

FINANCIAL ASPECTS OF OPEN INNOVATION

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ABSTRACT

This chapter concludes that competition plays an important role in how firms organize and finance their projects, especially in the innovation-intensive sector. It is shown that a limited number of innovation financing types are suitable for the discrete stage in the company life-cycle. It is shown empirically that for each stage, 2-3 types of financing are appropriate. These approaches to innovation financing differ by the financial provider's risk exposure. The scope of innovation approaches varies from the FFF (Friends, Family and Fools) approach that carries the highest risk to the least risky bank loans. Between these there are well-elaborated approaches like Venture Capital or Private Equity, P2P lending, Crowdfunding, Mezzanine financing, Business angels, and others. The basic principles of each approach to innovation financing are addressed. Apart from private funding of innovation, the attention is also paid to innovation financing from public sources, which is gaining growing importance in the EU. Especially public funding of innovation tied with the EU program Horizon 2020 represents a worthwhile source of financing.

Prerequisite	Basic knowledge of OI and financial management.
Objectives of the lecture	To demonstrate possible approaches to OI financing. To make students familiar with the evaluation of the pros and cons of the approaches presented. To make students aware of the risks combined with various ways of OI financing.
Workload	26h teaching; 52h self-study.
Learning outcomes	Understanding the key underlying principles of OI financing.
Knowledge	Being familiar with the key characteristics of OI financing, various models of OI financing coming from both private and public sources.
Skills	Acquiring knowledge and know-how about financing OI projects. Mastering the identification and analysis of the financial risks of OI projects. Implementing financial risk mitigation provisions. Capability to be conducive to implementing and monitoring suitable schemes of OI project financing. Being able to evaluate the financial and non-financial effects of the selected OI financing approach.
Competences	Acquiring expertise in OI financing. Being able to make an analysis focused on choosing the appropriate way of OI financing. Treating the risks tied with OI financing.
Reading List	Enclosed.
European Qualifications Framework (EQF) Level	Level 7.

LECTURE CONTENT

Definitions: Alternative approaches to Open innovation financing from public and private sources.

Practical implications: The student will be able to choose the most suitable approach to OI financing depending on the progress of the OI project.

Content-related material: Books by H. Chesborough, Linkegaard and Osterwalder. Financial management book by Brealey & Myers "Principles of Corporate Finance".

Additional reading material for students: see the list of references below.

INTRODUCTION

A new growth program for EU member states, known as “Strategy 2020” accentuates the concept of innovative companies which play a major role in advancing the internal cohesion of the EU. It brings into focus the need for the creation of enterprises based on knowledge, co-operation and innovation. The Europe 2020 strategy requires business, science, financial institutions and national governments in the EU to develop their strategic capacity for innovation, which is defined as the ability to create and implement innovative strategic products and innovative business models. Such activities are inherently risky and require capital that is not always certain to yield a satisfactory rate of return (Europe 2020, 2010).

To keep on sustainable growth, companies are looking for sources of competitive advantage. One of the most important underlying factors of their competitiveness is their ability to innovate (Lewandowska, 2013). Companies which are able to base their competitive advantage on innovation are ranked among innovative companies. A company is considered innovative if at least one of following four criteria are met (Pisano, Pironti & Bertoldi, 2009):

1. The company has introduced new or significantly improved products (goods or services) to the market,
2. The company has new or significantly improved processes for producing or supplying products (goods or services),
3. The company has been involved in activities – including R&D activities, which are aimed at the development or the market introduction of new or significantly improved products (goods or services) that are still ongoing (i.e. not completed),
4. The company has been involved in innovation activities similar to the above point, but these activities have been untimely aborted.

