

EU-financing of Innovation in Norway

*Norwegian participation in InnovFin and Eurostars –
the how and why*

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Master thesis

**Centre for Technology, Innovation and Culture
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Abstract

Innovation was for a long time a neglected study – and while studies of innovation have garnered increasingly more attention, finance as a subgenre has not. Financing innovation is one of the most important and time-consuming activities for entrepreneurial and nascent firms. Norway participates in two European Union programmes called Horizon 2020 and Eurostars. This is an exploratory study into how finance to innovation in these programmes are implemented into the Norwegian financial ecosystem and why Norwegian decision makers have chosen to partake in them. The Norwegian private sector for risk finance to innovative firms, entrepreneurs and organisations is significantly smaller in size and number of investments than, not only the EU average, but also our neighbouring countries. Equally problematic, our industrial strengths are not priorities in European innovation programmes, making obtaining financing elsewhere crucially important for Norwegian innovative firms. The study is built upon comprehensive interviews with representatives of key Norwegian agencies and institutions. The programmes are analysed using both innovation economic theory and principal-agent theory. The first because innovation economic theories explain the rationale for Norwegian decision makers to implement these programs into the Norwegian finance ecosystem as well as weaknesses within the programmes particular to Norway. The second because principal-agent theory offers satisfactory explanations to coordination challenges within and between large hierarchical organised programmes such as Horizon 2020 and Eurostars. Highlighting principal-agent problems clarifies and provides additional value to my findings as innovation theory does not address the organisational challenges and advantages. Through the study I show how our private sector deficiencies may have become a strength as Innovation Norway acts as a more informed intermediary than it would have been with fewer delegations and responsibilities but also that regulation prevents many innovative firms from receiving financing. And that the role of the Research Council of Norway is a costlier, but arguably more practical approach.

Acknowledgements

For a few years I carried around the idea of a student association at the University of Oslo where all students interested in finance and investment could participate. We started up with a brilliant team and invited our first guest from Norges Bank Investment Management. The first thing he told us as he started his presentation was: “You should care about what we do, because it will affect you.” And while this is not a thesis on Norway’s pension fund, his words that day definitely lead me down this path.

I want to thank my supervisor Magnus Gulbrandsen for believing in me when others might not have, and for always offering his opinion, insight and humour.

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Lastly, I want to thank my parents, Ida and Nils, for supporting me blindly. I also want to thank Caroline for tirelessly reading and giving feedback.

Any misrepresentations or other faults are mine and mine alone.

Oslo, May 2018.

Eirik Venberget

List of abbreviations

EEC	European Economic Community
EIB	European Investment Bank
EIF	European Investment Fund
EIG	European Investment Group
ERA	European Research Area
EU	European Union
FoF	Fund-of-Funds
FP	Framework Programme
IN	Innovation Norway
NCP	National Contact Point
NPC	National Project Coordinator
PE	Private Equity
RCN	Research Council of Norway
SME	Small and Medium-sized Enterprise
SMEG	Small and Medium-sized Enterprise guarantee
VC	Venture Capital

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1. Introduction

The entrepreneur and venture capitalist are sitting in a bar when the entrepreneur says:

‘Why don’t you guys fund us more?’

The venture capitalist replies:

‘Why don’t you have better ideas that we can fund?’

For many entrepreneurs and researchers, obtaining financing is one of the most time-consuming, and least favourite part of their job. Yet it is of crucial importance in order to be able to undertake research activity or launch a new project. As Mary O’Sullivan wrote in *The Oxford Handbook of Innovation*: “Innovation is an expensive process, significant resources must be expended to initiate, direct and sustain it.” (O’Sullivan, 2005, p. 240).

Herein I provide a short introduction to the concept of financing innovation and two European Union programmes that are currently financing innovation in Norway. And also, why I am interested in taking a closer look at them, as well as the research questions for this thesis, the scope – and specifically why I consider it natural to make the distinctions I make. Finally, a general structure of this thesis.

1.1. Financing innovation

One of the few things we know for a fact about the innovation process is that it is expensive. The necessity of financing has been key to innovation studies ever since Joseph Schumpeter first wrote down the words “credit creation” in *The Theory of Economic Development* (1934, [2017]) The importance of financing in innovation can be attributed to two aspects of innovation: first of all, innovation is a process that requires resources from beginning to completion. And secondly, which complicates the first point, innovation is a fundamentally uncertain undertaking. That might extend the time period during which financing is needed, but also means the entire attempt could be to no avail, thereby giving little to no return on investments.

Financing of innovation can take many forms. As shown by the change in Schumpeter’s thinking, often called Schumpeter Mark I and Schumpeter Mark II, from an emphasis on

making available credit to the entrepreneur, to a system where innovation occurs in larger firms who have multiple methods of financing (O’Sullivan, 2005, p. 243). Today, elements of both views are held to be true. Innovation financing necessarily must occur on any level innovation takes place. Thus, financing of innovation is a preoccupation in small start-ups, multi-national corporations, research institutions and places of higher learning and research alike.

Equivalently, the providers of financing come from a varied type of firms and entities, public and private. For the majority of businesses bank lending is their primary source of capital. Bigger corporations might do emissions where selling stock provides capital. However, those types of financing are not available to all actors in the market – in particularly smaller, newer, and more marginal ones. Professional providers of capital or financing, such as venture capital funds specialising in high risk investments into companies whose potential might be great yet fail to obtain more traditional forms of financing.

In Norway, there is also a large public presence in the early stages of a firm’s life cycle, where injections of capital and general support can be of vital importance. Innovation Norway offers lending and grants for innovative firms, The Research Council of Norway helps both researchers and firms doing private research and innovation access funding.

1.2. InnovFin and Eurostars in Norway – how and why

The topic of this thesis is two financing programmes owned by the European Commission and EUREKA. InnovFin is a series of financial instruments under the Access to Risk Finance part of one of three main pillars in Horizon 2020. It constitutes a relatively small part of the Horizon 2020 budget and is managed on the European level by the European Investment Fund and the European Investment Bank. Eurostars, or Eurostars-2 to be exact as it is the second iteration of the programme (I will hereafter refer to it solely as Eurostars but clarify where distinction is needed), is a EUREKA programme and is funded by member countries, such as Norway. But it is also funded through Horizon 2020, in the Innovation in SMEs segment. Because of the funding from Horizon 2020, the European Commission is also on the ownership side of Eurostars-2. On a national level the delegation is split amongst the Ministry of Education and Research, the Ministry of Trade, Industry and Fisheries, Innovation Norway,

and the Research Council of Norway, as well as experts on individual fields coming from smaller establishments.

Organised financing of innovation in Norway is predominantly a public endeavour. The earlier in a business' life cycle, the more difficult it is to get funded by private actors (NOU 2018:5, 2018, p. 11). But is that a problem? Or rather, is that the problem? It is indicative of a competent public sector that it is also more engaged. But maybe the problem is a lack of projects in which to invest, rather than a lack of available finance and risk-taking capitalists.

Naturally, there are a multitude of reasons for Norwegian involvement in Horizon 2020 and Eurostars, but any attempted explanation must be supported by a context. Norway is going through a transition period. There is a transition process into a society dominated by renewable sources of energy, rather than the non-renewables that have given our society tremendous public wealth, Norway's workforce needs to be retrained, re-educated and redefined. Does our history – our context – influence our participation in these EU-programmes? And perhaps more importantly, does it impact how well Norway is able to utilise the options made available?

On a European scale, the Framework Programmes have been attempts at stemming the loss of, in particular, Western-European hegemony in the world. Some European countries are suffering from unfavourable demographic trends, difficult outlooks with high youth unemployment, and are falling behind emerging economies in trade, productivity, competitiveness and innovation. It is important not to lose track of the fact that InnovFin and Eurostars are predominantly European programmes, not Norwegian ones.

Henceforth, this is not a study about the effects of European Union financing of innovation in Norway. I leave that to others far better equipped. This is a study where the problems and advantages of implementing such financing are shown, and the reasons for why the Norwegian state would wish to do so. Crucially, this is the main gap in the literature I have found. Business schools have for decades lauded the effects of venture capital and private equity financing of entrepreneurial and innovative firms. Social scientists have long been interested in supranational entities' roles, impact and definition power. But far too seldom are the experiences and motivations of financing innovation viewed from a governmental point of view, and problematised.

InnovFin and Eurostars are both part of much bigger parent programmes and organisations, but in very different ways, which affects how the programmes function on a practical level. And equally interesting is why exactly these two programmes have gained State approval, when other programmes are in existence, and other solutions could have been employed. Notably, Norway funds both these programmes directly, due to our associated membership status as Norway is not a member of the European Union. Recuperation of State investment is a hotly debated topic. The Norwegian government has set a goal for Norwegian entities to win back 2 per cent of the entire available sum from Horizon 2020. This is unrelated to the amount Norway has paid to become an Associated Member of Horizon 2020 but reflects more on the ambition to increase participation from the previous Framework Programme. However, innovation theory is clear concerning ascribing exact valuation to innovation financing – it is nearly impossible.

1.3. Research question

Financing innovation checks too many policy and scientific boxes to be written about generally in anything except a doctorate thesis or a book. In an Official Norwegian Report (NOU 2018:5, 2018) on Capital in a time of transition (my translation) the committee has written that access to capital is a necessary prerequisite for transition in and development of the business sector (2018:5, 2018, p. 18). They go on to claim that early-phase venture investments in Norwegian businesses have traditionally been low. (NOU 2018:5, 2018, p. 11) Thus, there seems to be a gap between the ideal and the current state of the financing, leaving room for government intervention.

At the same time, there is a desire amongst decision makers to connect Norway closer to Europe (Kunnskapsdepartementet, 2014) I wish to illustrate how offering InnovFin and Eurostars to Norwegian businesses and organisations engaged in and research and innovation makes sense theoretically, but I also raise some questions surrounding the advantages and disadvantages Norway has in its participation.

My research questions are:

- Why do Norwegian policy makers wish to provide and offer InnovFin and Eurostars financing to Norwegian innovative enterprises?

- How is InnovFin and Eurostars implemented in Norway?

Answering the first research question requires both contextual knowledge surrounding the reasons for joining and is best answered by using innovation theories developed in academia. Naturally, attempting to uncover reasons for why Norwegian decision makers wishes to offer these two programmes to Norwegian firms is difficult. It entails attempting to rationalise decisions made by someone else, which often results in probabilities and assumptions. Using innovation theory, I will show the rationality for offering the programmes, and sometimes lack thereof.

Answering the second research questions of how the programmes are implemented appears at first sight more straight-forward. But the organisational challenges in which both programmes are operated offer interesting differences between the programmes, while at the same time showing who accepts the costs on behalf of the parent organisations.

1.4. Scope

Naturally, there are numerous interesting themes and topics which have to fall outside the remit of this thesis. However, some interesting approaches not covered by either the innovation economic theories or the principal-agent theory will be discussed in the last chapter.

The biggest obstacle within my research question and regarding the thesis is the distinction between the financing programmes. By limiting the research question to InnovFin, I exclude the majority of public financing provided by Innovation Norway, and private financing in Norway altogether. As well as financing under Horizon 2020 done by other instruments than InnovFin and Eurostars. However, this is a necessity due to the vastness of Horizon 2020, about which financing of innovation could be studied in a multitude of different ways. Additionally, Eurostars is positioned under the European Commission as part-owner and contributor yet is fundamentally a EUREKA endeavour. I diminish the role of programmes such as COSME to merely serve to illustrate the differences between the programmes, and ask why one and not the other?

Apart from explaining the size and significance of the Norwegian private sector's financial contribution, it is also largely excluded from any deep analysis, even though the majority of InnovFin instruments require private sector participation in order to gain approval. And while it would be most interesting to consider the international aspects of what InnovFin and Eurostars might mean for Norwegian recipients – as they are both highly internationally cooperative in nature – I have chosen to put the emphasis on Norway exclusively.

Scholarly work on Horizon 2020, which now has been running for five years, often take a narrow firm- or case-level point-of-view. Alternatively, focus is directed towards a pillar or specific objective or a narrower concept within the pillars and objectives, such as implications for research on health. Interestingly, there is precociously little academic work on Horizon 2020 so far. It might be wishful thinking, but perhaps that will change soon as the interim evaluation of the entire program was not finished until late 2017. Notably, there are exceptions such as research on Responsible Research and Innovation under Horizon 2020, which is richer (see Owen, Macnaghten & Stilgoe, 2012) and policy debates surrounding the European Union itself – and implications for its future role on a global stage like in Young (2015). The same trends are true for Eurostars. The richest collection of reports, articles and books are published by the European Commission, often taking the form of evaluations by consulting firms or expert groups such as Makarow, et al. (2014).

Combining and comparing multiple programs from a supranational entity on a national level might sound like a mightily respectable undertaking, but I firmly believe the scope has been narrowed down sufficiently to answer the research questions in a fruitful manner.

