs companies and lenders during the interviews conducted for this study

Subsequently, we reviewed the identified instruments according to a set of criteria, including:

- > The type of instrument (debt, equity, hybrid, grants, subsidies, etc.)
- > The maximum size and market reach of the programmes
- > The industrial sectors covered
- > The geographical area of operation
- > The key features of the instrument, such as the minimum and maximum transaction size, maturity, eligibility criteria, conditions, target entities
- > The suitability and potential for adaptation by the EIB

D.2 Findings from the review of instruments

Based on our review, we clustered the financing instruments identified into four groups:

- > Debt instruments
- > Equity instruments
- > Innovative financing approaches
- > A combination of knowledge and capital

Within these four groups, we identified typical approaches and best practices.

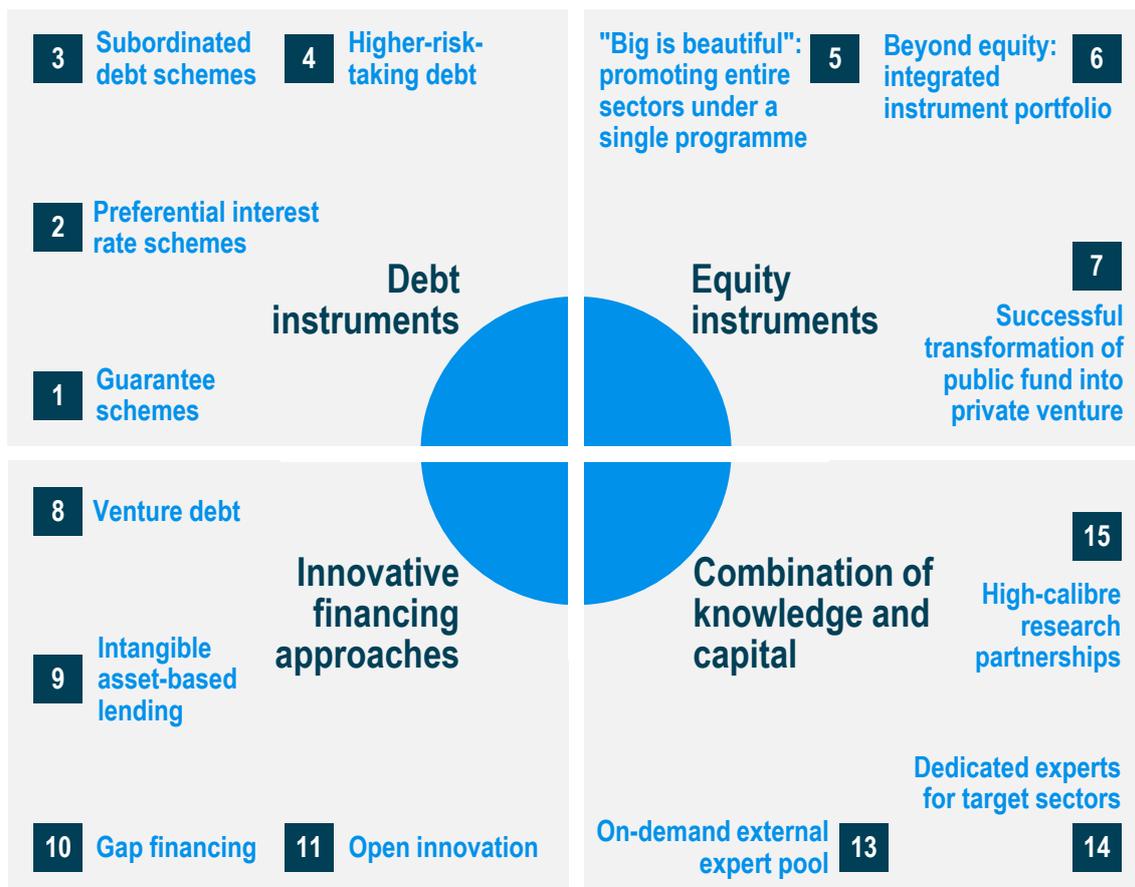


Figure 49: Overview of identified innovative instruments to support KETs companies.

1. Debt instruments

KEY TAKEAWAYS

- > Guarantee schemes provided by public banks are an effective approach to lower risk for commercial lenders; however, existing guarantee schemes alone are not sufficient to fundamentally improve access-to-finance conditions for weaker KETs companies
- > Higher-risk-taking debt instruments have been used successfully by innovative commercial lenders; those approaches could be adapted by the EIB

Debt instruments are by far public sector banks' most commonly used tool to promote innovative high-tech businesses such as KETs companies. Debt instruments are typically favoured by high-tech companies that are already fully commercialised and generate, or are about to generate, positive cash flows to repay loans.

Below we briefly present four different debt-financing approaches that we regard as relevant for KETs financing:

Guarantee schemes are the instrument we encountered most often during our interviews: 24 per cent of the KETs companies in our study received finance covered, partially or completely, by some form of guarantee from a public financial institution. Under a guarantee scheme, a public lending institution vouches for a commercial bank's loan in the event of the borrower's defaulting. The guarantee schemes we encountered during our research covered between 10 and 100 per cent of the total debt-financing amount, and typically between 35 and 50 per cent. Guarantees by public banks can (partly) compensate for the lack of collateral that prevents many KETs companies from accessing debt financing. Also, guarantees require no upfront investment from the underwriting financial institution, which means that available funds can be used more effectively than direct loans. In our view, the ability of guarantee schemes to attract private co-financing makes them a relevant instrument that will continue to play an important role in KETs financing.

Seven per cent of the KETs companies interviewed used **preferential interest rate schemes**. Here, a public lending institution provides debt financing at below-market interest rates, lowering the borrower's cost of capital. However, KETs companies can currently borrow at record-low interest rates. There is little evidence of new financing transactions in the Eurozone using preferential interest rate schemes, indicating that the instrument has become less relevant. At times of high interest rates, however, such schemes can be an appropriate means of improving access-to-finance conditions for KETs companies.

Subordinated debt schemes were used by another seven per cent of the KETs companies in our study. Under such a scheme a loan ranks below other loans with regard to claims on assets in the event of the borrower's defaulting. Subordinated loans from a public bank can provide a "risk cushion" for regular term loans by commercial lenders. A number of financial institutions interviewed for this study favoured subordinated debt schemes over guarantees because less administrative effort was involved (no need to claim a guarantee in the event of the borrower's defaulting). We therefore regard subordinated debt as a promising instrument for KETs financing due to its high potential to attract private co-investment.

High-risk ("venture") debt: Very few financial institutions offer financial instruments that compensate for the high risk involved in funding innovative businesses by charging higher interest rates. Yet we regard this approach as highly relevant to improve access-to-finance conditions for KETs companies: many of the KETs businesses we interviewed indicated their willingness to pay higher interest rates in exchange for adequate debt financing. Only a few commercial banks have already established this type of loan instrument. A notable example is Barclays' offering of a "Fast Growth Technology Fund" (see Figure 50).