The innovation potential of a company is contingent upon several factors, among which the availability of resources plays the main role (financial, human, technical and information). Another factor is a pro-innovative corporate culture which creates an environment that stimulates creativity, mutual trustworthiness and sharing ideas and competences. The underlying factor of a functional pro-innovative corporate culture is corporate communication oriented both inwards and outwards. Companies should not leave behind a technology base and knowledge originating outside the company's borders. Companies that have an ambition to play the roles of branch leaders should adopt flexible organizational structures (matrix, network or virtual etc.) that will help them react more effectively to market needs. For human resources to be effective in the innovation process, the typology of innovation roles should be taken into consideration. With respect to innovation role typology, the innovation champions, leaders and sponsors should be represented proportionally (Galbraith, 1999).

From the macroeconomic point of view, it is advisable for the state to establish an innovation policy which is aimed at the support of innovative companies. The state has to establish a policy which provides start-ups and companies in early development stages with legal, consultancy and financial support. Moreover, well-established companies or organizations with a proven track record may benefit from goal-directed or institutional financing innovations. It has been proven that public subsidy enhances companies' liquidity and thus may boost the probability of their survival (Ebersberger, 2011).

INNOVATIVE COMPANY FINANCING

An important factor in innovation is its financing. Financing is a critical issue for the survival and development of small and medium sized enterprises. It is clear that the profit generated by an innovation lags behind the expenditure of innovation development. Therefore, the availability of financial sources to be sufficient for both the development and the commercial launch of the innovation is crucial. Moreover, innovation decisions are highly risky. Properly structured innovation financing is thus a condition for further success of the innovation. It has become apparent that the innovative company which goes through its life cycle operates with alternating risk profiles typical for each life cycle period. The subjects in charge of financing the innovative company operate with a different "reference risk level" (Špaček, 2009). This term can be explained as the maximum level of risk which the financing subject or institution is willing to accept.

Figure 1 demonstrates possible approaches to the financing of a company during its life cycle.

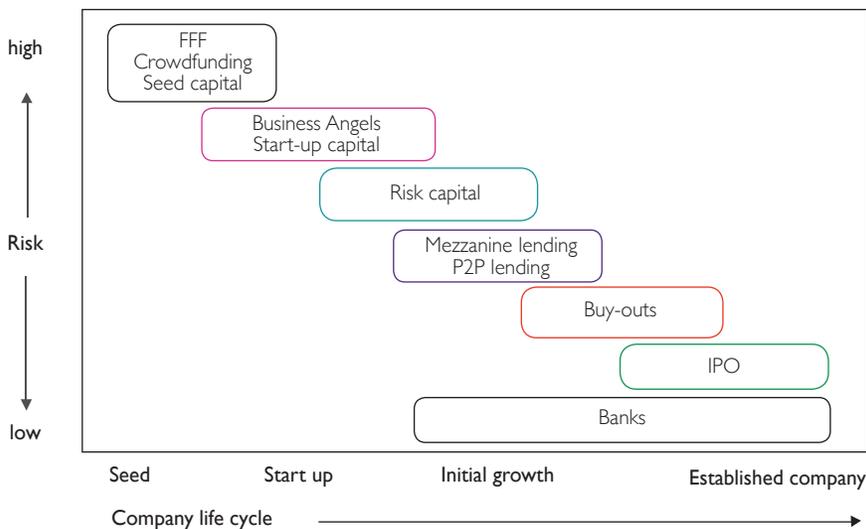


Figure 1. Financing of a company during its life cycle

Source: own elaboration

The Friends, Family, Fools approach

The approach with the highest risk to innovation financing is FFF (Friends, Family and Fools). This approach is applied at the seed stage of a company's existence. Mostly it represents financing the plain idea because the company has not come into existence yet. Seed capital is also applicable at the rudimentary stage. As opposed to FFF, innovative company financing by seed capital requires usually co-financing from private sources.