1.5. Structure

This is a broad outline of the structure of the thesis, and the contents of each chapter. **Chapter 2** is a combination of the theoretical approaches I have chosen. It consists of a handful of innovation concepts, a description of the principal-agent theory. It also contains some concepts which combined with the literature review are meant to inform the reader on this research's place in the literature both inside innovation, entrepreneurial studies and economics. The distinction is being made by placing all concepts which will only be used for illustrative purposes within its own section, after innovation economic theory and principal-agent theory. **Chapter 3** is a description of the context and case. Gradually, by setting the

historical setting, the chapter works towards the two pivotal programmes Horizon 2020, within which InnovFin operates, and Eurostars. **Chapter 4** is a methodology chapter. In it I explain how I gathered the data used herein, why I chose to use the methods I did, some key problems surrounding the methods and the practical experiences I had, as well as the reliability of my research design. Generally, the methodological chapter is the most practical, but it also contains some abstract concepts such as ethical considerations and validity, on which the research design was created. **Chapter 5** contains the analysis, wherein I explain my cases and my findings using the analytical framework made up of the theories outlined in the second chapter. Thus, the chapter consists of three major parts. The first is the conceptualisation of the analytical framework. The second is an innovation theoretical approach to my cases. And thirdly, I use principal-agent to illuminate the organisational difficulties, advantages, and generally, problems surrounding my cases from a principal-agent stance. **Chapter 6** is a discussion and conclusion. There are obviously interesting aspects of my cases which might not be sufficiently highlighted by the theories I have chosen; those aspects are illuminated here. The discussion also goes far as to advice potential future researchers on the pitfalls and advantages of taking the same approach as me, but also offers some insight into where research from here ought to go, as well as suggesting what kind of policy implications my research has both on a national level and for the European Union.

2. Theoretical framework

Throughout this chapter I will present, explain, and discuss the theory on which innovation, financing of innovation, and some theoretical issues surrounding these, is based. Naturally, these theories are closely related to programmes of the European Union surrounding finance such as aspects of innovation economics which explain why Norway might be in an advantageous or disadvantageous position to receive innovation financing. Secondly, I will utilise principal-agent theory, which I explain here in detail. While I show the general outlines of principal-agent problems, the special emphasis will be on aspects such as goal conflict, adverse selection, moral hazard, trust and programmes, all of which are most informative in these cases. A third section deals with extant literature on topics related to those who receive financing, and what kind of financing they get. Additionally, in order to understand why there might be specialisation in financial institutions offering different kinds of finance, as well as government intervention in providing finance, the concepts of market failure and the role of the state offers fruitful explanations.

2.1. Innovation economic theory

In this chapter I shall explain the fundamental development of the innovation theoretical field, and an assortment of concepts within innovation studies that are most appropriately suited to analyse InnovFin and Eurostars in a Norwegian setting. This is not an exhaustive overview of all innovation models and theories by any means, that would require far more than any single masters or doctorate thesis, but rather a handpicked amount of those models, theories and concepts that I consider to offer the most fruitful application to analyse the case. There is not a singular theory of innovation, and out of the hundreds of different components that together make up innovation studies, such as the role of technological development, the research sector, the role of the entrepreneur, and how to accurately measure innovation, I have chosen to use the following to analyse Norway's relationship to InnovFin and Eurostars: the economics of innovation, innovation as a growth policy for decision makers, the inherent uncertainty in innovation investment, finance in a systems of innovation perspective, and path dependency on a national level.

2.1.1. Economics of innovation

The study of innovation, is the study of economic change. To be exact, economic change in a capitalist society (Fagerberg, 2003, p 126). Contemporary definitions of innovation focus on novelty and the implementation: new products, new processes, new ways of marketing, and new methods of organising (OECD & Eurostat, 2005). However, the school to which innovation adheres, and is now considered to be a mainstream part of as Friedman (1998) has shown, emphasises innovation as processes within the larger economic sphere. Joseph Schumpeter intentionally set out to develop this school in the early twentieth century, as he felt the classical, equilibrium focused view of economics was too static (Fagerberg, 2003, p. 128). It excluded the dynamic elements of individuals as a force of change, a force that lead to evolution (Fagerberg, 2003, p. 129).

A number of studies showed that economic growth could not be “explained” by the quantitative growth of inputs of labor and capital, and the residual of unexplained growth was given a label “technical progress” (Pavitt, 1976, p. 16)

Accepting the importance of innovation in economic theory was removing it as an exogenous factor and treating it as an endogenous factor in economic models (Freeman, 1985). However, referring to innovation as part of the models in economics is a truth with modifications. Innovation was difficult to add to economic models, and it was not until the model of New growth theory and endogenous growth theory arrived more than half a century after The Theory of Economic Development was written (Fagerberg, 2005, 18). Partly because of its difficulty in incorporating into the dominant thinking in economics, innovation has become a multi-disciplinary study where the economics of innovation is one of many disciplines, and financing innovation is not the most actively debated amongst them.

2.1.2. Innovation as growth policy

Innovation is not invention. Innovation is carrying out the invention in practice (Fagerberg, 2005, p. 3). Crucially, taking invention into practice means commercialisation. In Schumpeterian tradition, the process of growth is driven by new products, processes and systems – innovations – rather than innovation being a by-product of growth (Freeman, 1985, p. 214). Contemporary scholarship notes that the innovation-growth paradigm has caught on

by policy makers (Mazzucato & Perez, 2015). Decision makers are not (hopefully) excited by the prospects of a new gadget to play with, but rather the effects innovation has on the real economy, which makes sense from a policy perspective. Most politicians are predominantly preoccupied by, and interested in, keeping unemployment low, inflation stable, and raising the standard of living for the people who elected them. Growth policy can be an all-encompassing concept, from tax structure to infrastructure. In this case, growth policy is only of interest when it incorporates innovation.

Growth is not merely the unforeseen but hopefully predicted inception of a new innovation being commercialised and the positive impact it has on economic activity. One innovation is likely to have a cumulative effect (Freeman, 1985). Called cumulative, swarming or band-wagon effect, it makes one innovation much more valuable than the innovation in and of itself. The cumulation of innovation is often combined with clustering in both sectors and regions, causing the clusters to grow more rapidly than the rest of the economy. Thus, the real value of one innovation can have potentially immense effects on economic growth in a region or sector.

A category of scholarly work within innovation has been devoted to understanding what kinds of innovations lead to the biggest impact on growth. A general demarcation is made between incremental and revolutionary innovations. An incremental innovation builds on an existing product, method or process. Incremental innovations are commonplace in areas such as consumer technology, where small improvements are made on existing product lines in scheduled intervals. Revolutionary or radical innovations, sometimes also called disruptive innovations, on the other hand, is an entirely new product, process or strategy introduced to the market. The word disruptive is popularly used because it disrupts markets at its introduction. Contemporary scholarly work lifts incremental innovations up for, over time, being equally important as revolutionary ones. However, a study by Beck et al. (2014, p. 27) has shown that radical innovations are more susceptible to be influenced by policy initiatives.

Newer strands of innovation as growth policy puts emphasis on the importance of bringing innovation into the centre of policy. Accordingly, a holistic approach to utilising the power of innovation for growth can then only be accomplished by turning innovation for growth policy into the only growth policy (Mazzucato & Perez, 2015).

2.1.3. Finance in a national system of innovation

In Schumpeter's view, it was not the presence of available finance that lead to innovation. Rather, the existence of available opportunities for there to be made investments in, and created credit for, was prioritised (Mazzucato & Perez, 2015). Perhaps caused by confusion and poor interpretation of Schumpeter, this sentiment may be at odds with impressions today where inadequate readily available financing is portrayed as a major barrier for innovation. Within the context of systems of innovation, pioneered by Lundvall (1992), Nelson (1993) and Freeman (1995) and innovation has a deeply systemic nature (Edquist, 2005). While some disagree, the generally agreed upon definition of the systems of innovation approach considers all important economic, social, political, organisational, institutional, as well as other factors generally believed to influence innovation and the relations between them.

Within the sphere of a national innovation system, finance is merely one determinant in the innovation process within a nation state. A systems approach is not exclusively applicable to a national perspective. The sectoral and regional perspectives, too, are enlightening. However, as my cases are specifically interested in the Norwegian perspective, the national system of innovation perspective is both logically and practically sensible.

A conceptualisation of the role of the financiers in a national system of innovation is as “[...] active agents in the allocation of resources to innovation [...]” (Tylecote, 2007, 1464).

Followingly, finance itself in an NSI framework is the resources that are being moved around, but the relations which it has to other component and with the institutions in the system impacts it greatly.

2.1.4. Inherent uncertainty of innovation investment

The inherently uncertain nature of innovation was emphasised at the very inception of it as a scholarly field (Fagerberg, 2005, p. 9). Equally uncertain is the nature of innovation investment (Mazzucato & Semieniuk, 2017). There are drastic differences in the nature of investments into innovation versus traditional investments calculated on net present value calculations (Mazzucato & Perez, 2015). A key distinction needs to be understood on the difference between short-term and long-term investments. Innovation investments are

inherently long term. It is not based on short-term profit chase, but a long-term presumption on the technological determinants and opportunities within a firm or concept, not mathematical calculations such as net present value, net future value or balance sheet evaluations (Mazzucato & Perez, 2015). From an investors perspective, finding the right person or firm to invest in is a difficult undertaking. It is further complicated by clustering, where there might be multiple operations doing similar innovatory activity. Selecting which investment to make in this kind of environment requires due diligence which might be impossible to undertake.

For the individual firm, the output of innovatory activity is highly uncertain, especially in the early stages of a venture (Hall, 2002). Because there is more uncertainty in the beginning, and it is equally more difficult to identify the true value of each project, part of research or development concept, having the ability to convey the importance of the venture is crucial.

Additionally, innovation investments are complicated and uncertain in two ways; first to innovate is not first to profit, and the time aspect of innovation financing is not aligned with most financiers' interests.

First-mover advantage is a complex concept in innovation. In the eventuality that someone creates a novel new product or process, they are not necessarily the ones who stands to profit from it in the long run. Sufficiently developed markets, or users who are not ready for the product or process, but who eventually come around, means a later copy by a different entity whose innovation 'hits' the market at the right time are in that case more likely to profit. In the meanwhile, unable to obtain more financing, the original entrepreneur and inventor could have been forced out of business.

The time aspect of innovation financing is complex. Under the assumption that the innovator manages to, against all odds, be the one who profits from the innovation by bringing it to market, commercialise it and has a viable organisation surrounding it that can constitute a profitable business; the whole process is immensely time consuming and extraordinarily costly. Therefore, investing in innovation requires patience. That kind of patience is currently not customary in the relevant financing institutions. Venture capital, for instance, a lauded source of financing for innovative firms has a time-schedule from entry to exit via making the firm public of approximately three years, while truly major innovations can take up to twenty

years to fully develop (Mazzucato & Perez, 2015, p. 8). And banks, who typically offer debt financing with longer repayment schedules, do not have the same risk profile and are unlikely to venture into risk-prone businesses.

2.1.5. Path dependency on a national level

Innovation is a fundamentally cumulative phenomenon (Fagerberg et al., 2009). As previously mentioned, the cumulative effect means that new knowledge builds in existing knowledge. A path dependency is a result of choices that have historically been made that affects choices made currently. Path dependencies can exist on multiple levels. At a micro-level, path dependencies might exist inside firms where tradition of manufacturing in a certain way has attracted competencies that are conforming to that type of manufacturing. That can lead to a lock-in within the firm to accept and adopt newer methods of manufacturing.

But path dependency can also exist on a macro-level, in a whole system. In this occurrence the whole system of innovation is locked into a specific path which supports one type of activity, and constrains another (Fagerberg, 2005, p. 13). Keep in mind that path dependency need not necessarily be negative. If there is a societal need to continue the direction on which society is ‘trained’, the path dependency has a congruent effect. However, in the event of a pathing that there is a wish to break out of (for policy reasons, or because of a management decision), the dependency will have a detrimental effect to efforts to do precisely that.

Fagerberg (2009, p. 4) mentions the evolutionary emphasis taking into consideration the effects of path dependency on variety creation, adaptation, selection, as well as retention. All these aspects will be severely influenced by the degree of path dependency on both a micro and macro level.

2.2. Principal-agent theory

Principal-agent theory was developed under New Institutional Economics (Braun, 1993). Also known under “agency problem”, “agency dilemma”, or as “ideal contracting theory” (Guston, 1996). It is a concept particularly suitable to examine the dynamics, relationships, and problem of delegation between two entities – or more. Initially, it was used in contracting to

understand the cost of a transaction between a principal and an agent. Its employment is prolific within social sciences, such as political science, international relations, and economics (Eisenhardt, 1989). I have chosen to use agency theory within this innovation thesis because large projects such as Horizon 2020 and Eurostars in many ways are akin to hierarchical systems with different power dynamics, with different goals on various levels, as well as added complications where third parties are involved.

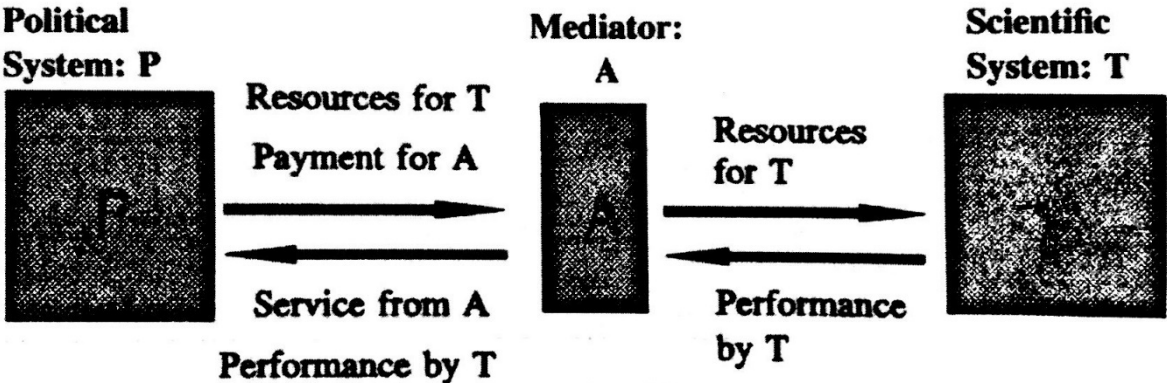
In its most basic way, as Braun (1993, p. 137) says, the principal-agent problem occurs when someone depends on the action of the other. Essentially, the problem arises when two parties – and there must be a minimum of two – exchange resources: The agent gains the privilege to control the actions and decisions of somebody but gives up its own actions and decisions. The principal equally gains the right to control the actions and decisions of somebody else, but also gives up its own actions and decisions. Keep in mind, however, that the rights gained and conceded is for a limited and specific area. E.g., the European Commission is not handing over constitutional powers to govern when it allows somebody else to be the recipient of financing.