Barclays' "Fast Growth Technology Fund"

Key facts 		Description	KET relevance
Sponsor	Barclays PLC	<ul style="list-style-type: none"> > Offers early-stage debt funding for technology firms with a higher-risk-taking approach > "Fast-growth loans" of up to GBP 5 m are repayable over three years, provided venture capital has already been secured > Catalyst for UK technology firms' development into larger companies 	<ul style="list-style-type: none"> > Fund designed to bear higher risk than usual debt instruments > Equity-like debt financing makes late pre-commercialisation ventures possible > Flexible usage makes the instrument interesting to overcome early-stage financing gaps
Type	Venture debt		
Launch	May 1, 2015		
Focus	Regional		
Maturity	Up to 3 years		
Loan size	Up to GBP 5 m		
Fund size	GBP 100 m		

Figure 50: Fact sheet of a higher-risk-taking debt financing instrument for KETs companies: Barclay's "Fast Growth Technology Fund".

2. Equity-based instruments

KEY TAKEAWAYS

- > Public equity instruments, if designed well, can be particularly successful in attracting private co-investments
- > The combination of debt and equity financing under one roof reduces the complexity of financing processes, creates long-term financing relationships and is likely to result in better risk assessment processes for the lender

Equity instruments are the most commonly used tool to support early-stage high-tech companies. Positive, or about-to-turn-positive, cash flows are typically a precondition for debt financing. Early-stage companies hence rely on equity investment before they can generate such positive cash flows. We found publicly funded equity instruments to generally work well in attracting private co-investment (i.e. venture capital). However, equity-based instruments are rarely used to finance larger investments (above EUR 5 million.)

Below we briefly present three equity-based financing approaches that we regard as relevant for KETs financing.

"Big is beautiful" – Promoting entire sectors under a single programme: The US-based Small Business Research and Innovation Program (SBIR) is a federal programme for smaller businesses, combining grants and equity-linked funding. The programme invests about USD 2.5 billion per year, providing equity to over 4,000 businesses. Individual investments range from USD 150,000 for feasibility studies and prototypes to USD 1 million for entire R&D projects. In later commercialisation phases, the companies have to compete in the market and finance themselves. The programme involves a network of some 450,000 engineers and scientists for due diligence and risk assessment. SBIR has a history of funding extremely successful companies (such as Apple, Intel and Compaq) during their early

development stages. Thanks to its considerable size and experience, accumulated over three decades since it was established, SBIR is in a position to effectively support early-stage high-tech ventures in the US instead of only offering ad hoc support. With its large pool of experts, SBIR is capable of assessing the business risks and potential of complex technologies. Also, SBIR has generated a significant multiplier effect in the past by attracting a total of USD 65 billion in private venture capital.

Closely combining debt and equity instruments in one portfolio: The SME + Innovation Fund (NL) is a programme established by the Netherlands Enterprise Agency (Rijksdienst voor Onderneming Nederland) to support innovative Dutch SMEs. The fund combines debt and equity finance under one roof: seed capital (equity) for start-ups, "innovation credits" (debt) for high-risk projects and a fund of funds (equity) for growing businesses. Companies can grow through several stages of their life cycle without having to change their main public financing partner. The fund is also designed to attract private co-investment. The overall design hence facilitates long-term lender/borrower relationships, resulting in beneficial access-to-finance conditions for innovative SMEs. On top of these advantages, the fund offers flexible repayment schedules and a forgivable loan component.

Successful transformation of public funds into private ventures: The YOZMA programme (IL). In 1992 the Israeli government sought to attract foreign investors by providing USD 20 million to USD 25 million in support of venture capital funds. YOZMA created 10 such funds, providing private investors with an option to buy out the government share. Between 1992 and 2008 the funds were privatised and grew to up to USD 700 million each, with a total size of USD 5.9 billion. The venture capital funds that grew out of the YOZMA programme focus on investments in KETs and infrastructure and invest in all stages of a company's development, with typical equity investments ranging between USD 1 million and USD 6 million. The set-up of YOZMA as an initially public fund became a model for the successful transformation into a private fund, attracting foreign capital and knowledge to grow technology-intensive sectors.

3. Innovative financing approaches

KEY TAKEAWAYS

- > Financial institutions in several countries are piloting a number of approaches for innovation financing
- > In our view venture debt, intangible asset-based lending and open innovation are highly interesting approaches that could be applied to improve access-to-finance conditions for KETs companies beyond conventional debt or equity instruments

In the course of our research we identified a range of innovative approaches applicable for designing new instruments for KETs financing.

Venture debt: Barclays Fast Growth Technology Fund (UK) offers early-stage debt funding for technology firms, taking a dedicated higher-risk-taking approach. Due diligence for investments is focused on the future potential of high-tech companies instead of past performance. Under certain conditions (e.g. highly valued intellectual property), the fund even lends to companies that are not yet profitable. This type of debt financing makes lending to pre-commercialisation KETs companies possible (see detailed factsheet in Annex C).

Intangible asset-based lending: Intellectual Ventures (US) practises intellectual asset-based lending (IABL), enabling firms to collateralise their intellectual property for lending. Intellectual Ventures has pioneered a commercial approach to value the intellectual property of innovative start-ups and SMEs. The

firm operates an investment portfolio of company-owned, patent-based inventions, thereby generating financial returns like any other asset-based investment. In addition, Intellectual Ventures helps to support these young companies in commercialising their products by facilitating joint ventures with larger conglomerates. As KETs companies tend to be patent-driven, the collateralisation of intellectual property is a promising, commercially driven approach to improve access-to-finance conditions for many KETs companies.

Open innovation, e.g. the Nine Sigma Network (US). Nine Sigma is an innovation network, connecting large-scale companies with innovation-driven high-tech ventures. The network has been effectively used by large customers such as Procter & Gamble, Unilever and Philips, among other blue chip companies. The fund has completed over 100 late-stage R&D programmes, facilitating investment of about USD 85 million in 2012. Such an open innovation fund is another promising, private sector-driven approach to help smaller, innovative KETs companies to connect with larger, financially potent businesses.

4. Combination of knowledge and capital

KEY TAKEAWAYS

- > Financing is not always enough: a closer combination of knowledge and capital can help to de-risk investments, reduce transaction costs and improve access-to-finance conditions
- > An effective combination of knowledge and capital can create strong networks of companies, research institutions and financial intermediaries; such networks can stimulate further innovation and sector growth

We also identified a trend to combine instruments for innovation financing with the provision of expert knowledge. Within a number of programmes, high-tech companies not only receive funding but also expert advice concerning financing strategies, business development and the commercialisation of products and services. For example, the talent network of the UK-based Business Growth Fund (BGF) features 3,000+ board-level industry experts, available as advisers to support BGF investee companies (SMEs) to grow. Another example is the Small Business Technology Transfer Program (SBTT), a sister programme to the US-based SBIR programme mentioned above. The SBTT facilitates R&D between smaller businesses and well-established US research institutions (such as the US Department of Defense) to strengthen their innovative capacities and potentially open up new funding options. An approach combining knowledge and capital would be useful because KETs companies often lack knowledge about sophisticated financing strategies, while investors lack knowledge about KETs businesses and their innovative products.