Crowdfunding approach

A company in an early development stage can be financed also by crowdfunding or crowdsourcing (Hossain, 2015). This approach is based on publicly announced money collection dedicated to a specific purpose. Individuals can freely decide to what extent they provide financial support to the investment project, if at all. Crowdfunding is believed to democratize both the financing and the commercialization of innovation. It also creates entirely new forms of interconnections between the project creators and entrepreneurs with their backers and investors. Crowdfunding is about making a dream real for both the crowd and the creator. For managers and executives, crowdfunding presents an exciting opportunity to examine the innovation process at the grassroots level. It helps them to understand consumer demand, user-driven innovation and nascent organization that are about to launch new ideas better (Mollick & Robb, 2016). From the technical point of view, crowdfunding is organized on electronic marketplaces which balance money supply with money demand. Crowdfunding platforms lower the costs of these campaigns dramatically by leveraging the geographic and social reach of the Internet to connect fundraisers to millions of potential backers (Fleming & Sorenson, 2016). If the requested sum of money is actually collected, then the project is implemented. If not, the money is given back to the investors. Various innovative products like the Pebble watch, book issues or cultural events have been subsidized through crowdfunding. Compensation for the investors varies from "having a good feeling from the investment" to direct engagement in the company, typically by acquiring a stake in the company.

Business Angels approach

Early-stage innovative projects may also be funded by private investors known as Business Angels (BA). They can be defined as wealthy private individuals who decide to invest part of their equity in the early stage of the life of a company, at the stage in which other financial operators such as banks or venture capitalists are generally reluctant to play a role due to lack of guarantees and/or the small size of the capital required (Aernoud, 1999). Business angels are usually wealthy individuals who have been successful in management or entrepreneurship. They have usually held leading positions or managed their own business during their careers. They basically invest a small part of their wealth in new enterprises so that in case they lose their money, this would not drastically influence their way of life. BAs are typically engaged in the early stages of projects, at a time when

neither banks nor institutional investors find them interesting. They are usually able to perform reliable assessment of an investment opportunity and make the final decision quickly. Most BAs use their private resources to contribute to innovative projects in return for intellectual satisfaction, a chance to be a part of the team, the possibility of fulfilling their passion, appreciations, etc. rather than financial gains. BAs are interested in innovative projects with high growth potential. Their tenure in the firm usually covers a period from 3 to 7 years.

In addition to necessary funding, BAs also contribute to the innovation project by their experience, knowledge and professionalism, business contacts, passion and commitment (Lewandowska, 2013). They fill the gap between the founders, family and friends on one side and institutional venture capital funds on the other side as a financial source. In addition to providing money, they are hands-on investors and contribute their skills, expertise, knowledge and contacts to the business they invest in (Ramadani, 2009). They invest in seed, start-up and early-stage enterprises in exchange for acquiring a stake in these companies. The precondition for the investment is high growth potential. BAs secure high risk capital and are motivated by something larger than money. Even today their emotional relationship to the investment plays an important role. The fact that BAs invest personal assets distinguishes them from institutional investors of high-risk capital, whose funds come from sources such as pension funds, banks, university endowments, and insurance companies that have legal obligation to exercise caution and invest in less risky ventures (Ramadani, 2009).

On average a BA invests 10,000 GBP per deal and has a portfolio of two to five investments (Ramadani, 2009). In the Czech Republic, BAs' investments rank from hundred thousand to several million CZK. In contrast, Amazon's CEO Jeff Bezos, who is believed to be one of the most important BAs in the USA, has subsidized 11 projects at the minimum 1.5 M USD each (Prive, 2013). In terms of the scope of the investments, BAs cannot compete with investment funds. They may operate either on individual basis or as an investment conglomerate. Some of them may be publicly known, while others are anonymous. It is no surprise that a BA's engagement in the business implies better financial performance. Financing through a BA is also associated with improved likelihood of survival for four or more years, higher level of employment, and more traffic on the firm's website (Kerr, Lerner & Schoar, 2011). Moreover, a BA's involvement in start-up financing ensures high innovation propensity and creates more innovations in a medium-term period than other types of funding (Pisano et al., 1999). Finally, it is worth mentioning that companies like Amazon, the Mining Company, Go2Net and Firefly owe their survival to BAs, their funds and expertise and experience (Ramadani, 2009).