Coleman (1990), however, claims the theory ought to be utilised differently. He claims one of the parties does not necessarily enjoy the same rights as the other, thus the relationship is not as symbiotic, and not parasitic because it does not cause harm, but benefit-seeking (Braun, 1993). In Coleman's view the principal and the agent enters the relationship because they both regard it to be mutually beneficial, but with a different set of expectations initially. Guston (1996, p. 230) puts it this way:

[T]he principal [...] requests the agent [...] to perform certain tasks because the principal is not capable of performing them directly. The agent performs the delegated task, out of self-interest, but with some of the consequential benefits accruing to the principal as well.

However, the relationship between principal and agent can be influenced by the presence of a third party. In scenarios where such third parties are involved the relationship goes from being 'dyadic' to 'triadic' (Braun, 1993). Interestingly, while the principal retains its position, a third party, such as an intermediary, changes the role and relationship significantly. As shown in the figure below, the intermediary often assumes the position of the agent, dealing directly with the principal. As a consequence, instead of dealing directly with the third party,

intermediation is established. In many ways, the agent becomes the third-party, because the principal would have otherwise been forced to go into a relationship directly with them. Such intermediation can lead to more effective communication and clearer delegation, but at the risk of allowing more freedom for the third-party.



P=the principal; A=the agent; T=the third party

Figure 2.1. Illustration of the political system principal-agent problem showing the position of the third-party as an agent. Source: Braun, 1993, p. 141.

Braun (1993) cannot emphasise the importance of the third party enough, it creates an ecosystem within the otherwise stringent theoretical approach to principals and agents.

In our case, the dynamics of the relationship influenced by the third party is of particular interest. Through the European Union, financing is done via a series of intermediaries, and their influence ought not to be underestimated throughout the process. By conceding much power to the national offices and institutions, the European Commission has to a varying degree accepted a structure very similar to Figure 2.1.

The question of interest posed by Eisenhardt (1989) then becomes; is a behaviour-stipulating contract preferable over an outcome-based contract? When stipulating behaviour there is a set

preferred way in which to organise, pay, operate on the part of the agent, instead of issues such as market governance and commission fees upon completion which is the case in an outcome-based contract (Eisenhardt, 1989, p. 58).

Three very interesting characteristics are present in principal-agent problems and central to our cases; goal conflict, adverse selection, and moral hazard. As Gulbrandsen (2005) writes they are omnipresent in principal-agent problems and they have no obviously apparent solutions. Likewise, they are costly and difficult on behalf of the principal to minimise or remove but are good descriptors for an analysis utilising the principal-agent problem. In addition, the influence of trust and the impact of program-organising must be mentioned. Both add a breadth of understanding to principals and agents and how they relate to each other that is suitable for the cases at hand.

2.2.1. Goal conflict

A goal conflict exists when the principal and the agent have conflicting or only partly overlapping goals (Gulbrandsen, 2005). It has also been referred to as having differing objectives and interests, but essentially means the same (Van der Meulen, 1998). Notably, there can therefore be a varying degree of goal conflict. The abstraction of this can be viewed on a spectrum, from no conflicting goal between the principal and the agent, to a complete deviation of goals. As Eisenhardt (1989, p. 62) notes: “As goal conflict decreases, there is a decreasing motivational imperative for outcome-based contracting [...]”. Logically then, while there is reason to believe a goal conflict is present, a behaviour-based contract ought to be used to bind the agent closer to the principal’s wishes. Interestingly, unlike the other characteristics there is a consensus about goal conflict, that it is omnipresent in principal-agent problems. That means there are at all times a partial goal conflict present between the principal and the agent (Rasmussen & Gulbrandsen, 2012).

The presence of goal conflict is particularly interesting for us because we are dealing with a supranational entity, a nation state, intermediaries within the state, and recipients whose funding is hard to control. There are necessarily stated goal differences, but the important question is what degree of overlap there is, and whether it is problematic.

2.2.2. Adverse selection

Another aspect within the principal-agent problem is that of adverse selection. Its usage was originally found in insurance theory (Guston, 1996). In our case, there would be various instances of adverse selection depending on which principal and which agent relationship is more closely inspected. The problem of adverse selection arises because the principal has complications in choosing the right agent due to a lack of information about the agents and the ability of the agent to perform what it promises to do (Rasmussen & Gulbrandsen, 2012). There exists an information asymmetry between the principal, who at a varied degree is uninformed, and the agent (Gulbrandsen, 2005). Thus, the principal incurs a cost to uncover the necessary information about which agent to opt for, and it is considered difficult to do so (Guston, 1996). One way the principal can – by incurring a cost – assess the agent is through a review process, but even after such an undertaking it is difficult to accurately assess the agent due to reviewer unreliability (Rasmussen & Gulbrandsen, 2012).

As we will later see, adverse selection is part of a larger problem in the market place where there is a dissimilarity in available information to different actors. Guston puts the difficulties succinctly in this way: “the choice of agents involves questions about the alignment of goals between the [...] sponsor and potential [...] performers, and about the available instruments of control over the performers.” (Guston, 1996, p. 233).

2.2.3. Moral hazard

Moral hazard builds upon the same underlying issues as adverse selection. However, with moral hazard the agent acts upon the information asymmetry in a way that inflicts harm on the principal, and to the agent’s gain. This is commonly called cheating, shirking, or unacceptable behaviour on part of the agent (Guston, 1996). On a theoretical level, the problem lies in whether the agent, contracted to act on way, will do what the principal wants them to do or not. Gulbrandsen (2005, p. 200) succinctly points out that it is in the incentive of the agent through the delegation to cheat on the arrangement. Finding out whether this is the case would be, again, a costly and difficult endeavour for the principal to uncover.

The classic examples of moral hazard are when someone increases their exposure to risk while insured by someone else and is often a key area of contention in financial matters. Another example building upon the same underlying issue, which has been used recently, is that of “Too big to fail”, or government safety nets for a specific sector. At which point, an institution becomes so important that it can increase their exposure to risk to such an extent that it may be untenable in the long run because it knows it must be saved to avoid further damage to the rest of society – it poses a systemic risk (Mishkin, 2006). With these examples fresh in memory, attempting to illuminate these cases through a perspective of moral hazard will be both helpful and in line with scholarly tradition.

2.2.4. Trust

Some, like Van der Meulen (1998), and Miller and Whitford (2002) add a fourth characteristic; that of trust. To be sure, Miller and Whitford define trust to avoid any confusion (because the authors they refer to are economists who never explicitly admitted that trust is what they meant) as this: “the belief that another will reciprocate a beneficent act not motivated by short-term self-interest (a gift)” (Miller & Whitford, 2002). For simplicity, I shall refrain from using the term reciprocity and use trust instead, because there is an implicit notion of trust that is not built on a reciprocal action, but inherent belief that an actor is good. As Van der Meulen (1998) points out, trust is a necessity in explaining how to achieve the stability and continuity that is a prerequisite in long-standing, long-term principal-agent relations. The importance of trust cannot be understated as a cost-reduction tool in modelling, but it is also a difficult concept to theorise. Trust can be both positive and negative for the principal. It allows for less strict monitoring of the agent by the principal, once a level of trust has been achieved (Van der Meulen, 1998). Notably, trust can only be assessed and used while there exists a presumption that the agent will act rationally and that incentives work. However, trust also increases the risk of moral hazard. While it is possible to claim that there exists a relationship of trust, while at the same time the principal accepts the costs of having a monitoring system on the same agent, it is unlikely to be realistic. Thus, trust and monitoring are, while not mutually exclusive, likely to have a detrimental effect on each other (Van der Meulen, 1998, p. 401).

In case of InnovFin and Eurostars, Horizon 2020 and Eureka, while there are developed monitoring systems, there are also mechanisms where a principal relies on an agent by trusting it. In many cases the trust has been built up over decades, and in many cases indubitably for good reasons. However, that leaves room for moral hazard on a basis of conflicting goals between the principal and the agent.

2.2.5. Programmes

Finally, taking programmes into consideration provides an interesting adage to principal-agent problems. Programmes influence on principal-agent relations are interesting because it encompasses many of the aspects already mentioned, such as shirking, and applies it to a more powerful and overarching system in which to operate (Shove, 2003). Programmes are also interesting because, as Shove (2003, p. 371) argues: “programmes fall outside the remit of theoretical understanding because they are not directly ‘part of’ the principal-agent relationship itself”. She also adds that programmes ought to be considered as tools wherein agents are organised, even though it is not an implicated intermediary (Shove, 2003). Thirdly, programmes could potentially alter the entire relationship between principal and agent on a large scale, as more than one relationship operates within any programme. Yet, this aspect of principal’s and agent’s behaviour change is not present in the aforementioned characteristics (Shove, 2003, p. 372).

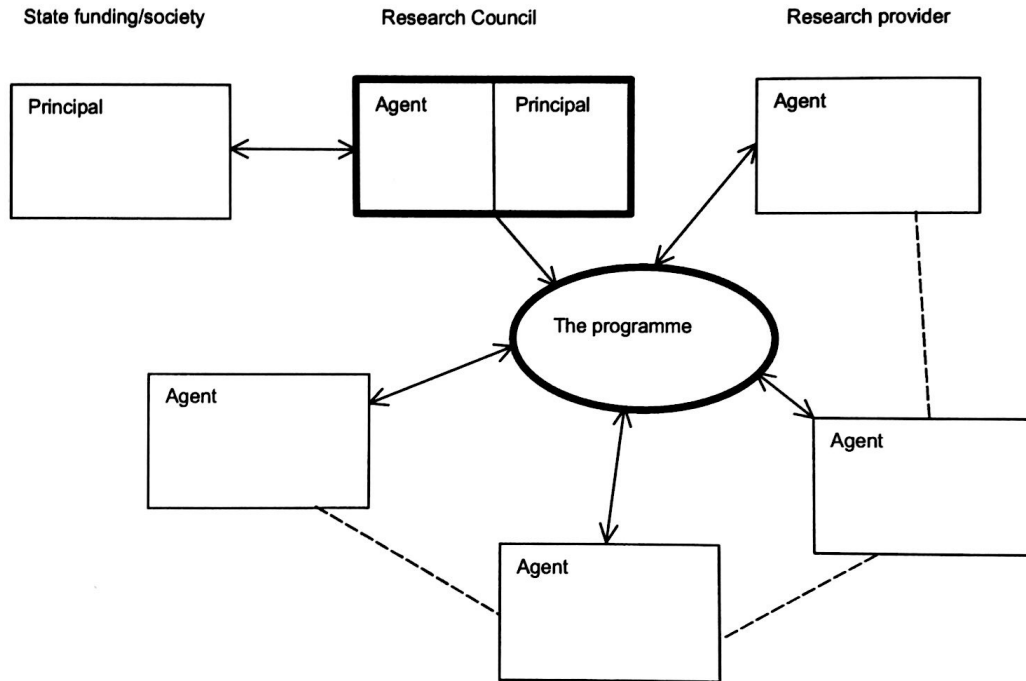


Figure 2.2. Illustration of how a programme can organise multiple agents for a principal. Source: Shove, 2003, p. 373.

Shove (2003) also uses two aspects which further explain why programmes are suitable for principal-agent problems. Firstly, the nature of programmes is to provide congruence and concentrate attention from many separate fields to one or a select few: “Principals use programmes as a means of influence the actions of multiple agents” (Shove, 2003, p. 372). Secondly, programmes are often designed to alter agent-agent interactions as well as principal-agent interaction. In essence, actors in a program engage with each other in an environment configured to encourage and discourage certain interactions.

2.3. Relevant concepts and earlier findings

There exists a multitude of concepts which influence both the theoretical approaches previously mentioned, and the practicalities of financing innovation as mentioned in the context chapter. Those mentioned herein serve to enlighten the reader on previously researched topics and offer a general explanation as to findings on topics such as firm innovation, and extra-firm innovation such as universities and places of higher learning and research. Additionally, the financing of innovation depends greatly on where in the life cycle of a venture the financing is necessary. Or alternatively, if it is not needed at all, as some

ventures rely on the entrepreneur's fortune. But ultimately, what does the need for a specialisation in financing needs result from? And what can be done to prevent it.

2.3.1. Firm innovation

As previously mentioned Joseph Schumpeter's view of where innovation mainly occurs evolved throughout his academic career. What is traditionally called Schumpeter Mark I consists of small, newly established, entrepreneur-led firms by what Schumpeter called "new men". Much innovation undoubtedly comes from these types of firms, but there exists perhaps an illusory image of proportionally how many innovations comes from them, because they are often linked to more radical innovations; the typical Silicon Valley start-up with a brand new technological advancement (Malerba, 2005).

Schumpeter Mark II, the view Schumpeter came to later in his career emphasises the innovatory activity going on in large organisations whose numbers are not many, but who have significant impacts on the overall economy. Innovation in these large firms, such as machinery improvements, new methods of organising, are often incremental innovation, but performed systematically, and on a large scale.