D.3 Description of existing instruments for innovation finance at EU and EIB level

1. Background and evolution of relevant programmes

European-level funds for innovation finance have been progressively increasing. For the period 2007 to 2013, the 7th Framework Programme for Research and Technological Development (FP7), with a budget of over EUR 50 billion, invested in various research and innovation-related activities. The budget had increased by 63 per cent compared to its predecessor's FP6.⁶ FP7's centrepiece for innovation finance was the so-called Risk Sharing Finance Facility (RSFF), featuring various financial instruments applicable to KETs financing. By the end of 2013, the RSFF had provided over EUR 11 billion to 114 research and innovation (R&I) projects worth over EUR 30 billion.⁷ Meanwhile, Horizon 2020 replaced FP7 as an umbrella programme for R&I support, with a budget of nearly EUR 80 billion (see Figure 51). Also, the "InnovFin" programme has replaced the RSFF as the innovation finance tool relevant for KETs and other companies investing in innovation. Compared to its predecessor RSFF, the budget for InnovFin has more than doubled, with EUR 24 billion in available funds. In addition, the EC has established the European Fund for Strategic Investments (EFSI), a financial scheme intended to attract EUR 315 billion's worth of investments in Europe's strategic infrastructure, including various R&I activities and SMEs. As a result, unprecedented amounts of European-level funds and various financial instruments for the promotion of innovative technologies are currently available.

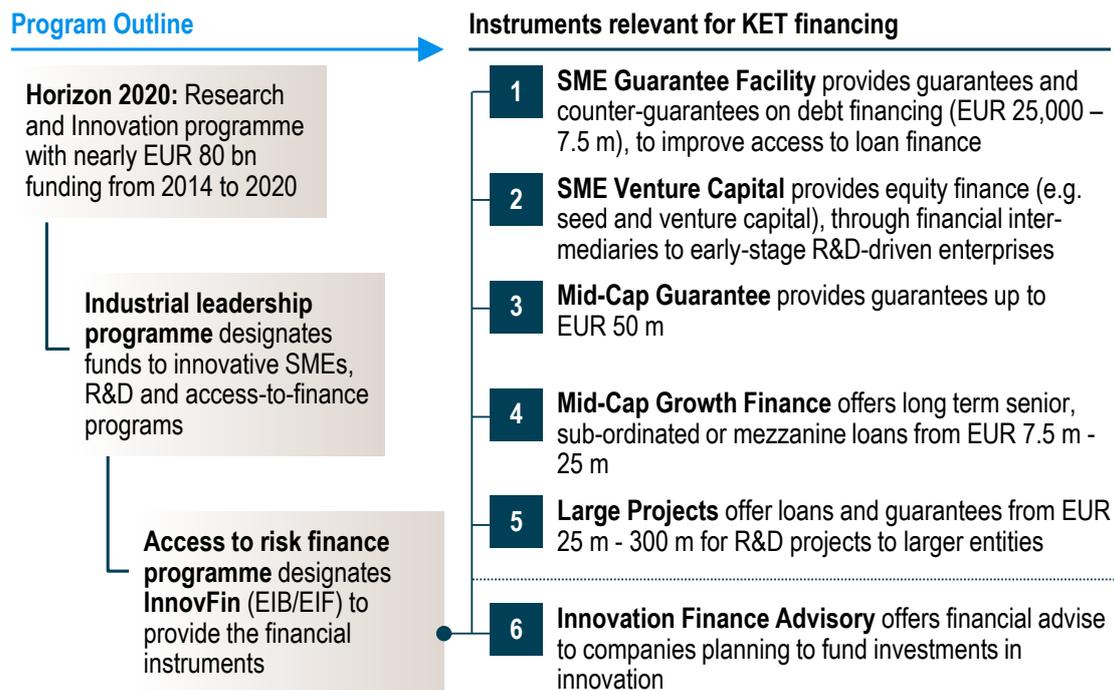


Figure 51: Illustration of financial instruments relevant for KETs financing under Horizon 2020.

2. Review of key programmes for innovation finance

InnovFin: Under Horizon 2020, the EU research programme for 2014-20, the EC and the EIB Group launched a new generation of financial instruments and advisory services to help innovative firms access finance more easily. Until 2020, "InnovFin – EU Finance for Innovators" will offer a range of tailored financial products for R&D by smaller, medium-sized and larger companies and promoters of research infrastructure. InnovFin further includes a number of thematic products addressing specific financing needs of certain innovative sectors. InnovFin financial products are backed by funds set aside by the EU (under Horizon 2020) and the EIB Group (from its own resources).⁸

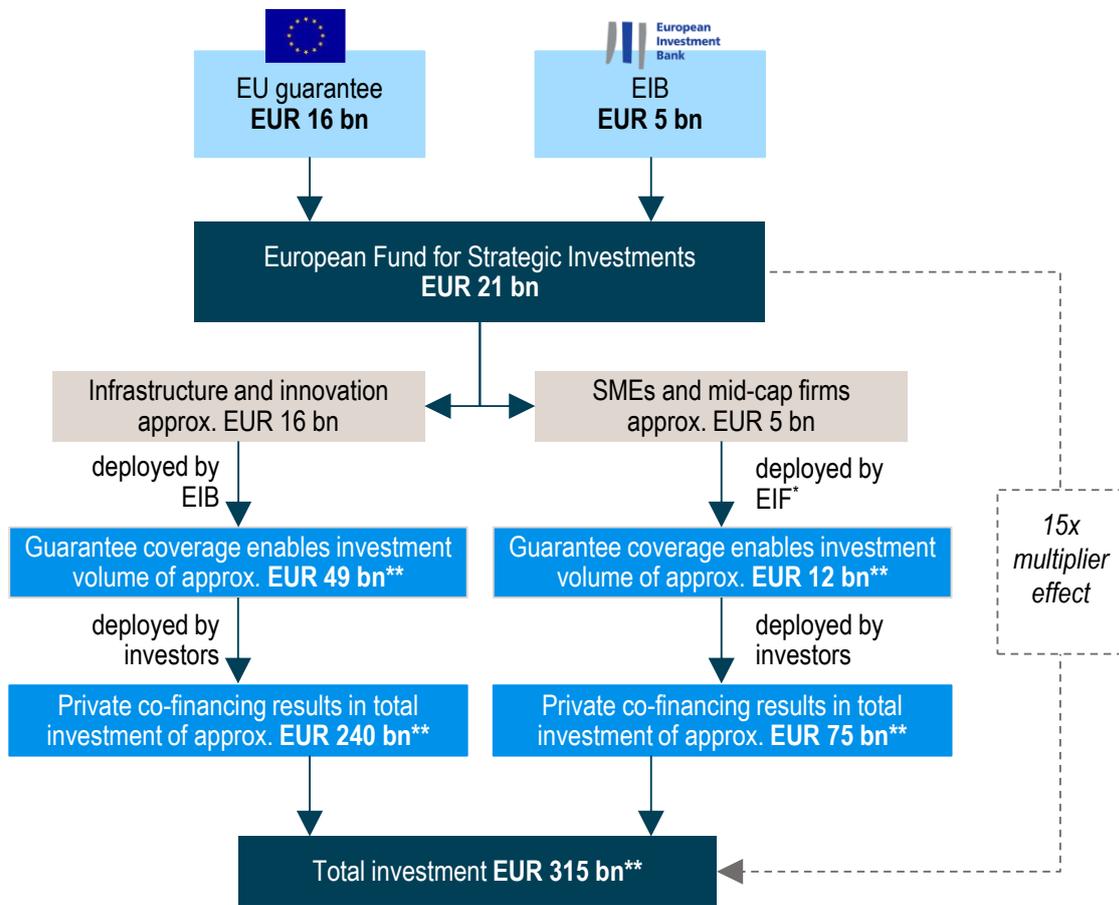
InnovFin consists of a series of financing tools and advisory services offered by the EIB Group, covering the entire value chain of R&D in order to support investments from the smallest to the largest enterprise. InnovFin is available across all eligible sectors under Horizon 2020, in EU Member States and associated countries. By 2020, InnovFin is expected to make over EUR 24 billion of debt and equity financing available to innovative companies to support EUR 48 billion of final R&D investments.