Some sub-categories to BAs have been developed over time. One group are Founding Angels (FAs) who operate on a slightly different ground than the usual BAs. FAs join the start-up team of a new technology-based firm (NTBF), complementing the scientific members coming mainly from universities and research institutions with business expertise and scientific understanding. They

make significantly fewer investments than BAs. An FA plays more the role of a founder and an entrepreneur than that of an investor because of his/her early engagement in the venture (Festel & Cleyn, 2013).

Private Equity and Venture Capital approaches

A very effective way of innovation financing is the involvement of risk capital funds. These funds can be roughly divided to Venture Capital (VC) Funds and Private Equity (PE) Funds, which mainly invest into companies listed in the Stock Exchange with later stage development. Lewandowska (2013) contends that VC funds seek to invest in the early stages of promising projects or firms while PE funds focus on a later stage of company development.

The prerequisite for PE or VC fund engagement in innovative company financing is a competent management and viable business plan. Venture capital is a medium- or long-term investment where the investor buys interests in an unlisted company to sell them when the company has become successful (Lewandowska, 2013). A risk capital fund usually buys a minority stake in the target company and then pushes the company management to boost the company's performance. The expected company valuation ranks between 20-30% per annum. Should the investment be recognized as having lost its potential for growth, measures are undertaken to terminate the agreement. At the end of a successful investment, which is tentatively 4-7 years, the fund exits the company and sells its stake, which was in the meantime significantly revaluated to the company managers (management buy-out – MBO) or external managers (management buy-in – MBI), or sells the shares in the Stock Exchange (Initial Public Offering – IPO) or to strategic investor which can further benefit from incorporating the target company into its network. It has also been shown that more innovative and profitable ventures are more likely to go public than ventures with more imitative or derivative projects (Schwienbacher, 2008). Lerner, Sorensen and Stromberg (2013) state that the engagement of PE funds in the transaction will result in higher investment in innovation.

Ebersberger (2011) argues that public subsidies, when successful in fostering innovation, affect the exit of firms indirectly. Subsidized firms are significantly less likely to exit than they would without subsidy. Moreover, subsidies do not have a significant effect on the closure of firms. Subsidies for innovation do not keep an innovation alive which would have to close without subsidies.

Today, Corporate Venture Capital (CVC) has gained increasing importance in innovation financing. CVC is defined as the practice where a large firm takes an equity stake in (or enters into a joint venture arrangement with) a small but innovative or specialist firm to which it may also provide management and marketing expertise. The objective is to gain a specific competitive advantage (Business Dictionary, 2016). Many reputable companies, like Microsoft, Intel and Merck have made substantial amounts of CVC investment in collaboration with external start-ups where they have

reduced the start-up's need to raise financing from external capital markets and independent venture capitalists (Chesbrough, 2002). The role of CVC has been thoroughly studied by Fulghieri and Sevilir (2009). They found that CVC not only created firm value, especially when firms undertook CVC to exploit new technologies, but also increased the innovation rates of established firms significantly. Chemmanur and Louskina (2008) have shown that CVC represents an important source of financing for the development of innovative technologies by young and risky entrepreneurial firms that would not have received financing from other sources, such as independent venture capital (IVC). CVC is believed to be beneficial for start-ups, because it allows them to benefit from synergies generated with a strategic investor. On the other hand, it may expose them to a possible conflict of interest with the firm providing the CVC (Fulghieri & Sevilir, 2009).

Leverage Buy-out approach

A risk capital fund can also participate in a leverage buy-out (LBO) which aims at the purchase of the target company by means of using financial leverage (borrowed money). Schematic outlay of the LBO process is depicted in Figure 2.