2.3.2. Who innovates outside firms?

Naturally, firms are not the only entities engaged in innovatory activity. The role of researchers, universities and places of higher learning plays a crucial role in developing knowledge that can be of vital importance in a venture (Malerba, 2005, p. 388). There exists a vast literature on the role of universities and places of higher learning, as well as agencies specialising in research, both public and private, such as national research institutes and privately funded research environments (see Bozeman, 2000; Etzkowitz, 1998)

2.3.3. Entrepreneurial finance

“Firms must raise, use and reproduce capital in order to come into being, survive and grow, so the question of finance is central to them.” (Tylecote, 2007, p. 1461) Of such importance is financing to firms, according to Tylecote, that it is the main impact on their ability to exist and innovate. For nascent entrepreneurs, however, most financing comes from the entrepreneur themselves (Parker, 2009). Some research has been done on entrepreneurs and the likelihood of succeeding in a venture depending on the entrepreneur’s fortune, either inherited or from earlier successful ventures, such as Blanchflower and Oswald (1990). It indicates that if given an inheritance a person is more likely to become an entrepreneur. The aspect of help from family is interesting. According to Parker (2009) using the US as an example, approximately three times as many ventures rely on help from family as from venture capital (Parker, 2009, p. 203). But most important of all is debt financing and equity-based financing, respectively.

For many reasons, the preoccupation with obtaining finance is more important in nascent ventures and small businesses, newly established businesses. The entrepreneur or business owner in these kinds of firms often have limited funds, and little collateral. The combination of self-financing and paying one’s own salary makes financial constraints into personal finance constraints. There are also greater problems related to information asymmetry in nascent ventures and small firms because, as previously mentioned, they often rely on radical innovations. Larger firms, in comparison, have access to multiple different types of finance, smaller information asymmetry problems as they deal with incremental innovations, but also a different corporate governance structure which makes the risk profile less important for the business owner and the leadership of the firm.

Myers and Majluf (1984) developed the theoretical approach called the pecking order theory as an explanation for why some methods of financing are more preferable to others for firms. It is associated with the financial costs in order to obtain the different forms of capital. Firstly, firms always want to use retained capital from within the business to fund future business, because internal agents are much easier to deal with, and far less costly, than external ones. If one is to get external financing, debt is often preferred because it does not come with the cost of granting external actors entrance into the governance of the firm. This is especially a case

in European countries, where debt is preferred to equity even when it is financially costlier (Brutscher & Hols, 2018). Thirdly, firms will result in taking equity financing, whereby giving the financier a bigger upside. The pecking order theory is important in order to understand how both InnovFin and Eurostars-2 are structured, and also why the traction amongst Norwegian recipients looks the way it does.

2.3.4. Start-up financing cycle

The start-up financing cycle describes the various stages of a firm's existence and the traditional financing methods available, and the actors usually involved in them. As shown in figure 2.3. the most critical period of a firm's life cycle is the so-called Valley of death, where operating income is lower than expenses, resulting in a negative revenue. Up until the break-even point, external financing comes from angel investors, but also as we have shown, from self-financing, help from family and friends, as well as public sector aide. Typically, the second phase is split into financing rounds by venture capital, but also making alliances or acquiring other firms or merging your own venture. In the eventuality of a venture making it to an Initial Public Offering, this is the point where venture capital firms exit and the general public can buy equity positions in the firm, typically by purchasing stocks.

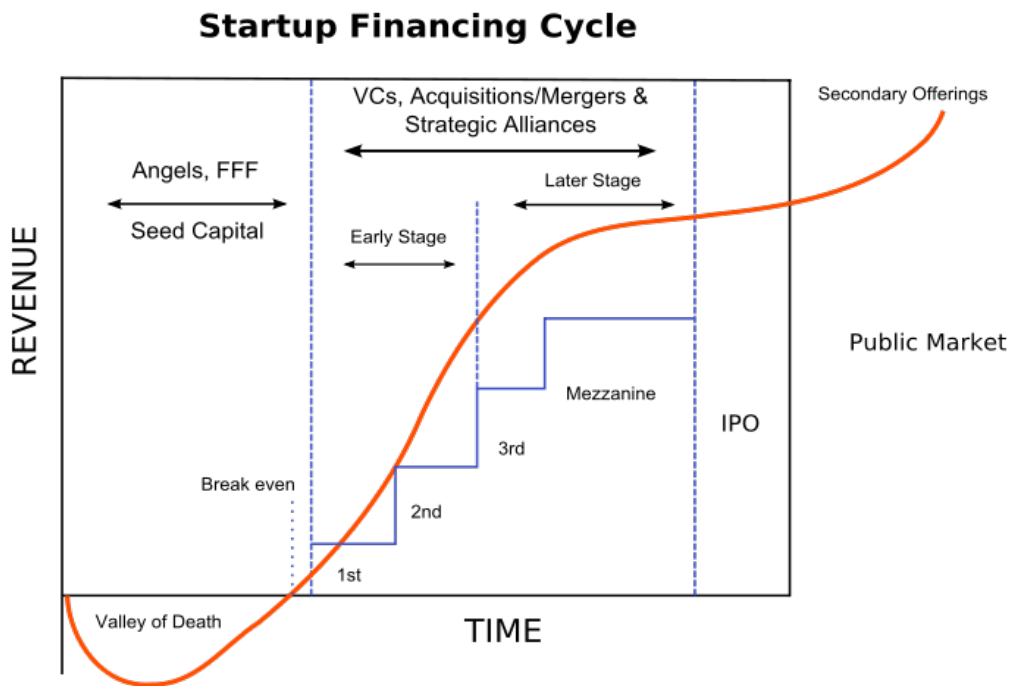


Figure 2.3. The start-up financing cycle where the Y axis is revenue and X axis is time elapsed. The red line represents operating capital in a new firm. The blue dotted lines represent stages in a firm’s lifecycle by types of financing normally available. Source: [Wikimedia Commons](#)

An interesting discussion on the financing cycle is that it can also be applied on a project level inside a firm. By letting the time axis show different stages of a project, it shows that the beginning of undertaking a new project, the project will run a deficit. Thereafter, once it has been commercialised and released on the market it will begin to turn a profit. However, financing will still be needed in order to expand to new markets and improve on the innovation (European Commission, 2017b).

2.3.5. Who does R&D?

According to the OECD Frascati Manual on research and development, it is defined as: creative activity performed systematically in order to achieve increased knowledge (OECD Frascati Manual, 2015). With an emphasis on scientific systematically reproducible R&D, this definition excludes many firms established to bring forth an innovation, and many SMEs. For instance, one of the people I interviewed (Informant 4) found that firms themselves often know that they are engaging in R&D, while others who consider themselves to be a research and development-type firm would not be categorised as such under the OECD definition.

Research and development-categorisation becomes more problematic when taking into consideration the fact that many businesses actively preoccupy themselves with learning on a daily basis. It may not appear systematic, but deals with a succinct development of skills, technology usage efficiency or production method improvements. Under the OECD definition those firms are not engaged in R&D yet rely on development to survive as a business.

Bronwyn Hall's (2002) by now classic work on financing research and development is key to the understanding of the problems financing R&D, and why it matters. In it, Hall points out, as argued previously on financing innovation generally, that R&D investment is different to ordinary investments. Research and development is performed by highly educated, and highly paid researchers, engineers, scientists and leaders, which makes it a costlier endeavour (Hall, 2002, p. 36). The same type of labour force makes investing in research and development difficult if it consumes much of the enterprise's budgets. For example, an overly costly project might produce a wealth of knowledge that is tacit in nature, rather than codified and embedded in the institution. Instead, some of the investments can 'escape' into more competent and knowledgeable researchers, scientists, engineers and leaders. Thus, if the enterprise encounters financial difficulties and is forced to fire some of the workforce, some of the investment also parts way with the enterprise.

Therefore, research and development are considered a key activity in order to stimulate innovation. R&D numbers are often used to measure innovation and offer comparisons between countries but have also garnered criticism surrounding its relevance.

2.3.6. Market failures

In the field of economics, the ideal is an efficient market. One where resources are allocated to where they are most highly valued at all times. A Norwegian Official Report (2018:5, p. 25) defined market failures as: situations where the market solution does not provide the best possible use of society's resources. Market failure is thus a prime source of government intervention into the private markets, because there is a belief a correction in the allocation of resources might provide an effect which will be to the benefit of society as a whole. Keep in mind, however, that the theoretical approach to market failure is considered unobtainable in practical terms. As such, there will always be market failures present, and in reality, the role of government is to reduce, not eradicate them.

Market failures mentioned herein do not constitute a complete nor exhaustive list of all types of market failures – and there are many. It is merely identifying some kinds of market failures which are present in the intersection of innovation and finance. Likewise, each failure has a remedy. Although the remedies are often more similar: interference.

Stiglitz and Weiss (1981, p. 393) explain that market equilibrium, or a perfect market, is not present if there exists credit rationing or unemployment, which respectively implies “an excess demand for loanable funds or an excess supply of workers”. So why is credit rationed in an imperfect market? Banks are inherently interested in fulfilling their fiduciary obligations. They care about interest rates and the likelihood of the borrower repaying their loans. In a pool of potential borrowers, or even borrowers the bank has already given loans, there are different likelihoods of repayment in full and likelihood of defaults. If the lender had perfect information about the market, the borrower, and the product or service the borrower offers, it would not be difficult to determine which would be able to repay a loan and at which interest rate. They do not, however, and that is referred to as asymmetric information in the capital markets. Stiglitz and Weiss rightly point out that banks instead of giving out more, but smaller loans, instead offer loans to fewer companies than they potentially could.

Crucially, Stiglitz and Weiss highlight another point of contention in this debate. Namely, that even if a firm is willing to accept paying higher interest rates as they themselves consider their venture riskier, that is only to their own detriment. Willingness to accept more unfavourable terms tend to be considered, by the lender, as a sign that problems with repayment, or default, will be more likely. Similarly, putting up more collateral or accepting other favourable terms for the bank, will only decrease the chances of being funded. Henceforth, the bank, by virtue of an asymmetric information relationship, is likely to decline funding firms which in all probability will have little or no problem servicing their loans.

Stiglitz and Weiss have been refuted and debated. Meza and Webb (1987) showed findings which indicate the opposite; that lack of information about entrepreneurial projects lead banks to supply too many loans. Their findings suggested that it is not the good firms that suffer from being one of many seemingly similar companies, but that good firms make the lesser firms appear better than they are. Meza and Webb have not gained as much traction as Stiglitz and Weiss, for various reasons.

Asymmetric information is omnipresent in the market place. Myers and Majluf (1984, p. 2) wrote in unquestionable terms that management “is assumed to know more about the firm’s value than potential investors”. In a perfect market potential investors are required to have access to all the same information, so that any action is taken based on the same information. That is the basis of why insider trading is illegal – one possesses information others in the same market do not. However, an executive naturally must possess information that is not readily available to outsiders. Akerlof (1970) considered the implications of what is called “unevenly distributed information”. And it is a serious issue because uneven information leads to what one might refer to as injustices in the market – in all kinds of markets. Ventures which otherwise would receive investment and become successful go unfunded and firms applying for loans are denied based on the wrong sentiment – that is costly to society.

2.3.7. Role of the State in innovation

State involvement in innovation is of inherent interest for both public and private spheres (Dolfsma & Seo, 2013). Governments have realised the spill over effects of innovation in technology to the well-being of the rest of civil society (Dolfsma et al., 2013). The tools which a state has available to impact innovation are policies and regulations – and the impact is significant to the success of innovation, according to research (Patanakul & Pinto, 2014). The range of policy instruments available to the state to foster innovation is vast. From tax adjustments, and incentives to nation-wide systemic changes, such as encompassing innovation systems into the national innovation policy. Both are, coincidentally, not universally acclaimed in the literature (David, Hall & Toole, 1999; Flanagan, Uyerra & Laranja, 2011).

Additionally, there are areas such as protection of innovation-necessary or innovation-resulting property, such as patents and other Intellectual Property Rights. The research on IPR has been increasingly negative of its role in innovation because of the constraint it poses (Dolfsma et al., 2013). Nevertheless, ensuring good IPR has been the go-to policy for governments all over the world – the variance being in patent length and amount of flexibility in the IPR regime. A nascent body of literature has been spurred on surrounding the role of the state in procurement practices as an innovation policy (Edler & Georghiou, 2007). A

practise that also has been criticised for being unanchored in theory, with good intentions of procuring to support innovation instead leading to unfavourable terms for competitors and sustaining an unsustainable industry (Pavitt, 1976, p. 77).

Direct support of research and development has for some time been a favoured policy tool used by governments, even before the systematisation of innovation that we know today (Godin, 2006). It stems from the, now considered to be outdated, view of innovation whereby funding research and development inherently lead to technical innovation, the linear model (Godin, 2006). Some seminal works exist on this topic, such as Nelson's *The Simple Economics of Basic Scientific Research* (1959) which queries why the US was not spending more on basic research, when it was proven to be positive for the economy, and perhaps more interestingly, what the exact amount spent on basic research ought to be. Pavitt (1976, p. 17) added to that by using the economics theory of public goods: "[...] when goods and services are provided for the general public either wholly or partly independently of each individual's ability to pay for them, then governments should finance R&D related to them". Support – which then can be loosely translated to financial support in most of the cases – ought to be given by the state because it cannot or will not be given by the collective individuals. That is to say, a mandate for governmental intervention.