- > **InnovFin SME Guarantee** provides guarantees and counter-guarantees on debt financing between EUR 25,000 and EUR 7.5 million, in order to improve access to loan finance for innovative smaller and medium-sized enterprises and smaller midcaps (up to 499 employees). This facility is being rolled out through financial intermediaries. Under InnovFin SME Guarantee, financial intermediaries are guaranteed or counter-guaranteed a portion of their potential losses by the European Investment Fund (EIF)
- > **InnovFin SME Venture Capital** will primarily invest in venture capital funds and other vehicles investing or cooperating with business angels. The programme targets enterprises that may not yet have started generating revenues from the sale of their product(s) or service(s). This includes companies in their pre-seed, seed and start-up phases. The investment focus will be on innovative sectors, including life sciences, clean energy and high-tech
- > **InnovFin MidCap Guarantee** provides guarantees and counter-guarantees on debt financing of up to EUR 50 million, in order to improve access-to-finance for innovative midcaps (up to 3,000 employees) that are not eligible under the InnovFin SME Guarantee. This is being rolled out through financial intermediaries such as banks and other financial institutions. Under InnovFin MidCap Guarantee, financial intermediaries are guaranteed against a portion of their potential losses by the EIB
- > **InnovFin MidCap Growth Finance** offers long-term senior, subordinated or mezzanine loans from EUR 7.5 million to EUR 25 million for innovative larger midcaps (up to 3,000 employees) but also SMEs and smaller midcaps
- > **InnovFin Large Projects** delivers loans and guarantees from EUR 25 million to EUR 300 million for R&D projects emanating from larger firms, universities and public research organisations, for R&D infrastructure (including innovation-enabling infrastructure), public-private partnerships and special-purpose vehicles
- > **InnovFin Advisory** aims to improve the bankability and investment-readiness of large projects and companies that need substantial, long-term investments. It will also provide advice to improve the conditions for access-to-finance for R&D through horizontal activities such as sector studies, criteria reports and better information tools. The main clients are expected to be promoters of large R&D projects and companies (both private and public) that meet Horizon 2020's societal challenges. It builds on a successful pilot operated under the RSFF in FP7

The Investment Plan for Europe: Since the global economic and financial crisis, the EU has been suffering from low levels of investment. Compared to the 2007 peak, investment has dropped by around 15 per cent in the EU. In the short term, weak investment slows economic recovery. In the longer term, the lack of investment hurts growth and competitiveness. Weak investment in the euro area has a considerable impact on the capital stock, which in turn holds back Europe's growth potential, productivity, employment levels and job creation.⁹ Collective and coordinated efforts at European level are needed to reverse this downward trend and put Europe firmly on the path of economic recovery, which is the top priority of the so-called "Juncker Plan" under the President of the European Commission Jean-Claude Juncker. Therefore the EC has introduced the so-called "Investment Plan for Europe".

The Investment Plan for Europe has three objectives: to remove obstacles to investment by deepening the single market, to provide visibility and technical assistance to investment projects and to make smarter use of new and existing financial resources. According to EC estimates, the Investment Plan for Europe has the potential to add EUR 330 billion to EUR 410 billion to the EU's GDP and create between 1 and 1.3 million new jobs in the coming years. There is sufficient liquidity in the EU,

but private investors are not investing at the levels needed due to a lack of confidence and uncertainty among other factors, so the Investment Plan for Europe aims to address this.



*European Investment Fund (EIF) as part of the EIB Group

**Estimates by the EIB and the EC

Figure 52: Illustration of the European Fund for Strategic Investments' targets.

The European Fund for Strategic Investments (EFSI) is at the heart of the Investment Plan for Europe. EFSI's challenge is to break the vicious circle of under-confidence and under-investment, and to make use of liquidity held by financial institutions, corporations and individuals at a time when public resources are scarce. EFSI is being set up within the EIB. It will mobilise additional investments in the real economy in areas including infrastructure, education, research, innovation, renewable energy and energy efficiency. It will also focus on SMEs and midcaps (companies with between 250 and 3,000 employees). EFSI will target projects that will, among other objectives, promote job creation, long-term growth and competitiveness.

To establish EFSI, a guarantee of EUR 16 billion has been provided by the EC. The EC guarantee will be backed by a guarantee fund of EUR 8 billion (half the amount) from the EU budget. The EIB has committed an additional EUR 5 billion, giving EFSI a risk-absorbing capacity of EUR 21 billion. Thanks to this EUR 21 billion in capital/guarantees, EIB/EIF are expected to provide EUR 61 billion of debt and equity investments. EIB and EC experience indicates that such debt and equity investments provided by the EIB/EIF catalyse approximately five times additional investments from the private sector. Therefore, the EUR 21 billion of capital/guarantees provided by the EC/EIB is expected, via an aggregated 15x

multiplier effect, to catalyse an overall EUR 315 billion in total investments from the public and private sector. This means that EUR 1 of protection by the EC/EIB would generate EUR 15 of private/public investment in the real economy that would not have happened otherwise.