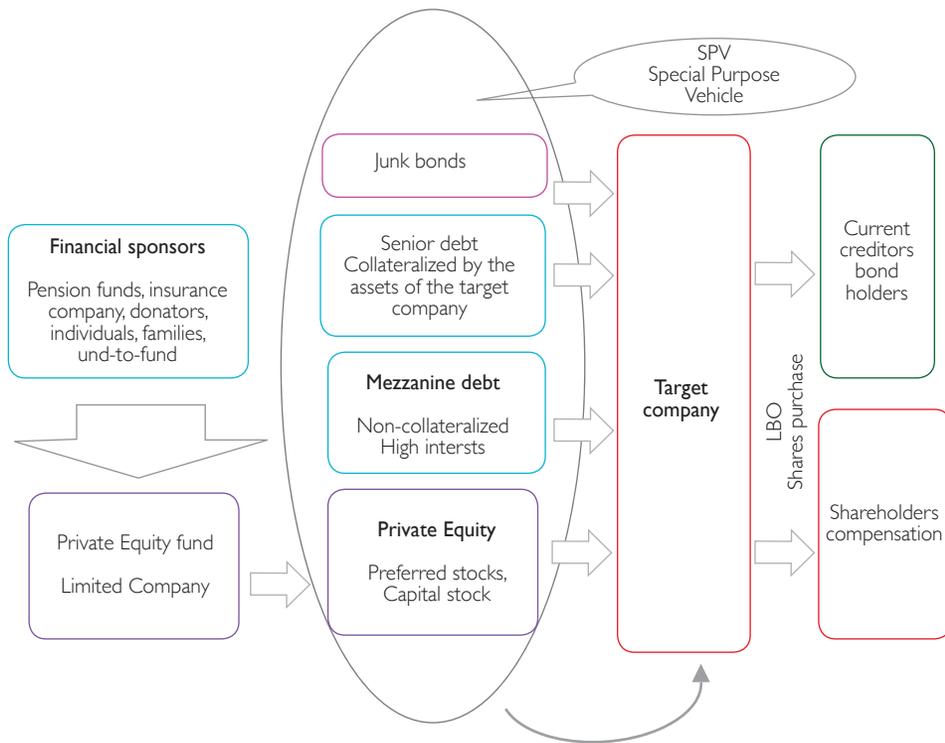


Figure 2. Scheme of the LBO process

Source: own elaboration

The LBO process works rather simply, but sometimes it is at the borders of the law. In the beginning, there is a private equity fund established by the support of pension funds, donors or other providers of financing. Such a fund gets together with a limited company formed by investors (which may include the target company managers as well). They found a one-off purpose company which aims to buy the target company. This company is called a “special purpose vehicle” (SPV). To raise money for these transactions, the SPV floats a loan which is collateralized by the assets of the

target company. In special cases, the SPV can issue bonds, which are usually characterized by poor rating. The reason behind this is that these bonds are issued by an excessively indebted company. The debt burden may exceed 80% of the total company liabilities. Therefore they are called junk bonds. Once the SPV raises enough money, it is able to acquire the target company. At first the shareholders of the target company are compensated. In the wake of the shareholders' compensation, the SPV is merged with the target company and all the liabilities are transferred to a newly established company which is pushed to its maximum performance so that all the debts would be repaid (senior and mezzanine debt, as well as to satisfy the claims of bond holders). It is apparent that banks are prone to finance LBOs because they can afford to charge high interest rates. When using an LBO, the investors can purchase the target company even with minimum private financial funds. It is apparent that an LBO is a very risky operation, the success of which is dependent on the target company's operation performance, which is the condition for a timely debt repay.

Mezzanine lending

Mezzanine lending is used preferably for further expansion of existing firms in situations when the company needs additional financing while all company assets are collateralized. Mezzanine debt is usually provided by financial funds or by some banks. Mezzanine debt is not collateralized, and therefore it is very risky. Finance providers charge high interest rates (20% or more) to compensate for the excessive risks. In the case of default, the company may run a debt-equity-swap to minimize the potential losses. Since mezzanine debt is subordinated to the senior debt provided by the established bank. It is not exceptional that mezzanine financing is often recommended by the senior debt provider. Deferred repayment of the mezzanine debt does not expose the company to excessive risks. The term “mezzanine” means that this type of financing is in-between FFF and IPO.