In the last few years there has been a resurgence in discussions surrounding the role of the state, and especially the state's success at intervention into innovation. In the spectrum of policy making, intervention adheres to a more active, hands on, policy on innovation, and the achievable success of states in promoting innovatory activity. Mariana Mazzucato has been instrumental in redefining the possibilities, as well as the public image of government intervention to foster innovation (Mazzucato, 2015). A key phrase is the socialising of risk and sharing of rewards. The state must, in this view, dare to take risks in policy making, and accept losses which will inevitably come. More notably, the tax payers must allow the state to take those risks and losses without scorn. Mazzucato's plead is simple: innovation must be the focal point of all economic policy (Mazzucato, 2015). As she writes: "Innovation policy must become growth policy and vice versa" (Mazzucato, 2015, p. 2)

Essentially, there is ambiguity and no clear consensus surrounding the one "ideal" public policy to encourage innovation (Dolfsma et al., 2013, p. 174). Indeed, it has been shown that the type of policy or regulation will impact different types of innovation differently, further

adding to the complexity (Patanakul et al., 2014). There is, however, sufficient agreement that having an innovation policy is both effective and desirable, under the presumption that the effects of individual policies are uncertain, but that having any focus on policy for technological growth will have a positive effect (Blind, 2012). While Mazzucato, as previously shown, believe the holistic, grand, approach is the only viable one.

3. Context

In this chapter I will broadly outline the events in Norway, Europe, and the world that has lead us to the programmes for innovation financing existing today. I do this because context matters, in particular to explain the shift towards a holistic innovation-oriented policy on national and European level. Equally interesting is the notable emphasis on finance, and access to finance. Understanding the role of finance in Europe since the financial crisis is a necessity to understand its prominence in innovation-policy and approach today.

3.1. Historical background

Horizon 2020 is fundamentally influenced by the collective European history of the last decade. So much so that the interim evaluation of Horizon 2020's financial instruments says: "The InnovFin programme is being implemented in a post-financial crisis context" (Panteia et al., 2017, p. 20). By providing the necessary historical background, one gains greater insight into why these programmes are shaped the way they are.

3.1.1. The financial crisis

The financial crisis of 2008 lead to a subsequent credit crunch in many countries around the world, followed by economic stagnation. What started as a banking crisis became a sovereign debt issue, and while the approaches to fixing the issues were varied – as were the severity of the problems faced from one nation to another. Initially the cause of the crisis was mortgage-based, home owners were unable to service their mortgage loans. When the US markets quickly deteriorated, the shock was necessarily spread to Europe. No fewer than 27 European banks had to be acquired by either a government, a government supervisory unit, or other banks in the four years following the crisis. Countries which previously had enjoyed widespread economic growth – albeit financed by leveraging debt – found themselves insolvent, and with decreasing economic activity, skyrocketing unemployment and bleak future prospects.

While most sectors of the economy indubitably suffered, the European aftermath of the financial crisis came to be referred to as either the debt crisis or the European banking crisis.

And the banks, many of which knowingly or unknowingly had helped spur on the crisis, did suffer greatly. In a chain reaction banks stopped lending, all kinds of lending, as uncertainty gained a hold of the markets. And even those banks who wanted to found themselves unable to as the credit markets effectively dried out. Naturally, all kinds of firms and individuals rely on credit, not only innovative firms and entrepreneurs (Lee, Sameen, Cowling, 2014). For all firms the retracting credit markets thus had significant impact on their ability to operate, extend product lines, grow, and hire, even when there was plenty of competent labour readily available (Lacina, Vavrina, 2013).

Some European countries, such as Greece and the United Kingdom responded, more or less reluctantly, with a policy of fiscal austerity. Others relied on counter-cyclical economic theories that said “spend in bad times, be austere in good times”, and initiated large government-funded projects to stimulate the economy.

3.1.2. Norway’s peculiar economic situation

The shock on the Norwegian economy from the financial crisis was remarkably mild. Compared to the Eurozone and, OECD and the US the Norwegian economy had fared well, with little impact on unemployment and the growth rate reduction was reversed within a year. Norway’s great test would come later. In 2014 and 2015 the price of a barrel of crude oil fell from over \$100 to less than \$30. The plummeting prices hit the Norwegian state which relies heavily on oil and gas exports in order to finance its daily operations. The Norwegian state is directly invested in the oil and gas industry through Equinor, formerly Statoil, and various smaller engagements. The Government Pension Fund Global, colloquially known as the oil fund, which invests some of the income from oil and gas exports, has billion-dollar investments in foreign oil and gas-related businesses. But the exogenous shock the low oil price inflicted on the Norwegian economy reverberated to more than just the offshore industries.



Figure 3.1. Brent blend spot price in USD. Source: e24.no

The idea of imagining a Norway without oil and gas was unsettling for Norwegians. Prior to the discovery of Ekofisk and the beginning of the oil adventure, Norway had a GDP per capita equalling that of Greece (Cleary, 2016). It was an average country compared to the rest of Europe. Dependency, it was generally agreed upon, was unhealthy. Transition became the buzzword, specifically transitioning away from oil and gas, and into green energy, information technology, and a knowledge-based economy. The duality of Norway’s economy has been an issue ever since the growth of the offshore industry started in the 1980s. The rapid growth offshore worried politicians and the traditional industry because it was believed high wages for offshore workers would impact the older industry and their ability to compete. As such, models for wage settlements have since taken offshore into consideration in order to avoid a chasm in the economic climate between the two.

“The new oil” is a theme that has been frequently visited by scholars, politicians, and media alike since the mid-2010s. However, ignoring the offshore sector, Norway has not managed to foster any unicorn businesses, meaning a start-up company valued at more than \$1 billion. The prevailing fear is that without oil, the relative size of the Norwegian economy will revert to pre-oil and gas levels, leading to a reduction in both relative incomes measured in GDP per capita and general life satisfaction, measured in HDI. A key area of innovation policy in Norway today is thus to foster new businesses and sectors that can potentially replace the oil and gas sector in the following decades to come.

3.1.3. Europe and future economic hegemony

Up until the financial crisis, the European Union was believed to be successful, both in terms fostering trade between former adversaries, and its original mission of tying European countries tighter together. However, even under most successful conditions, European countries appeared to be unable to compete with emerging economies, a failure that was only exacerbated by the debt crisis (Begg, 2015). The high growth rate and rising productivity in emerging and developing economies, additionally, are forecasted to continue, while internal problems in European countries indicate the Eurozone as a whole will continue to grow slowly. Chief among these internal problems are high unemployment, especially among youths, an aging population and generally unfavourable demographic developments (European Commission, 2014a, p. 12), and high, in some cases untenable, levels of debt taken on by both the public and their governments.

The member states that constitutes the European Union are very different – and they continue to become more different to each other as time goes on. Greece and Portugal, for example, are wildly different economies to Sweden and Ireland. Some member states are giants in all measurable metrics, while others are small and relatively insignificant on the European economic scene. As Fagerberg and Verspagen (2015) point out, the member states can be divided into north, south, east, and west. They are far from a homogenous group, and the “one size fits all” policies that the European Union has attempted to apply to all member countries, will work better on some than others. Furthermore, the policies enacted by governments in each member state cannot be controlled by the EU and are thus not guaranteed to be positive for the Union as a whole. Fagerberg uses the example of austerity measures seen in some Union member states as an example; a policy that might work as intended in the country in which it is applied, but that is wholly negative to the long-term growth of the country and thus the Union.

The European Union cannot, under current legislation, budget in deficit as a Keynesian counter-cyclical measure. As such the EU does not have the authority to boost spending to stimulate but may be restrictive when the economy is booming. Adding to the budgetary strain faced by the European Union, approximately 90 per cent of the entire budget is “funded by payments from national budgets [...]” (Begg, 2015). These restrictions mean only organic growth in each member state can actually create growth for the entire region.

For the European Union, innovation is about staying competitive. European countries are today, among the wealthiest in the world, but the perception in Brussels is that their dominance will come to an end unless innovation can help them reach their goals – and create growth. Thus, innovation becomes a tool utilised to stay competitive on the global scale, while at the same time performing specific functions within each member state such as addressing climate change, or youth unemployment.

3.2. Innovation financing policy in Norway: a historical background

State financing of business in Norway has a history that is relatively unimpeded from the 1850s until 2003, with one notable exception. But it was not a prioritised issue until innovation and innovatory activity became popular terms in the early 2000s. Einar Lie (Lie, 2016) notes that it was not until after the second world war that governmental banking was offered at regulated interest rates. There was certainly no holistic innovation policy where financing had a prominent place until the early 2000s. Innovation Norway came into being in early 2004 from an amalgamation of Statens nærings- og utviklingsfond, the Norwegian Export Council, the Norwegian Tourist Council, and Statens veiledningskontor for oppfinnere. Statens nærings- og utviklingsfond was itself an amalgamation of previous banks and funds related to financing industries or districts – in particular in rural areas (Lien-Nasir, 2014). Generally speaking, all innovation policy before Innovation Norway came into being was banks and funds financing inventors, firms, and traditional labourers, albeit very fragmented and specialised. Notably, however, financing was emphasised heavily, with few advisory services. The concept is accentuated at the launch of the first holistic policy reform on innovation *From idea to value* [my translation], where the emphasis is precisely on the value of a holistic innovation policy, rather than merely financing.

3.2.1. Innovation Norway

Upon creating Innovation Norway on January 1st 2004, it amassed the tasks previously held by numerous organisations. Necessarily, this meant Innovation Norway now have a vast array of responsibilities – some forty, in fact. They report on these responsibilities to seven different departments, but the majority stakeholder is the Ministry of Trade, Industry and Fisheries.

The responsibilities range from promoting tourism, to helping entrepreneurs gain access to international markets, foster innovatory businesses, and, of course, directly or indirectly help innovatory business find financing options.

Although one of many responsibilities, financing is one of the more prominent parts of what Innovation Norway does. Specifically, financing to businesses through loans, grants and guarantees, or a blend of these. There are, however, different programmes through which financing is channelled. There are traditional loans and grants to entrepreneurs in early, mid- and later stages of starting a company, programmes which offer to partly finance together with a private actor – in essence burden sharing, grants specifically for environmentally friendly technology, finance for ventures in agriculture, the maritime sector, as well as forestry. Additionally, there are a handful of special vehicles for financing which operate within certain time periods, such as businesses within bioeconomy, guidance on taking advantage of tax incentives, and of course how to get access to EU-available funding.

Notably, in 2018 Innovation Norway launched a programme called Vekstgarantiordningen where Innovation Norway guarantees bank loans, thereby facilitating financing of innovation through the Norwegian banking sector – expecting the banking sector to accept taking a larger risk by guaranteeing part of the loaned amount (Informant 1).

It is worth keeping in mind that much of Innovation Norway's financing work is preparing businesses for incoming capital. The preparation could consist of structuring the business in a way that makes it susceptible to an infusion of capital, and how to operate efficiently.

Presumably, some, if not many, of the businesses who require capital are not accustomed to dealing with large amounts of capital, and as such the pre-financing help could be crucial.

Innovation Norway also accentuates the importance of the preparation themselves, noting receiving a loan or grant from them traditionally takes much longer than a traditional consumer loan, from applying to receiving the funds, up to years.

3.2.2. The Research Council of Norwegian

The Research Council of Norwegian is the governments' and departments' research-political advisory agency. They are tasked with giving strategic advice on research, as well as a

plethora of research-based responsibilities. These vary from advancing basic research, participating in the public discourse around science, and promote internationalisation of Norwegian researchers, to financing research and development through funds made available to them by the Norwegian government. The Council also has an explicit task to foster innovation and work to promote the commercialisation of science (Norges forskningsråd, 2004).

In total, they are responsible for distributing funds to research and development purposes amounting to approximately 10 billion NOK yearly (Norges forskningsråd, 2017). Chief among these outlays are User-driven Research based Innovation, a programme specifically tailored for innovation research. The amount of funding granted makes The Research Council the second largest government financier of innovation, after Innovation Norway.

3.2.3. SkatteFUNN

SkatteFUNN is different to the aforementioned entities. It is a programme, administered by The Research Council of Norway and the Norwegian Tax Administration. Nevertheless, it is significant enough to warrant mention. SkatteFUNN has been in effect since 2002 and provides tax deductions up to 20 percent at a maximum of 20 million NOK for projects that can be considered innovative (Norges forskningsråd, 2017). Through the last sixteen years it has become an increasingly important tool for enterprises in Norway to finance their projects, which vary in size, but must pass the Research Council's scrutiny as to whether it is a worthy project to be granted part-exemption. In 2016 the tax deductions awarded through SkatteFUNN totalled 4,8 billion NOK.

3.3. European Union innovation financing programmes

The European Union offers and are on the ownership side of numerous different innovation programmes. The EU budgets are made up from contingents from all their member countries, and associated countries such as those in the European Economic Area. This provides massive economic power and allows the Union to operate at a higher level than each individual nation state can. Thus, the EU, even under current relatively tight budgets, have the financial might to finance programmes each nation state could not on their own. Furthermore, they are not

under the same level of political aspects such as having to focus on re-elections, which national politicians do. This allows the EU to be bolder.

Historically, the Union has also placed value on programmes that bind the member nations closer together. As such, most programmes, both those mentioned herein and those that are omitted, have a clear element of internationalisation; from the Framework Programmes to Eurostars.

3.3.1. Framework Programmes for Research and Technological Development

The first Framework Programme was adopted as a strategy in 1983 by the European Commission to promote competitiveness among EU countries. Already in the first Framework, the notion of technological advances featured heavily in achieving their goals (European Communities, 1983). And while the word innovation does not feature in the first Framework proposal, technological research is called for – most notably within the energy sector.