3. Instruments that could be further focused and strengthened to meet the access-to-finance shortcomings identified in this study

We believe that there is a sufficient product offering for well-established innovators, as these companies are well covered by the EIB's existing innovation finance programmes. Mid/larger-sized, well-established companies have access to generous loan guarantees of up to EUR 50 million under the InnovFin MidCap Guarantee programme, as well as to sophisticated instruments such as long-term senior debt, subordinated debt and mezzanine loans under the InnovFin MidCap Growth Finance programme (see Figure 53). These instruments, however, might be difficult to access for Post start-ups and Quantum leap companies because those companies are often too small and/or too risky to have access to EIB financing. Furthermore, they are often unaware of the EC/EIB financing instruments that are available.

Based on the findings of our study and taking into account our review of the EIB's existing innovation financing programmes, we believe there is room for strengthening the products addressing the needs of Post start-up and Quantum leap KETs companies. With respect to Post start-up companies, the main reason why the existing instruments are not fit for purpose is the relatively small size of the companies and their investments. If these companies need to make investments smaller than EUR 15 million, they do not have access to EIB direct financial instruments 2, 4 and 5 (see Figure 53). They can only apply for indirect financial instruments 1 and 3, which are backed by guarantees from the EIF but disbursed and administered by financial intermediaries (equity investors and banks). In this situation, even if banks benefit from a 50 per cent guarantee from the EIF, the fact that regional branches follow conservative asset-based lending approaches prevents such banks from lending to less proven/more complex KETs companies. To address this issue, a higher-risk-taking debt instrument, administered by the EIB but targeting investments smaller than EUR 7.5 million, would need to be created (e.g. a venture debt fund).

The situation for Quantum leap companies is different. These companies need to raise financing amounts that are often sufficient to be dealt with directly by the EIB. On the other hand, due to the large amount of funds to be raised in relation to the size of the company and the unproven nature of the company/investment, the risks involved are often very high. For these reasons, debt financing of Quantum leap companies requires the availability of equity products or equity-type debt instruments. While years ago such instruments were not available in the EIB products portfolio, they are now becoming more available, especially under InnovFin and EFSI.

InnovFin Finance Scheme	1 SME Guarantee Facility	2 SME Venture Capital	3 MidCap Guarantee	4 MidCap Growth Finance	5 Large Projects
	Provides guarantees (EUR 25,000 - 7.5 m), to improve access to loan finance	Provides equity finance, in the form of seed and venture capital	Provides guarantees (up to EUR 50 m), to improve access to loan finance	Offers long term senior, subordinated or mezzanine loans (EUR 7.5 m - 25 m)	Offers loans and guarantees for R&D projects to larger entities (EUR 25 m - 300 m)
KET company type					
Post start-Up					
Quantum leap companies					
Well-established innovator	n.a.	n.a.			

Assessment of relevance Instrument not at all suitable/relevant to meet financing needs
Initial assessment done by project team Instrument fully meets financing needs

Figure 53: Assessment of relevance of existing funding programmes for KETs companies.

E. Recommendations

We derived targeted recommendations for boosting access-to-finance conditions for KETs companies based on the analysis and findings presented in the previous chapters. In this chapter, we present our recommendations grouped into two clusters (see Figure 54).

In a nutshell: recommendations of our study

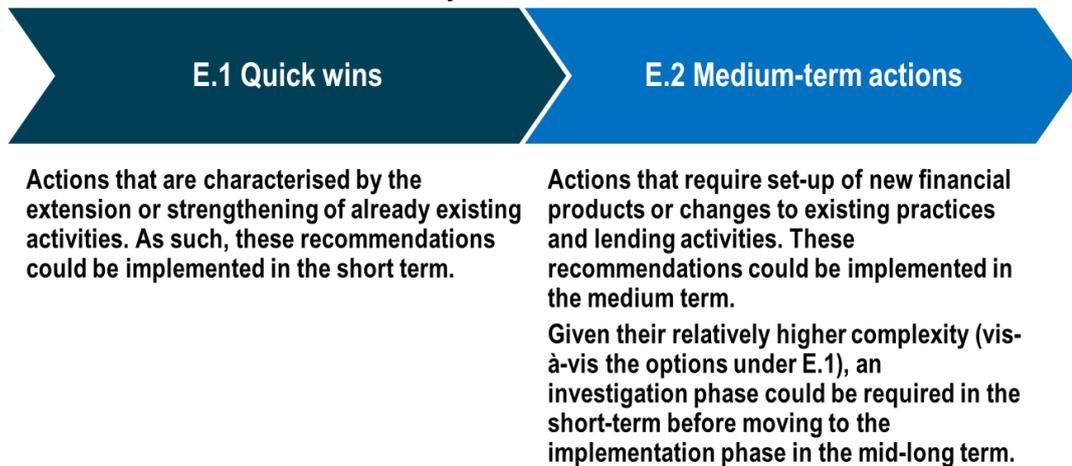


Figure 54: Two clusters of recommendations according to the timing and complexity of their implementation.

E.1 Quick wins

Recommendation 1

Implement measures to increase potential customers' awareness of the EIB and EC offerings leveraging EIAH and other communication channels

KETs companies have limited knowledge about relevant EIB and EC programmes that could help them finance their investments. In particular, 65 per cent of the KETs companies we interviewed were completely unaware of the EIB's offerings and the majority of those were smaller KETs companies. Considering that many of the companies we interviewed had already benefited from EIB/EC finance or programmes (e.g. H2020), we can assume that if we take a random sample of companies from the market, at least 80-90% of them are likely to be unaware of the EIB as a potential provider of finance for innovative companies. At the same time, the vast majority of KETs interview partners expressed great interest in learning about the EIB's instruments portfolio.

Related Quotes

We are not fully aware of the EIB, but we would like to receive more information about it.

Director of an advanced manufacturing company

I have very limited awareness with respect to loans from the EIB. I am aware of grant funding such as Horizon 2020.

CEO of a biotechnology company

I am aware of publicly available information and what the EIB typically does, but I do not have a particular idea about the specific instruments that are in the market.

CFO of an advanced manufacturing company

I heard about the EIB for the first time in the context of this study.

CEO of a biotechnology company

Figure 53: Quotes about KETs companies' perception of the EIB.

To improve access-to-finance for KETs companies, the EIB, in close collaboration with the EC, should significantly increase its visibility and raise market players' awareness of EIB/EC financial instruments. We recommend that the EIB or EC undertake additional market research in order to identify the most suitable channels for reaching KETs companies and making them aware of the EIB's product offering. The EIB should then use the newly gained market knowledge to prepare targeted information material to reach both potential borrowers and regional commercial banks.