Peer-to-Peer lending

Peer-to-peer (P2P) lending has grown in importance in recent years. This approach, which leaves out banks as financial brokers, is very promising. P2P uses the electronic marketplace to balance the supply and demand for money. Despite some initial mistrust in this concept, especially SMEs have taken interest in this model of financing. Both parties concerned (lender and debtor) benefit from the partition of the profit margin which originally belonged to the bank. This approach has inspired traditional banks to establish subsidiaries or other affiliated entities to get a stake in this

new business. The portfolio of loans offered through P2P comprises one-off repaid loans, stepwise repaid loans, overdraft loans etc.

Various platforms have been established for innovation funding. One of them is NewConnect, which has been listed in Warsaw Stock Exchange. This platform helps small and middle size enterprises (SMEs) raise capital for innovation funding. In general, NewConnect allows the companies to fund both their own innovation research and the purchase of innovation from external sources. The reason for the establishment of NewConnect was SMEs' lack of assets which large companies usually operate with. Companies are therefore seeking for external inputs, preferably for external capital sources. NewConnect can offer innovation financing at interest rates that are lower than those of bank loans (Lewandowska, 2013).

Initial Public Offering approach

Initial Public Offering (IPO) represents the most traditional approach to raising money for further development of the company. Notwithstanding the fact that IPO was originally targeted at start-ups, this approach is usually reserved for well-established companies with proven track records which can persuade the potential investor to purchase company shares. "Going public" as it is termed in the USA, is arranged through an investment banker, who oversees preparing share underwriting. Investment banks act as a financial intermediary for businesses and other large organizations, connecting the need for money with the source of money. An investment bank helps an organization, which may be a company or a government or one of its agencies, in the issuance and sale of new securities. The most critical point is determining the initial share price to be in consonance with investors' demand. Any overpricing or underpricing of the shares is detrimental to the company. A good investment banker should be able to place all newly issued shares by the IPO date (Higgins, 2015). IPO is very costly, and therefore it is advantageous for big companies. There are many examples to demonstrate the effectiveness of IPO financing. A typical one concerns combined financing of company growth, which includes the sequential process of venture capital and IPO financing.

In the late 1990s, one of the biggest Central European pharmaceutical companies, Zentiva, got together with the venture capital fund Warburg Pincus, which acquired a 66.6 % stake. After the squeeze-out of minority shareholders, the stake was increased up to 99.25 %. The upcoming expansion was financed by IPO in the Prague and London Stock Exchanges in 2004. During the IPO, the company sold 11.2 M shares at more than 5.5 M CZK, which accounts for a 30.2% stake. This stake became freely tradable. The rest of the shares were kept by Warburg Pincus (53.9%), the management and employees (13.8%) and other minority shareholders (2.2%). After the IPO, the company's market capitalization reached the value of 18.5 bill. CZK. After the exit, Warburg Pincus sold its stake to the strategic investor Sanofi-Aventis in 2009. During this period Zentiva's share was evaluated (fixing an artificial price by governmental action) by 120% (Nývtová & Režňáková, 2007, 2008).

Bank loan

Financing innovative companies by a bank loan is one of the most favourite approaches. In Europe bank loans remain the prevalent way of financing innovative companies (Kislingerová, 2010). This conservative approach exhibits many advantages. The loan is relatively easily accessible due to the increasing competition on the European banking market. A variety of new banks are approaching clients very aggressively by offering them relatively low interest rates. They are also able to slash bank fees purposely to attract new clients. There is also the good experience with the European bank sector which went through financial crisis almost unshaken in 2008-2012, with some exceptions (Wolf & Kain, 2016). Banks usually offer a variety of loans at conditions which can be tailored as per company needs. Moreover, global companies can resort to any bank abroad to ask for a loan, which increases the competitiveness of the European banking market.