The first six Framework Programmes covered five-year periods from 1983 to 2006. The Framework Programmes, followingly, from the second to the sixth, are relatively similar. Recurring sectors that are emphasised are information technology, the energy sector, and the environment. The funding provided within each Programme increased incrementally for each new reiteration – and was in the beginning a very modest sum.

The seventh Framework Programme, FP7, was different to the previous six. The budget grew from €16,3 billion to €50,5 billion – a bigger leap than any Programme before or since – an increase of “41% at 2004 prices, 63% at current prices” as the Commission themselves proudly proclaimed (European Commission, 2007, p. 6). FP7, it was also decided, was to run for seven years, rather than five, as was previously the norm.

FP7 also differed by introducing encouragement to efforts by individuals that were neither multinational nor transnational for the first time, under the argument that raising the competitiveness between European nations would be favourable to the whole Union

(European Commission, 2007). All facets of the Programme were divided into five Specific Programmes: Cooperation, Ideas, People, Capacities, and Nuclear Research.

Through the thirty years the first seven Framework Programmes were developed and executed, they changed tremendously. The budgets grew more than tenfold, from a measly sum in 1984 to tens of billions in 2007, with ambition levels equally increasing.

3.3.2. Horizon 2020

The eight Framework Program, now changed from Research and Technological Development to Framework Programme for Research and Innovation, goes under the name of Horizon 2020. It runs from 2014 to 2020 – hence the name – and has a budget of €80 billion. It is, in fact, the most comprehensive program of its kind in the world. Its intended purpose is to create growth and jobs in Europe. Horizon 2020 is different to the previous Framework Programmes – it offers more varied funding, but also has programs tied to it that supersedes previous Framework Programmes. Horizon 2020 can also be seen as a policy instrument intended to fulfil other policy goals like Europe 2020 and Innovation Union. It operates under three pillars: Excellent Science, Industrial Leadership, and Societal Challenges.

The pillar of Excellent Science has four explicit objectives. Providing research of exceptional quality through the European Research Council, with grants up to €10 million to everyone from young academics, to funding for the commercialisation of research. Future and Emerging Technologies, FET for short, aims to help research into cutting edge technology at an early stage. These include nanotechnology, robotics, quantum technology, and green technologies. FET has a budget of approximately €2.7 billion. The Marie Skłodowska-Curie actions offer funds and help to universities, research centres and other organisations to be hosts to foreign research talents, exchange programs for doctoral candidates to gain experience and employability outside academia. The recurring topic of Research Infrastructure also features within Excellent Science. Defining research infrastructure is difficult, it is not uniform or globally defined, but the European Commission has defined it as “facilities, resources and related services that are used by the scientific community to conduct top-level research [...]” (European Commission, 2010, p. 11). There is a wish to connect national facilities into networks, and furthermore to enable developing e-infrastructures to

enable distance communication for researchers, and data processing for research purposes. Notably, the ESFRI is also an important part of the Research Infrastructure. It stands for the European Strategy Forum on Research Infrastructures, and it develops the Roadmap on which infrastructure developments follow.

The second pillar, Industrial Leadership, is intended to create jobs and economic growth through allowing businesses to innovate, and to help SMEs – small and medium-sized businesses – to grow. The three objectives within Industrial Leadership are: Leadership in enabling and industrial technologies, access to risk finance, and innovation in SMEs. LEIT, the first objective, is perhaps more than any other objective at the heart of boosting European businesses' competitiveness. Its actions are to use research to strengthen Europe's industrial capacity, encourage public-private partnerships, and to contribute to the third pillar - Societal Challenges. Access to Risk Finance is a programme which offers funding through the InnovFin instrument to enterprises involved in research and innovation – R&I. InnovFin is of such significance that it deserves further enquiry in the forthcoming chapter. The third objective of Industrial Leadership is Innovation in SMEs. Small and medium-sized enterprises gain plenty of recognition in Horizon 2020 and have also been important in previous Framework Programmes. Innovation in SMEs aims to help SMEs utilise research, but also set offer guidance to enterprises who perhaps more than other segments require it – guidance on topics such as intellectual property rights, and innovation management capacity building. SMEs are also inherently in need of funding by virtue of often being small. Thus, Innovation in SMEs offer funding through various instruments, including COSME which also will be revisited.

The third pillar within Horizon 2020, Societal Challenges, is interesting because it highlights the slow, gradual shift from research to solve problems, to publicising challenges facing Europe today – and then rewarding those who can help solve them. In essence, Societal Challenges encompasses much of what has been mentioned before as real developments which have lead Europe into the position it is today; Europe in a changing world, demographic change, security for European citizens, and also food security, climate change and environmental challenges.

3.3.2.1. InnovFin

InnovFin, or InnovFin – EU Finance for innovators, as it is officially called, is a new concept under Horizon 2020. Essentially InnovFin is merely a series of financial instruments, or products, which are given only to projects which the European Investment Bank or European Investment Fund (referred to when in cooperation as the European Investment Group) deem to fulfil a series of criteria. However, it is a crucial part of Horizon 2020 and will take up approximately half of the entire Horizon 2020 budget. It functions to allow funding – whichever kind is best for the client – of research or innovative projects in all European Union member countries and associated members, such as Norway. The initiative is meant to target especially those businesses or projects which otherwise would have found it difficult to obtain financing. And it additionally offers financing at more favourable terms than feasible lending alternatives.

On the exterior, and more important to those seeking to apply for funding, InnovFin is divided into several different segments. There are instruments for varying size of enterprise or project, as well as stages of an innovative company's life. The European Investment Fund and the European Investment Bank have separated these instruments according to the size and type that are normally within their normal *modus operandi* outside of InnovFin. Accordingly, the European Investment Fund are responsible for sections Early-Stage Enterprises and SMEs, whereas the European Investment Bank handle InnovFin Corporate, Science, and Thematic Finance.

Early-stage Enterprises		SMEs		Midcaps	Large Caps	Thematic Finance	Advisory
InnovFin Technology Transfer	InnovFin SME Guarantee	InnovFin MidCap Guarantee	InnovFin Large Projects	InnovFin Energy Demo Projects		InnovFin Advisory	
InnovFin Business Angels		InnovFin MidCap Growth Finance		InnovFin Infectious Diseases			
InnovFin Venture Capital							
InnovFin Fund-of-Funds							
Early-Stage Enterprises, SMEs and Small Midcaps < 500 Employees	SMEs and Small Midcaps < 500 Employees	Midcaps < 3 000 Employees	Large Caps Typically > 3 000 Employees	SPV, Midcaps and Large Caps		Public and Private Sector Promoters	
Intermediated Equity Financing	Intermediated Debt Financing	Intermediated and/or Direct Corporate Lending	Direct Corporate Lending	Project Finance and/or Direct Corporate Lending		Financial Advisory	

Direct products
 Indirect products

Figure 3.2. InnovFin products under Horizon2020 offered by the EIF and the EIB. Source:

<http://www.eib.org/products/blending/innovfin/products/index.htm>

InnovFin Technology Transfer is relatively straight forward: working so as to enable the transfer of technology through TTOs, research entities and higher learning institutions, exclusively through or besides funds on a *pari-passu* basis. These kinds of funds normally operate on a regional level, rarely internationally, and invest during the very earliest stages of an enterprise’s existence – perhaps even before incorporation, such as investing proof of concepts (European Investment Fund, 2016a).

InnovFin Business Angels aims to help business angel funds who invest in innovative start-ups or seed-stage investments. Normally, business angels are thought to be affluent individuals who in a more informal setting funds enterprise. However, this is not the type of investors InnovFin BA aims to assist. To be eligible to receive co-funding there needs to be a pooled effort of multiple business angels, and investments require 30 per cent of the fund to be raised as private capital (European Investment Fund, 2016b).

InnovFin Venture Capital offers equity funding for venture capital funds – primarily at first closing of the fund. InnovFin VC can finance up to €50 million, and never more than 25 per cent of the entire fund. Crucially, InnovFin VC can also offer to take an equity position in venture capital funds that are new actors in their industry, and also where the success of raising a fund depends on a large institutional investor, such as the European Investment Fund (European Investment Fund, 2016c).

InnovFin Fund-of-Funds (FoF) is an interesting instrument, because it is a rather novel one, and has been subject to discussion lately. An FoF is a fund where the investment is also a fund, hence the name redundancy. InnovFin FoF can commit an investment up to €50 million and must operate in multiple European countries or associated members of Horizon 2020. An interesting specific requirement of InnovFin FoF is that it must “focus on areas covered by the societal challenges and industrial leadership of Horizon 2020” and as such has more explicit thematic requirements than the aforementioned instruments (European Investment Fund, 2016d).

A common denominator of InnovFin Technology Transfer, Business Angels, Venture Capital, and Fund-of-Funds is that they schematically belong to InnovFin Equity. A firm taking equity also gives up some ownership in return. InnovFin Equity is intermediated by partner institutions on a national level, and typically invest relatively small amounts of money, but to funds know how to utilise the investment. Because of the nature of fund funding, an investment into a fund encourages and enables private capital which otherwise might not have been invested into the funds to do so, and therefore multiplying the InnovFin engagement. It is worth noting that even though it is called InnovFin Equity the *raison d’être* for the European Investment Group is not to invest anticipating an income from dividend or capital gains, but to encourage and enable innovatory activity.

InnovFin SME Guarantee is second instrument class which the European Investment Fund operate and manage. While InnovFin Equity targets early-stage enterprises, which may involve SMEs the InnovFin SME Guarantee exclusively invests in SMEs. Furthermore, the SME Guarantee is a debt financing programme. It guarantees or counter-guarantees loans up to €7.5 million, essentially accepting to take losses for financial intermediaries on loans to innovative activity in small and medium-sized enterprises.

The instruments offered by the European Investment Bank are somewhat different, and often more complex, reflecting the European Investment Bank’s might and competency on these subjects. What is more, the instruments offered by the European Investment Bank are not as easily recognised as innovatory, or innovation-enabling, of nature as the instruments offered by the European Investment Fund to early-stage enterprises and SMEs – focusing more on research and innovation.

InnovFin Emerging Innovators is an instrument under the Corporate umbrella. Through InnovFin EI, enterprises, infrastructures or other entities can receive financing from €7.5 million, again through intermediaries in their respective countries. Interestingly, InnovFin EI investments can be done through both debt and equity instruments. In order to understand what InnovFin Emerging Innovators aims to achieve, one needs to be familiar with the European Innovation Scoreboard. The scoreboard gives each European Union member country and Horizon 2020 associated country a score based on human resources, research systems, an innovation-friendly environment, finance support, firm investments, innovators, linkages, intellectual assets, employment impacts, and sales impact. Each nation is categorized into either, from best to worst, Innovation Leaders, Strong Innovators, Moderate Innovators, or Modest Innovators. InnovFin Emerging Innovators aims to help the two latter; Moderate and Modest Innovators.

InnovFin MidCap Guarantee is a loan guarantee through an intermediary to innovative mid-sized firms. To emphasise the nature of the guarantee; the European Investment Bank will guarantee 50 per cent of the loan given out by the national intermediary which again offers the risk-laden loan. The loan size can range from €7.5 million to €50 million. The “Cap”-part deserves further explanation. Typically, firms are categorised according to their market capitalisation, where small caps are considered to be firms at a group level capitalised less than €2 billion, midcaps from €2 to €10 billion, and large caps as larger than €10 billion. The InnovFin MidCap Guarantee operates with some leniency as to capitalisation but requires end-recipient to be firms with fewer than 3000 employees at group level.

InnovFin Corporate Research Equity (InnovFin CRE) aims to provide investment in a financing gap identified by the European Investment Bank. Namely, equity-funding of research and innovation through contingency loans. Thus, one of the requirements of eligibility is that a minimum of one round of financing has already been successful. InnovFin CRE can be utilised both directly, or indirectly through a financial intermediary.

InnovFin Science belongs under the appropriately named Science umbrella. It is relatively self-explanatory; it provides financing for public or private research institutes or places of higher learning. InnovFin Science is one of the more substantial instruments in that it has a wider spectrum to finance than aforementioned instruments. For instance, InnovFin Science

can be used to partly finance building laboratories or university buildings connected to research and innovation, or for research purposes. Financing starts at €25 million, is exclusively handled by the European Investment Bank.

The third umbrella which the European Investment Bank controls is rather different; Thematic Finance. The Thematic Finance approach is new under Horizon 2020 and is specifically meant to address societal challenges which the European Union consider it important to address. In a way, the thematic approach is contrary to what is done elsewhere. Normally, the offer of financing is performed to those who claim to have an idea, put simply. Under the thematic approach, the idea is already explicitly put by the European Investment Group, then funding goes to those who claim to solve it. Necessarily, these InnovFin instruments will be much narrower, but carry the weight of the European Investment Bank and be given the priority necessary in order to solve them.

InnovFin Energy Demo Projects is aimed at financing projects dealing with renewable energy, and future clean technology and aiding the recipients in going from demonstration of the technology and its viability to commercialisation. Showing the flexibility of the European Investment Bank, who directly handles the instrument, the financing can be done both in terms of debt, equity, or guarantees in sums between €7.5 million to €75 million.

InnovFin Infectious Diseases is the second thematic instruments. It aims to offer financing options to ventures attempting to develop vaccines, drugs, diagnostics devices, or infrastructures aimed at alleviating the problem of infectious diseases. Typically, the recipient of this instrument will be a large pharmaceutical company or research institution.