Possible implementation:

- > Conduct market research to identify KETs companies' information channels about financing
- > Develop channel-specific communication tools and messages
- > Leverage the European Investment Advisory Hub (EIAH) as a communication platform to increase awareness of EIB/EC financial instruments in the market
- > Identify best-suited multipliers and cooperation partners at national and regional levels

Recommendation 2

Through the use of existing financial instruments:

- continue being a stable partner for established KETs players in all phases of the market cycle
- expand “indirect equity” approach: the EIB should increase its lending activities to (public) technology investors. Based on loans provided by the EIB, technology investors can then effectively provide equity to KETs companies

The EIB's existing portfolio of instruments suits well-established innovators and should be maintained. Current market conditions, with low interest rates and readily available liquidity, are favourable for Well-established innovators. Such companies either have no difficulty raising sufficient funds on the commercial market or are in a good position to use the EIB's existing portfolio of instruments. Consequently, there is no need for the EIB to go beyond existing instruments in order to support Well-established innovators. Nevertheless, the EIB can play a useful role by being a stable and reliable partner: access-to-finance conditions, even for solid KETs players, are sensitive to macroeconomic changes. The EIB should be prepared for a possible worsening of the macroeconomic environment in the Eurozone.

Possible implementation:

- > Maintain the tried-and-tested instruments and funds available in the existing portfolio and make these tools available during economic downturns
- > Do not limit access to established instruments in times of worsening macroeconomic conditions and thus remain a stable financing partner during periods of high uncertainty in the markets

Besides using its existing instruments to support Well-established innovators, the EIB could also expand an innovative approach that it has already implemented to sustain smaller/emerging innovative companies. Banks mostly consider younger/smaller Post start-ups to be too risky an investment. These companies have typically brought a number of innovations to the near-commercialisation phase. However, Post start-up companies lack the proven track record or collateral needed to gain sufficient access to commercial lending. Consequently, these companies require equity to finance their activities because commercial banks consider the risk of lending to younger/smaller Post start-up companies to be too high for debt finance.

The EIB should roll out its already successful "indirect equity" approach to a wider range of markets and countries. KETs companies tend to require equity more than debt finance, especially in the early stages of their life cycle. This need can be met by the EIB by providing debt to financial intermediaries, who in turn make equity investments in KETs companies. The EIB should therefore supply specialised technology investment firms with debt finance. Such technology-driven investors have the knowledge and experience to select the most innovative KETs companies for equity investments. The EIB has already piloted the "indirect equity" approach: Imperial Innovations, a UK-based technology investment firm, successfully obtained GBP 80 million in debt from the EIB to invest in early-stage university spin-offs.¹⁰

Extending the use of financial intermediaries, for example to public development banks, public innovation support programmes or other specialised technology investment firms, would have a range of positive effects:

- > The EIB could build on existing KETs expertise: public development banks, innovation support programmes and technology investment firms have developed market insight and due diligence

capacities based on technology and commercialisation experience in the KETs sector. By acting as a facilitator for experienced intermediaries, the EIB would not have to take time and effort-consuming investment decisions at the individual company level

- > The EIB could maintain the basic principle of being a debt, not an equity investor
- > Collaboration with experienced intermediaries could be suitable for the regional financing focus of many KETs companies. With their often better access to regional finance markets, which is the preferred choice for Post start-up companies, financial intermediaries could help in improving the reach of the EIB's funds
- > The EIB could increase its market reach, as intermediaries may give access to "bundles" of Post start-up companies: many Post start-up companies are either too small (i.e. the required financing amount is below minimum EIB investment thresholds) or unaware of existing EIB offerings. Intermediaries could help overcome the problem of excessively small financing tranches by serving as a single point of access for a range of companies

Possible implementation:

- > Identify suitable technology-financing organisations (publicly backed development banks, public innovation support programmes, specialised technology investment firms) that could serve as a vehicle to convert debt finance provided by the EIB into equity investments for KETs companies
- > Concentrate financing activities on a number of selected geographical "hot spots" in Europe (areas with a high concentration of relevant KETs companies)
- > Focus lending activities on organisations with an outstanding track record in the commercialisation of innovative high-tech companies, such as Imperial Innovations
- > Include covenants to ensure the resources provided are specifically targeted at the KETs sector
- > Monitor investments based on pre-established measures of success

Impact-generating investment volume:

- > Total investment volume: EUR 200 million to EUR 500 million
- > Average investment in individual KETs companies by providing "indirect equity" through financial intermediaries ranging between EUR 0.5 million and EUR 5 million

Recommendation 3

Review existing internal lending processes and procedures to enhance responsiveness and maximise customer satisfaction

Improve administrative procedures in response to KETs companies' preference for easier and shorter lending processes. Our study has revealed that under current market conditions, well-performing KETs companies ("good risks" from a lender's point of view) focus on convenience and low administrative effort as key selection criteria for their lenders. We recommend that the EIB review core processes and procedures in order to simplify them where possible and become a leading market player for innovation financing.

Possible implementation:

- > Benchmark core processes with best practice approaches in public and private sector banking; focus on process duration, complexity, user friendliness and degree of digitalisation
- > Based on the results from a preliminary review, redesign core processes to be fully competitive with sector leaders; enable full integration of services, e.g. with commercial banks and regional development banks
- > Create a new, favourable customer experience, in combination with increased market reach, making the EIB the "natural" first point of contact for borrowers

E.2 Medium-term actions

Recommendation 4

Set up targeted/specialised advisory services including the use of “expert pools” to assist in the assessment of new technologies and their market potential and help KETs companies prepare for financing. Such additional resources could bring “science to finance” and “finance to science”

The study has highlighted the fact that 92% of financial institutions believe that it is difficult or very difficult to lend to KETs companies. At the same time over 90% of smaller KETs companies struggle to raise the amounts of finance they need.

Besides other potential actions, there are two mutually reinforcing approaches that could be implemented to increase the expertise in the market to facilitate financing operations.

The first approach would aim to provide advice to financial institutions, especially on the assessment of new technologies. In this connection, one solution could be the creation of a “pool of experts” with relevant profiles to provide advice in certain technological areas. Such a “pool of experts” would complement InnovFin Advisory and aim to improve the bankability of innovative projects by enhancing the technological assessment of such projects by investors. It would aim to single out technologically rigorous and promising projects, with the advantage of avoiding a mixed equilibrium between non-viable and viable projects, leading to higher interest rates and, potentially, to the migration of some promising projects to outside the EU.

The second approach would be to target companies, particularly small/medium-sized ones, which are normally less sophisticated than larger, better established ones. This could be done by providing additional resources to advisory services within the EIB, as the resources currently available under the existing mandates are sufficient only for focusing on relatively large projects/companies. An increase in advisory resources would enable the EIB to extend the provision of financial advice to small and mid-sized companies and to increase their chances of a successful fund-raising. As with the current set-up, a key benefit of this approach is that EIB advisory services would not be linked to EIB finance. A company would be free to raise finance from any other sources. This aspect would therefore lead to an increase in the number of financing operations carried out not only by the EIB but also by other financial institutions, which would be dealing with companies that are better prepared.