As an alternative to bank loans, various types of a leasing can also be applied. Leasing is a special, economically attractive solution where the lessor (the financing party) gives the lessee (the financed party) a right to use a fixed asset for a specified period in return for a fee, usually paid periodically, on terms that the parties have agreed on (Lewandowska, 2013). Leasing can be further broken down into financial leasing, which gives the lessee the right to purchase the asset after the expiration of the lease, and operation leasing, which operates as simple renting of the asset. In special cases, the “sale-and-leaseback approach” can also be used, which enables the lessee to sell the asset and lease it back. In addition to other advantages, it may help improve a company’s cash-flow position. In general, the advantages of leasing are the following (Lewandowska, 2013):

- accessibility to innovative technologies,
- optimization of the lessee’s tax burden,
- the lessee can negotiate the schedule of payments to make it maximally convenient (seasonal instalments etc.),
- the on-going financial burden is minimized, because instalments become due at fixed dates,
- leasing companies expect lower collateral than banks offering investment loans,
- legal and tax security,
- leaseback releases the “locked-up” capital, and
- relatively simple procedures.

PUBLIC SUBSIDIES OF INNOVATION

Public subsidies and their effects on innovation performance

A great deal of emphasis has been already put on public subsidy of innovation. There is a consensus among professionals on the need of public stimulus for innovation, but, due to the uncertainty of its results, the increasing costs of innovation processes, and their risks the sentence is incomplete

(Heijs, 2001). Abors-Garrigos and Rodriguez Barrera (2011) have shown that public subsidy enhances the innovation performance of companies. It also stimulates R&D. It is believed that the subsidy must have a critical mass to influence innovation behaviour. The authors have also arrived at the conclusion that, in addition to the critical mass of the subsidy, a company's innovation intensity is influenced by its innovation structure as well as its technological intensity. Moreover, public R&D funding has a significant positive effect on innovation inputs and innovation outputs, as well as on the breadth and depth of cooperation in funded companies (Ebersberger & Lehtoranta, 2008). When going deeper into details, research has indicated that the effects of EU subsidies are significantly weaker than those coming from other public sources (Abors-Garrigos & Rodriguez Barrera, 2011). A possible explanation can be ascribed to the assumption that the subsidies provided by the EU are not treated with the same level of cautiousness and responsibility.

It is important to stress that public subsidies may either complement existing innovation funding or to substitute it. In the former case the public subsidy increases R&D expenditure, and the company can start more projects or to run projects on a larger scale. In the latter case, the company simply replaces existing private funding. This way public funding does not generate additional private investments. This effect is defined as the crowding-out effect. This effect is not rare, and it is closely combined with a firm's permanent incentive to apply for public subsidy (Salmi, 2012).

New approach of EU to innovation financing and the implications for national economies

InnovFin - EU Finance for Innovators is a joint initiative launched by the European Investment Bank (EIB) and the European Commission under Horizon 2020. It consists of a series of integrated and complementary financing tools and advisory services offered by the EIB Group, covering the entire value chain of research and innovation (R&I) to support investments from the smallest to the largest enterprises. InnovFin targets R&I-intensive industries like ICT, manufacturing, life science/health and renewable energy (Malo, 2015).

InnovFin SME Guarantee, the first and current product, targets R&I-driven SMEs and small midcaps requiring loans of between EUR 25 000 and EUR 7.5 million. A loan of more than EUR 7.5 million can be considered on a case-by-case basis.

Another instrument is the InnovFin SME Venture Capital. It is designed to improve access to risk finance by early-stage R&I-driven SMEs and small midcaps through supporting early-stage risk capital funds that invest, on a predominantly cross-border basis, in individual enterprises. SMEs and small midcaps located in the Member States or in the Associated Countries are eligible as final beneficiaries (EC, 2016).

Access to risk financing for European innovative businesses is one of the key factors regarding the effort to improve the status of European economy. Financial resources for funding via Horizon 2020

are limited, and all the applicants for the subsidy have to face fierce competition amongst other European companies. The biggest value added of this program is the satisfaction of even SMEs' needs for innovation funding. These companies are usually not strong enough to guarantee loans fully. That is why Horizon 2020 provides them with the Instrument program which facilitates granting loans to companies. This program is broken down into several phases. A significant level of investment under the SME Instrument program is needed in order to succeed at least in Phase I and receive initial funding for the purpose of carrying out the feasibility study. InnovFin is a very important tool for overcoming these obstacles and enabling companies to continue their development.