InnovFin Thematic Investment Platforms is a relatively unsubstantial instrument, comparatively. It aims to encourage others to help finance the thematic areas of interest. Specifically, through debt or equity directly from the European Investment Bank, but which will be managed by an intermediary. Currently, the thematic call is on financing the bioeconomy – a challenge that has been addressed previously under food safety, and food security, among others. However, the European Investment Group is clear that it may at any point in time revise its challenges, and the thematic platforms it wishes to support and encourage.

Lastly, there is a part of InnovFin called InnovFin Advisory. Colloquially, money can either be smart or dumb. InnovFin Advisory is an internal part of the European Investment Bank, which was meant to – naturally – advise. This is not outside any area of expertise or field of knowledge to the EIB. The three core areas of business they deal with is financing, blending, and advising. InnovFin Advisory was an attempt to make sure they were dealing with competent capital. That means helping recipients with structuring, in various different ways, and becoming more bankable. However, it quickly became clear that an internal team of the European Investment Bank would not be able to physically visit and help every recipient of either large or medium-sized investment engagements. Therefore, InnovFin Advisory today acts more like a hub of knowledge within the European Investment Bank, while much of the advising is done by the national intermediaries who again can rely on InnovFin Advisory if necessary.

3.3.3. EUREKA

EUREKA is a Pan-European, or Greater European, intergovernmental organisation for research, development, and innovation, established in 1985. It is not an EU organisation; however, the EU is a member through the European Commission. And while the European Union have had several frameworks since its inception, EUREKA, often abbreviated simply as E!, has been continuously operating since 1985. Its mission is to finance research and development, specifically joint research between the forty-one member-countries. Additionally, it encourages cooperation and synergy between its day-to-day activities, and programmes, and those of the European Union, such as Horizon 2020.

3.3.3.1. Eurostars

Eurostars is a funding programme under EUREKA that specifically supports small and medium-sized businesses. It also goes under the name Eurostars-2 as this is the second iteration of the programme. I will refer to it as both Eurostars and Eurostars-2, but whenever I am actually talking about the first iteration, I will refer to it exclusively as Eurostars-1. As is EUREKA's mission, Eurostars funds SMEs which collaborate internationally on research and development projects. There is also a real desire for the projects that receive funding to be able to be quickly commercialised. Because of this caveat, Eurostars funding will typically

not run for a long period of time, and no more than 36 months from project inception to market introduction. The market introduction is can take up to two years.

Eurostars is backed up with €861 million in funding from its members. However, it is also funded by the European Union through Horizon 2020 for €287 million. The EU involvement is further solidified by the fact that the European Commission is a joint owner of the programme, together with EUREKA – of which it is also a member. Much like the majority of Horizon 2020 funding through InnovFin, Eurostars is also managed on a national level by intermediaries, called National Project Coordinators. These NPCs do the majority of due diligence and advising for applicants. In the case of Norway, the NPC is the Research Council of Norway, who advises applicants before and is in contact with the Eurostars officials in Brussels, as well as meeting the other member countries.

Eurostars is quite different from other programmes because of the requirement for internationalisation. A Norwegian applicant must cooperate with at least one enterprise in another Eurostars member country. Additionally, projects often use, and even rely on, the help of outside institutes and research entities, because of the fundamentally knowledge-driven nature of the projects (Informant 4).

3.3.4. COSME

COSME, too, is an equity or debt financing instrument, with additional support features. As is indicative by its name it, too, is directed at SMEs. COSME is an acronym for the Competitiveness of Small and Medium-sized Enterprises, it is managed by the European Commission. It runs from 2014 to 2020 but is not connected to Horizon 2020. The instruments COSME disposes is twofold: A Loan Guarantee Facility which guarantees losses suffered by financial institutions on loans to SMEs, and the Equity Facility for Growth, which provides capital to funds which invest in SMEs. However, COSME offers more than access to finance for SMEs. It also provides expertise on how to access markets and information, encouraging entrepreneurship, and improving conditions for competitiveness. With a total budget of €2.3 billion, it is a sizable programme with some peculiarities. Because it is not connected to Horizon 2020, Norway is not a participant in COSME. (European Commission, 2014c).

4. Methodology

In this chapter, I intend to explain how and why decisions were made regarding the methodology of this thesis. I will show how all original information was found, whether it is indeed reliable and trustworthy, and the reason for choices I made which impacted the research. Primarily I will illustrate the strengths and weaknesses to a qualitative study, compared to a quantitative study, and precisely why I considered a qualitative study to be preferable in this instance.

4.1. Research design

Hay (2016, p. 117) put it like this: “Careful design and rigour are crucial to the dependability of any research”. The design of the methodological approach is all-encompassing throughout qualitative research. While being aware of one’s own biases and interests can explain why one has been drawn to this particular research topic, or even the wording of the research question, it is dangerously difficult to address. I must admit introspective analysis is hardly my strongest suit, but I have been aware of my interests and that they undoubtedly have influenced how I ended up with the thesis I currently have. I do believe it has been made clear in previous descriptions of the extant literature that I have been original in choosing topic when taking into consideration the interpretive community within which I operate.

Within economics, and within innovation studies, there is a prevailing emphasis on quantitative methodology. In economics, in particular, that is perhaps understandable as the reliance on mathematics is omnipresent. Yet it leads to important aspects of potential research being ignored. I claim in no way that my methodological approach will lift or illuminate segments of innovation studies scholarly work to a higher dimension, or any other field for the matter. However, coming from a historiographical background, it merely made more sense to me to choose an approach which provides more depth, and richness, as well as debatable findings, rather than generalisability. The intention of a qualitative research study is not to generalise, but to discover experiences, impressions and feelings – specifically reasons, opinions and motivations which are not immediately apparent.

A key dimension in my choice of research design lies in the nature of the programmes I was inquisitive about. Horizon 2020 on a whole still has three years left to run. While InnovFin has been ongoing since 2014, initial attempts at accessing data from the EIB appeared to be complicated. Eurostars on the other hand would have been easier to obtain datasets about, but any usability would not be applicable to compare both programmes. Perhaps as Horizon 2020 and InnovFin grows closer to completion as programmes for innovation, a grander qualitative study will be more feasible.

Because of the emphasis on depth in qualitative research, topics such as sample size are not considered as important to the reliability as in a quantitative study. Instead, according to Hay (2016) the skill level of the researcher is of higher value in qualitative research.

4.2. Case selection

Looking at European Union programmes that finance innovation was by no means obvious to me. I have never been overly interested in the EU, living in a country in Europe that is not a member of the Union. Frankly, I had never even heard of any of the programmes currently financing innovation throughout Europe before starting this undertaking. Upon reading about the programmes then, it struck me that perhaps because I had never heard about Horizon 2020, Framework Programmes or Eureka it was the perfect topic to research further. How is it possible that there are tens of billions being spent and I, an innovation had no knowledge of them?

Thus, it was most definitely a case I selected myself, and in fact innovation financing is not a topic on which my curriculum before this thesis in either history or innovation studies has emphasised much. While not exactly swimming against the stream, I am looking at a topic which is not often studied using qualitative research methods.

4.3. Data collection

The data collection for this thesis was done in two different ways: through interviews and documents. I quickly realised interviewing would be hugely effective for my thesis because there were numerous Norwegian and foreign contact points with professional people readily

available to answer my questions – and whom I could learn a great deal from. That would turn out to be one of my main mistakes, which I will divulge more about later. The same contact points, massive organisations, produce vast amounts of documents. I have scoured through hundreds of these, both ones produced by Norwegian organisations and those put out by different European Union entities.

4.3.1. Preparation

Truthfully, the initial preparation for this thesis began based on the assumption of a different research question. Hence, I began reading about the venture capital scene in Norway, as that was my first topic. Regardless, as venture capital has become relatively important in the final edition of the research question, it was certainly not in vain.

Initially, preparation took the form of predominantly catching on to the lingo used in finance. Finance and economics are worlds in which I have travelled on an amateur-level previously. However, the language used by experts in any field are nearly always hard to grasp. Even for me, who has had an interest in the field for some time, I found fundamentally understanding every concept difficult – in fact I still do now and then. Having said that, understandings concepts undoubtedly provided more fruitful discussions with persons of interest later, as it allowed a more fluid conversation to take place, as well as serving as an invitation to discuss more advanced topics than the interviewee having to explain simple topics such as investment types, methods and actors to me. I am confident the preparation prevented what would otherwise have been unmitigated disasters to become interesting exchanges of information.

4.3.2. Interviewing

Yin (2014, p. 110) calls interviews “[O]ne of the most important sources of case study evidence [...]”. In my case interviews have helped clarify topics on which my preparation reading had made me uncertain, or topics which there existed little available information. Interestingly, my interviews also provided information where the existing public information was wrong or misrepresenting.

Interviewing is so multi-faceted it can really be anything, achieve anything, and result in anything the researcher wants it to, depending on the skill level of the researcher. In my case, I had virtually no experience in conducting interviews. Because of my own inexperience, I depended on academic and non-academic writings on interviewing in order for the interviews to provide me with the material I wanted, as well as – hopefully – nice experience for all those involved. It quickly became apparent that employing an interview guide would be both necessary and helpful, which I did in all but one interview.

As Hay (2016, p. 149) so aptly put it “interviewing [...] is so much more than ‘having a chat’.” Followingly, I want to explain why I made some of the choices leading up to and performing the interviews, and how I adapted during the process to the unforeseen conditions which I faced. In all but one interview I used a semi-structured guide, because it allowed me to send an overview of the interviews to the interviewees beforehand and let them prepare. I chose to send a rough list of the main questions to the respondents because they wanted to make sure they had all the necessary information before doing the interview. I considered this a good idea, and often in large institutions multiple people work on the same relatively small area of interest. Thus, more than the one interviewee might possess information I seek. Of course, the disadvantage of providing the questions beforehand has certain drawbacks, such as eliminating a, for lack of a better phrase, “element of surprise”. Considering information gathering was my primary concern, providing them with the questions made more sense, however.

Before and during the interview I attempted to establish rapport with small-talk and showing my genuine appreciation for their taking time out of their day to talk to me. Equally important to me, was letting the interviewee take the conversation where they wanted to, provided I felt comfortable I would be able to steer the conversation back to the questions I had provided. Because they knew the questions, and had them available, they were surprisingly aware when digressions needed to be directed back to the original questions. In the end, all questions were answered satisfactorily, but allowing the interviewee to steer the conversation more provided me with more information about novel, yet relevant topics I had not thought of to include in my question guide. Overall, the flexibility added by the semi-structured interviews proved fruitful in this case. Perhaps because as a student, I was in an inferior power position, and because all the informants felt comfortable steering the conversation, which will not always be the case.

As previously alluded to, there was one interview where I purposely decided to alter my methods. In this case the informant responded to my e-mail in a very informal way, because we had a mutual connection. I deemed it unnecessary to be stringently formal in return; hence I did not provide any questions, but rather lowered my responses to the informant's level of formality. The interview reflected this, and it was more difficult for me – as an untrained craftsman – to keep the conversation on topic. Luckily, the informant was highly professional, and my probes were effective at extracting the kind of information and feelings about topics I was interested in. However, I suspect a more skilled interviewer and a more structured approach would have been even more effective, even in this informal setting, as I left the interview with a notion I had not been able to uncover all the knowledge the respondent possessed on the topic.

Overall, the interviews proved effective at uncovering the tasks I had set forth; while providing me with background information that cleared up concepts and topics on which I was insufficiently informed, it also enlightened other key aspects of which I was unaware. Such as when a discussion on SME funding provided by Horizon 2020 led to talk about how important the Eurostars program is, even though the informant was contacted exclusively because of Horizon 2020.

An interesting trend I noticed as I was concluding my very last interview was my personal development throughout the process. Presumably my technique had improved somewhat, which allowed me to ask better timed probes, and I felt more awareness as to when to interrupt and when to allow the interviewee to continue their thought process and digressions. But I also became increasingly aware that as my background knowledge of the institutions they represented, and the programmes which we discussed, I was able to change my questions in a way that provided more fruitful answers. Thus, for any future process such as this, I will take more into consideration the most suitable time to conduct the interviews, rather than letting my interviewees pick the most suitable time for them.

4.3.2.1. Recruitment and access

All contact with interview objects was established through e-mail and found as manually as possible. This was undoubtedly a slower and less effective method than for example asking

the first interviewee for recommendations on who I could contact. Interestingly, all interviewees also recommended other points of contact and other persons I ought to contact unprompted during our talks. There is also a real risk that I might miss out on contacts I was not aware I should have been in contact with, a so-called unknown unknown. However, I considered the scope of the research was narrow enough to not necessitate more contact than I had already decided to do.

I contacted the following, respectively:

- (i) Norwegian Venture Capital Association
- (ii) Innovation Norway
- (iii) European Investment Bank
- (iv) European Investment Fund
- (v) European Commission
- (vi) Norwegian Ministry of Education and Research
- (vii) Norwegian Ministry of Trade, Industry and Fisheries
- (viii) Norwegian Council of Research

Only one of the respondents chose not to respond, Norwegian Venture Capital Association. While the European Investment Bank, European Investment Fund, and European Commission courteously replied that they did not have any free personnel at the time to conduct an interview. I will not speculate as to how or why that is, but they all were kind enough to refer me to references and libraries where I could find any and all information about the topics which I had asked them. Truthfully, I had not expected their unavailability. Their unavailability represents a difficulty in representing the multiple views I had hoped for – a European and Norwegian perspective. Fortunately, their online documentation is so extensive that I believe it has not impacted my study significantly negatively, especially with regards to programme details.