Possible implementation:

- > Prioritise potential areas of intervention based on potential demand for financing/advisory services and complexity of technology
- > Determine appropriate level of resources required to achieve a material impact in the market
- > Discuss potential solutions with financial intermediaries

Recommendation 5

Leverage existing EFSI/InnovFin resources to develop targeted/bespoke financial mechanisms, including investment platforms that can provide:

- equity and equity-type debt to companies on the verge of commercialisation or planning ambitious investments
- “venture debt” to high-growth/young KETs companies

Under EFSI/InnovFin, and in line with the equity product under development, the EIB should position itself as an equity investor or provider of equity-type debt for KETs companies. The EIB needs to further target the lack of equity investments and high-risk debt into KETs companies by acting as a direct investor. A potential EIB equity product could target promising and healthy KETs companies that have been turned down by commercial banks due to the technology risks involved as well as the lack of a track record and collateral. This is often the case for Post start-up and for Quantum leap companies. An EIB equity stake in the company or subordinated debt layer could further increase commercial lenders' confidence to invest in KETs companies and therefore have a catalytic effect in attracting private capital: such lenders often trust the EIB's tried-and-tested due diligence and risk management procedures, ensuring that risks are kept within acceptable limits. Private capital could be attracted for individual projects, based on the equity or subordinated debt EFSI could provide to de-risk private investment, or via Investment Platforms. Investment Platforms have the advantage of combining finance from different sources (EC/EIB/National Promotional Banks/private investors), to be readily deployable over a number of investments. Advisory services are instrumental in both creating of Investment Platforms and preparing borrowers for upcoming financing operations.

Possible implementation:

- > Concentrate financing activities on a number of selected geographical "hot spots" in Europe (areas with a high concentration of relevant KETs companies)
- > Determine key tenets of the equity product, including guidelines on how KETs companies can apply for funding and how commercial lenders can co-invest; develop guidelines and benchmarks for financial risk limits and growth target ranges in cooperation with experts in technology finance
- > Identify suitable KETs companies (potentially through close collaboration with regional partners)
- > Focus risk assessment on projected future performance, taking into account intellectual property, innovation capabilities and market potential
- > Accompany programme with a guarantee scheme to encourage private co-investment
- > While KETs should be a core investment area of the financial product, investments could also cover other high-priority policy areas facing similar challenges to KETs companies (i.e. the product could be sector-agnostic)

Impact-generating investment volume:

- > Total product size: between EUR 200 million and EUR 500 million
- > Individual investments in KETs companies could range between EUR 5 million and EUR 60 million

Still in the context of EFSI/InnovFin, and in line with what is being developed to finance broadband projects, the EIB should create a dedicated fund/investment platform in order to be able to offer higher-risk-taking debt to relatively small/young KETs companies. To further support Post start-up companies, which, due to their relatively small size, cannot be eligible under existing EIB debt products,

the EIB should set up a dedicated "venture debt" fund. The fund should offer higher-risk-taking, equity-like debt ("venture debt") to younger/smaller KETs companies, which are currently too small to access the EIB's direct instruments. Our study indicates that such a fund would attract high demand but is in short supply. Many KETs companies, especially younger/smaller ventures with a higher risk profile, indicated that they would be willing to bear a higher cost of capital to overcome difficulties in accessing adequate debt finance. On the other hand, the lenders interviewed in this study indicated that very few market participants offer such "venture debt" instruments. An EIB "venture debt" fund would bridge this gap and expand the reach of the EIB's high-risk debt products, which are currently set at a minimum amount of EUR 7.5 million under the MidCap Growth Finance facility.

A "venture debt" fund could also attract private co-investment if structured as an Investment Platform. The EIB could offer investors access to a very particular asset class (fast-growing, innovative technology companies) with potentially high yields. The EIB has significant potential to make this asset class attractive by reducing risk: the "venture debt investment platform" should be offered in combination with the EIB's established due diligence and risk management processes and could, for example, be structured as a layered fund to attract investors with different risk appetites.

Possible implementation:

- > Set up a separate fund structure for "venture debt" activities in order to protect the EIB's AAA credit rating from the risk involved in the "venture debt" fund
- > Establish a tailor-made risk assessment approach, focused on the expected future performance of KETs companies. The aim of such an approach should be to overcome typical "show stoppers" (lack of track record/collateral, negative EBITDA, etc.) for lending to KETs companies
- > Offer a debt financing instrument that charges KETs companies higher interest rates according to the assessed level of risk involved
- > Accompany the "venture debt" fund with guarantees to encourage private co-investment
- > Aim for a first-loss piece cover by the EU Commission (approx. 50-80 per cent)
- > Promote the "venture debt" offering through national and regional technology hubs and RTOs
- > While KETs should be a core investment area of the fund, investments could also cover other high-priority policy areas facing similar challenges to KETs companies (i.e. the fund could be sector-agnostic)

Impact-generating investment volume:

- > Total fund size: EUR 150 million to EUR 500 million
- > Individual investments in KETs companies: up to EUR 5 million

Recommendation 6

EIB to investigate the possibility to increase the acceptance of intellectual property as collateral for debt financing

Intellectual property (IP) is a key asset of KETs companies but is not valued by commercial lenders. Many of the KETs companies interviewed view IP as a key factor in the success of their businesses. KETs companies' patents are usually the result of time-intensive and resource-consuming R&D work. Patents give the KETs companies that own them a significant competitive advantage on the market, enabling them to commercialise new products and processes. However, commercial lenders usually do not accept intangible assets (i.e. patents) as collateral. Few banks have looked into this new market, mainly because they lack the knowledge and necessary risk management tools to assess the value of IP. At the same time many KETs companies lack tangible assets, such as real estate, plant and machinery, which most banks accept as collateral for debt financing. Consequently, the lack of IP-based lending puts many KETs companies at a disadvantage on the commercial lending market.

Increasing the acceptance of IP as collateral for debt financing would improve access-to-finance conditions for many KETs companies. The approaches recently taken by financial intermediaries in the United States, Denmark and Singapore have shown that it is possible to securitise IP in debt financing operations. In Singapore, it is possible to use IP value certificates as collateral for loans from commercial banks. Furthermore, the Intellectual Property Office of Singapore offers an "IP Financing Scheme" together with financial intermediaries and independent evaluators of patents. Under the scheme, young and growing companies in particular can obtain a grant from the government of up to 50 per cent of the cost of valuing their patents.¹¹

Again, the EIB would be able to take a leading role in bringing together the relevant players of the rather fragmented European KETs market in order to unlock the potential of IP-based lending.

Possible implementation:

- > Organise a conference on IP-based lending to KETs companies; invite experts and practitioners, discuss best-in-class examples, IP-valuation approaches and market potential; build a network of experts, practitioners and financial institutions
- > Develop valuation guidelines and risk management approaches for IP-based lending; cooperate with credible independent expert organisations for the valuation of KETs patents
- > Set up a pilot scheme for IP-based lending to KETs companies; cooperate with commercial lenders to share risk and experiences
- > Track progress and convert the pilot scheme into a regular financing offer once expectations are met

Recommendation 7

EC to review regulatory matters potentially affecting KETs investments and access-to-finance

Bringing technological and non-technological innovations to the market requires having a supportive investment framework in place, in particular a stable regulatory environment, the right institutional set-up and the removal of sector-specific investment hurdles. Regulatory barriers and uncertainties are one main reason for not fully exploiting the innovative potential in the EU. Some of the barriers to investment will require specific action at Member State as well as European level.