Assessment of the economic effects of open innovation

The distinctive emblem of Open Innovation (OI) is the effort to make use of new opportunities through external paths to the market, if a technology is not suitable for the current business model (Chesbrough, 2003, 2006). A key idea of OI is that multiple firms must often cooperate to create value for customers. The cooperation usually includes any of the potential forms of collaboration, specifically alliances, networks, communities, consortia, ecosystems and platforms (West, 2013). It is apparent that the application of the OI business model may lead to significant savings of costs. Apparent or hidden financial effects of OI can be disclosed in the following areas:

- risk and costs decrease during the development,
- risk and costs decrease upon launching the product,
- shortening both the development time and the time-to-launch,
- achieving cost savings in production, and
- support of shared learning.

All the above benefits contribute directly or indirectly to the increase of a company's financial performance. Link, Ruhm and Siegel (2014) have examined the impact of PE investments on the interest towards the application of OI principles. They show that PE investments accelerate the development and commercialization of research-based technologies, thus contributing to the economic growth. They have arrived at the conclusion that the firms attracting PE investments are likely to adopt innovation strategies, such as entering licensing agreements and selling their technology rights, as well as engaging in R&D agreements.

Link, Ruhm and Siegel (2014) also conclude that PE investments accelerate the commercialization of publicly funded research and the diffusion of knowledge by becoming an integral part of the entrepreneurial firm's innovation strategy. This way they prove that both public and private investments have a positive effect on innovation performance.

Salmi (2012) draws attention to the impact of public R&D funding on open innovation. This way of research financing encourages companies, as well as universities and public research institutes, to

start new research and development activities, and thus create new knowledge, competencies, and innovations. First, it is important to take into consideration whether obtaining public subsidies either extends R&D activities or simply replaces private funding. In the former case, we speak about the additionality effect of public subsidies. They are further classified as input or output additionalities, depending on their position in a linear innovation process. It is obvious that additionality effects are measurable (e.g. by the number of granted patents, productivity, and profitability).

Assuming that public subsidy increases R&D expenditures, it may have an impact on the increase in internal R&D activities and external sourcing of technologies. One of the possible effects of public subsidy is that a company can embark upon a project which would have been either too expensive or too risky. The OI concept in turn suggests that leveraging external innovations and technologies will reduce the costs and risks of R&D (Chesbrough, 2006). Therefore, it is reasonable to assume that the extent of the public funding of a project can favour internal over external execution of R&D. Consequently, additional funding is expected to lower the need for external innovation, and by contrast, drives firms to consider external sourcing of technologies seriously (Salmi, 2003). In addition to the financial effects, non-financial effects of public subsidies, like more intense collaboration and networking, are also supposed to come into effect.

KEY TAKE-AWAYS

- By reading this chapter you acquire basic knowledge about principles of financing OI projects and companies.
- In addition, the effects of public subsidies on company financial performance and boosting innovation activities is addressed as well.
- Finally, the impact of OI adoption on company financial performance is discussed and critically evaluated.

PEDAGOGICAL GUIDELINES

Interactive activities: Seminars and workshops with the providers of financial funds (bankers, financial fund managers, private investors).

Learning exercises: Case study concerning OI financing. Comparison of the suitability and economic effectiveness of various approaches to OI financing.

Self-study: The papers and books dealing with the topic referred to below.

Self-evaluation: Elaboration of an essay on a chosen topic referring to the economic aspects of OI.

EVALUATION QUESTIONS

Individual work examples: Case study resolution

Group-work examples: Field research and group presentation of the results of the research concerning OI financing.

TEACHING TIPS

Slides Slide presentation: PowerPoint presentation enclosed (Innovation financing)

Links to teaching material: The enclosed text dealing with the topic (Financial Aspects of OI)

Supporting case material: Case Study OI

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