In the context of the Better Regulation package and the third pillar of the Investment Plan for Europe, a further impetus has been given to improving the regulatory framework in order to make it more innovation-friendly. As stressed in the various reports of the high-level group on KETs, unleashing the full potential of KETs requires 'intelligent regulation' which should support the market deployment of KETs and hence the competitiveness of EU industries. Although the feedback from the study suggests that the regulatory framework is not perceived as a major investment hurdle by KETs market players, the investment environment for KETs along its value chain should be further assessed, on the basis of additional market evidence from KETs companies.

Recommendation 8

EC to review content/user friendliness of the European Investment Project Portal (EIPP) and to evaluate launch of platform on best fund raising practices

The European Investment Project Portal (EIPP) has not yet been launched and therefore it is impossible at this stage to say whether any intervention will be required to improve its user-friendliness or functionality.

One concept that could be evaluated is the launch, within the EIPP, of a platform on best fund-raising practices, which could help KETs (and other) companies to find specific information, material and advice to prepare for an upcoming fund-raising process.

Recommendation 9

Promote the increase of resources for KETs investment schemes/financial products at national levels

KETs companies are looking not only for subsidies and grants, but also for debt or equity to grow their businesses. The European KETs sector is very entrepreneurial. All the KETs companies in our sample had a business case and a commercialisation strategy for their products and were prepared to take considerable risk to implement their innovations on the open market. While subsidies and grants play a key role in stimulating early-stage R&D activities, debt and equity instruments remain the most appropriate way for financing the companies.

KETs companies and other market participants would benefit from the conversion of part of existing subsidy programmes into market-based investment schemes not only at EU level, as has already been done via the RSFF and InnovFin programmes, but also at national level. Grants or subsidies are one-off investments. In contrast, debt financing or guarantee schemes encourage a more dynamic environment because most loans will be repaid (partly or in full) with interest and converted back into available funds. For that reason debt financing or guarantee schemes are more effective than subsidies or grants from the perspective of public institutions. The KETs companies we interviewed also indicated that subsidies or grants become less important once they reach the commercialisation stage. Therefore we recommend that the EIB initiate discussions at national level to potentially convert part of existing KETs subsidy or grant programmes into repayable investment schemes.

Possible implementation:

- > Conduct a systematic screening of subsidy programmes for KETs companies at the national levels, assessing their potential convertibility into financing schemes
- > Enter into discussions with the relevant public authorities operating the identified subsidy programmes; explore the possibility of converting such programmes into debt or equity-based investment schemes
- > Prepare arguments and case studies highlighting the effectiveness of investment-based programmes for the European KETs sector; partner with national and regional development banks

F. Concluding remarks

We see a clear need for action to improve access-to-finance conditions for KETs companies. KETs companies are important drivers of growth, innovation and industrial competitiveness in Europe. However, under the current market conditions for debt financing, a significant proportion of the European KETs sector lacks the necessary funding to fulfil its growth and innovation potential. This inadequate access-to-finance needs to be addressed. The EC and the EIB should implement targeted measures and initiatives to improve access-to-finance conditions for European KETs companies.

In order to improve access-to-finance conditions for KETs companies, particular emphasis should be placed on actions to improve awareness of available programmes, to strengthen advisory services for better preparing potential borrowers and to leverage EFSI/InnovFin to launch higher-risk-taking financial instruments. In particular, instruments should be designed to meet the specific needs of the identified types of KETs companies. Higher-risk-taking financial instruments are required because many KETs companies lack access to adequate funding in risk-averse debt financing markets. Due to their often entrepreneurial nature, young KETs companies often fail to meet banks' preconditions for debt financing: an adequate track record and collateral. Furthermore, our study has highlighted the fact that KETs companies have different financing needs. Targeted measures are needed to support the "Post start-up" and "Quantum leap" types of KETs companies identified in our study.

Instruments beyond traditional debt financing are needed to have a significant impact on access-to-finance conditions for KETs companies. New debt financing instruments alone are unlikely to have a strong enough impact to overcome the KETs companies' access-to-finance problems identified in this study. We have therefore highlighted the importance of the equity instruments that are being developed under EFSI, especially in early-stage financing. Moreover, measures to increase geographical proximity to KETs companies as well as targeted networking strategies are needed to foster collaboration between market participants.

The EC and the EIB need to take a lead role in further improving innovation-financing conditions in Europe. We found that numerous KETs companies throughout Europe are facing challenges concerning access-to-finance. As the EU's bank, the EIB is uniquely positioned to contribute to shaping the entire KETs sector, stimulating further innovation and growth. In a highly fragmented European KETs sector, the EIB has a unique ability to combine a deep understanding of the market with the necessary boldness to make a significant difference. The European Fund for Strategic Investments, which is currently taking shape under the management of the EIB Group and the EC, is a key lever for achieving this goal.

End notes

- 1 European Commission, "A European strategy for Key Enabling Technologies – A bridge to growth and jobs", available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0341:FIN:EN:PDF> (last accessed: November 27, 2015)
- 2 n/a = no recent data available
- 3 Significance is calculated by dividing the EU's total production by the individual KET's share of production. It is a measure of the importance of a particular KET in the EU's total production activity.
- 4 As of 18/11/2015.
- 5 Five companies with negative EBITDA were excluded from the calculation of the ratio.
- 6 European Commission, "What is FP7? The basics", available at: https://ec.europa.eu/research/fp7/understanding/fp7inbrief/what-is_en.html (last accessed: 4 December 2015)
- 7 Horizon 2020 website, "InnovFin – EU Finance for Innovators", available at: <http://horizon2020.lu/Horizon-2020/Industrial-Leadership/InnovFin-EU-Finance-for-Innovators> (last accessed: 4 December 2015)
- 8 European Investment Bank, "InnovFin: EU Finance for Innovators – Questions and Answers", available at: http://www.eib.org/attachments/innovfin_faq_en.pdf (last accessed: 4 December 2015)
- 9 European Commission, "The Investment Plan for Europe: Questions and Answers", available at: [http://europa.eu/rapid/press-release MEMO-15-5419_en.htm](http://europa.eu/rapid/press-release_MEMO-15-5419_en.htm) (last accessed: 4 December 2015)
- 10 Imperial Innovations, "Innovations obtains further £50m loan facility from EIB to strengthen UK biotech & life science investment", available at: <http://www.imperialinnovations.co.uk/news-centre/news/innovations-obtains-further-50m-loan-facility-eib/> (last accessed: 2 December 2015)
- 11 Intellectual Property Office of Singapore, "Intellectual Property Financing Scheme", available at: <http://www.ipos.gov.sg/IPforYou/IPforBusinesses/IPFinancingScheme.aspx> (last accessed: 2 December 2015)

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