Those who responded and with whom interviews were conducted were, chronologically:

- (i) Innovation Norway
- (ii) The Ministry of Education and Research
- (iii) The Ministry of Trade, Industry and Fisheries
- (iv) The Research Council of Norway, on Eurostars
- (v) The Research Council of Norway, on Horizon 2020

Where I considered it necessary, I followed up with e-mails with questions for clarification. I will not make this distinction while referencing, but it was the case with my contact at Innovation Norway, and The Research Council of Norway, on Eurostars.

For reasons of privacy and anonymity, I have chosen not to disclose their names, job title, area of expertise, or under which section they work. I can, however, disclose that all were the most relevant person(s) at their respective organisation with regards to my topic, the programmes, and the research questions.

4.3.3. Validity and reliability

Validity and reliability are effectively mechanisms to ensure the quality of the research. Yin (2014) suggests three methods to ensure validity, and one to test reliability.

Construct validity relies on using multiple sources of evidence, being able to show a chain of evidence, and having your informants review your work. Having multiple sources is part of the triangulation of data which means your evidence is not based on a single source, which can be misunderstood, misrepresented or wrong for any reason. In practice, that means checking informant statements up against documents, or having multiple informants reiterate statements (Yin, 2014, p. 119). With corroboration being the operative word. Establishing a database or chain of evidence means having the ability and desire to establish a repository to which you can guide to if need be. As Yin also says, having an adequate database or chain of evidence does not eliminate the need to show sufficient evidentiary data within the work, but is rather an added measure. Giving your informants, as well as your peers, the ability to review your work is as Yin (2014, p. 199) says “more than a matter of professional courtesy”. Equally so, allowing your informants to review their statements or air their disagreements provide strength to the study.

Internal validity, firstly, is useful in explanatory studies. It can highlight causal links and inferences based on the available data. Yin (2014, p. 48) divide the approaches into pattern matching, explanation building, addressing rival explanations, and using logic models. Pattern matching means to compare your findings to your presumptions before conducting the

research. Explanation building is similar to pattern matching but is a more gradual process of building explanations using multiple patterns, so to speak. Addressing rival explanations is what it says on the tin, confronting rival explanations is necessarily done before designing your own research, so that your research also encompasses the same prevailing thoughts. A logic model is an analytic technique that stages events over time by a cause-effect-cause-effect-order (Yin, 2014, p. 155). Whereby, feeding a cause in at one point with an anticipated expected effect in order to explain the outcome.

External validity, by force of opposition, looks at the outside of the study. If a study can be applicable to other studies, for example, but which crucially were not part of the original study that is a force of strength by inherently having transferrable traits (Yin, 2014, p. 272). It is dependent on whether you are using one case or more, however, whereupon an added external validation can be the use of a theory or multiple theories, which can be reproduced in other studies.

Reliability, Yin (2014, p. 46) writes, is “demonstrating that the operations of a study [...] can be repeated, with the same results”. Many confuse reliability with replicability, which is prominent in quantitative studies. However, reliability in qualitative research studies can never be perfectly replicated. Thus, reliability builds on the strength of the researcher – as well as the design. Golafshani (2003) illuminates this further by showing the vast difference in opinion on the concept of reliability in qualitative research. Rather than being able to, itself, illustrate a strength of the design through reliability, having sufficient validity proves the reliability.

4.4. Ethical considerations

Any ethical considerations in research must be based on the presumed knowledge that a researcher’s actions can and will have consequences.

I will not name any informant, but as I name the institutions which they represent, someone wishing to speculate as to who my informants might be could potential figure it out. Based on the assumption that any reader might discover their identity I have offered each informant to read the transcripts of our interviews, so as to ensure the informant can correct any impression

given to me. It is not because of the nature of the discussion topics that I have chosen to offer privacy and confidentiality, but merely because it offers no added value to the research to publicise my interviewees. However, for clarity and notational conciseness I will cite and refer to interviewees as Person 1 to 5, or Anonymous 1 to 5.

Additionally, I used the word interview explicitly in recruiting my interviewees and provided them with my place of study, the level of the academic work, as well as my name and contact details. I did this in order to clarify that by consenting to the interview, they were under no erroneous impression as to what I was trying to achieve by contacting and interviewing them.

I do not consider that any harm has been done or is being done from the research done, or what will be publicised herein, neither to any interviewee, third-party or myself.

As a graduate student, however, an interesting concept to keep in mind is that you are highly likely in a constant state of being the less powerful part. In my case, interviewing professionals, academics on a higher level in their career than myself, as well as representatives of ministries and governmental institutions, I have always been the lesser part of an asymmetrical relationship (Hay, 2016, p. 36). Being in this power dynamic is not necessarily only negative but being aware of what it means has allowed me to deal with it throughout my research.

Finally, I have sent transcripts of interviews to three out of my five interviewees. I have done this to allow them to alter or modify what they said, as I might have heard wrong or transcribed erroneously. Additionally, allowing them to more precisely address their statements will only offer me more insight into their thinking around the topics. I will not, however, allow them any say in how I choose to represent their admissions.

5. Empirical findings and analysis

In this chapter I will utilise the theoretical approaches in Ch. 2 to analyse the data I have gathered on InnovFin and Eurostars. In the first part I analyse my findings on InnovFin and Eurostars in an innovation theoretical view of the programmes. In the second analysis I show the organisational problems, but also advantages of the programmes, by explaining their relationships using agency theory. Both innovation and agency theory are used because alone one does not answer both research questions, nor provide the depth of complexity both research questions pose. Innovation theory can explain the programmes and why Norway considers them important and wishes to be a part, whilst agency theory shows how they are implemented, who plays key roles in their implementation, and what problems and costs are associated with it.

5.1. Analysis 1: an innovation overview of the programmes

In this chapter I will compare my empirical findings with the contextual information given about InnovFin and Eurostars to the theoretical foundations of innovation. Due to the contextual explanations and peculiarities of each programme given in the context chapter, and for notational brevity the analysis will only provide clarifying and additional information on InnovFin and Eurostars where it has been obtained as an empirical finding. Where it is considered necessary I will provide the contextual information pertaining to each programme in order to make clear the point of analysis.

5.1.1. InnovFin in innovation theory

Any effort to explain why Norway wishes to offer to firms, and its financial institutions, InnovFin, must reflect on Horizon 2020 as a whole. InnovFin comes in a package deal, so to speak. Thus, the question necessarily that must be asked is why Norway takes part in Horizon 2020, and then by extension whether InnovFin was a part of the decision to participate.

Norway became an associated member of Horizon 2020 on the 17th of May 2014 through the European Economic Community (Kunnskapsdepartementet, 2014b). In the announcement the emphasis was made on the exchange and development of research, knowledge and education as the way ahead to escape the financial crisis. No mentioning of InnovFin is made, however that is only natural as InnovFin was not yet established as part of Horizon 2020. But access to risk finance and support for SMEs is briefly mentioned as an explanation to what the Industrial Leadership pillar consists of (Kunnskapsdepartementet, 2014b). In its Strategy for Research and Innovation Cooperation with the EU-report the government states its wishes, hopes and goals for cooperation in Horizon 2020 (Kunnskapsdepartementet, 2014a). The Norwegian government has stated that it is a goal to become one of the most innovative countries in Europe, and Horizon 2020 is an important part of that (Informant 3). Overall, the strategy is a reflection on the need for Norwegian research and innovation policy to be attached to knowledge-generation in the European Union and Horizon 2020.

However, it is difficult to draw the conclusion that the decision to join Horizon 2020 was based on experiences gained in the previous Framework Programme, FP7. In FP7 Norwegian firms were not particularly active in gaining access to risk capital, had lower firm participation than the other Nordic countries, while researchers' participation was generally a positive experience (Kunnskapsdepartementet 2014a). The decision to join Horizon 2020 despite varied impressions from FP7, while simultaneously deciding not to join COSME will be revisited in the Discussions chapter.

Horizon 2020, and by extension InnovFin, represents the European community, and Norwegian participation is a reflection that Norway wishes to gain access to European research and researchers, be part of the larger European community, and all that comes with it. Access to risk capital, and InnovFin, appears not to have been a deciding factor at all, but merely an added bonus. Thus, InnovFin in itself, cannot be analysed as part of a larger national innovation policy discussion as it was announced after the decision to join the programme was taken by Norwegian decision makers. However, it has now been running for four years, and so its impact on the Norwegian financing ecosystem can.

Economics of innovation

Horizon 2020 famously has a €80 billion budget, of which InnovFin under the access to risk finance category amounts to just under €3 billion. While €3 billion is a relatively small part of the Horizon 2020 budget, it can have a tremendous impact for the recipient firms. Arguably even more so than any other basic or applied research project outside of InnovFin's scope. Because of the nature of how risk financing works, with huge upside and downside, measuring innovation financing by the amount of money available is not the most optimal metric. A risk investment made into an innovative firm can multiply by the tens of thousands, but also has a higher likelihood of failure. Such is the nature of risk.

Norwegian politicians have set a 2 per cent Horizon 2020 recuperation goal for innovative firms in Norway, which is approximately €1.6 billion. But, how much is €1.6 billion in innovation financing worth? For example, an equity position in a firm whose technology becomes extremely popular and whose market capitalisation becomes very high can quickly become much more valuable for the state than many smaller sums given to other firms across the country, but which in total is a higher sum. The goal is predominantly an ambition to work towards, rather than an indication of the total expected growth from innovation policy, as some might interpret it as (Informant 1 & 3). In other words, there is an argument to be made that credit creation has lost some of its importance since the age of Schumpeter, in a world where there is international access to risk finance, but where the difference is in the conditions with which the finance comes. Ergo, whether venture capital is more competent than public capital, and how much smarter and competent those actors are than the simplest debt financing products obtained in a bank.

The first and only public InnovFin transaction in Norway was announced in January 2017. It was a guarantee and counter-guarantee between the European Investment Fund and Innovation Norway for 1200 MNOK (Informant 1). It was signed under the InnovFin SME Guarantee, and InnovFin SME Counter-Guarantee. It has effectively allowed Innovation Norway to increase lending to SMEs by approximately 900 MNOK, and additionally a 300 MNOK through the counter-guarantee, which funds a new instrument for Innovation Norway (Menon Economics, 2017a). The guarantees allow for Innovation Norway to increase their support for SMEs in Norway with a lower risk profile than would have otherwise been the case. As the only public InnovFin deal signed in Norway, it is interesting in its own right, but

it is even more interesting due to how it is applied by Innovation Norway towards Norwegian SMEs.

The SME Guarantees will predominantly be used in two products offered by Innovation Norway: The Innovation Loans and Growth Guarantee.

The Innovation Loans product offers debt funding to innovative SMEs, for any project in all sectors. It can cover start-up, a transition process, and internationalisation in Norwegian firms, but also acquisition of new machinery, equipment, as well as investments into buildings in some cases. The Innovation Loan can cover up to 50 per cent of the capital demand. The degree to which the SME recipients of this debt financing are innovative is arguable. From an external point of view, it appears to be an SME financing tool more than an innovative SME financing tool. That need not necessarily be problematic, because as we have discussed previously the inherent uncertainty of innovation results in what can appear to be completely arbitrary origins from which an innovation can come. In other words, those who appear innovative can be less innovative than those whose original reason for finding finance was merely to scale up production, or transition into a new market segment.

However, logically and by pure chance, being able to support more SMEs means that there is a higher likelihood one of the recipients produce something innovative, comes up with something new that they can bring to market, or finds a new process upon which to improve their business. As an appendage to the Innovation Loan where the financing comes through the EIF there is a set of criteria and a screening process of whether the financing needed is innovatory and will lead to growth.

Growth Guarantee is a new instrument financed through InnovFin. It is not a product for SMEs, however. It is a product for banks, to serve as a push for them to provide debt financing for SMEs by outsourcing the administrative costs to Innovation Norway (Informant 1). While the final beneficiary are SMEs, the Growth Guarantee thus uses banks as financial intermediaries. The Growth Guarantee has a stated intention of “Strengthening innovative and fast-growing small- and medium-sized businesses access to bank financing” (Menon Economics, 2017a, p. 9). Three banks are currently signed on to the product: Nordea, DNB and SpareBank 1 SMN. By covering the 75 per cent of the losses incurred by the banks, Innovation Norway hopes to increase their lending to innovative SMEs. Innovation Norway

can again incur the losses because 50 per cent of the final losses will be guaranteed by the European Investment Fund (Menon Economics, 2017a)

Innovation Norway chose to act as an intermediary in the InnovFin SME Guarantee signing. Interestingly, any bank could have chosen to sign the InnovFin SME Guarantee independently, and directly with the EIF, but no Norwegian banks have chosen to do so (Informant 3). There might, of course, be a multitude of reasons why, but one of the main reasons appears to be that Norwegian financial institutions considers participating directly as too costly. The first person I spoke to about InnovFin put it this way: “these [guarantee instruments] are quite administratively heavy, and the best explanation for why is that the EIF needs to coordinate on everything from Romania to France, and amongst other things different IT systems. [...] That means there will be manual reporting, and somewhat outdated methods.” (Informant 1, my translation). As the financial industry is more than ever involved in the process of digitalisation, manual reporting and old methods for communication is too costly. And it is a sign of perhaps an alarming trend of one size fits all instruments, as the European Union has been accused of earlier. Equally worrying is the inability of the access to risk finance-responsible in Europe to remove the “red tape” bureaucracy which has been emphasised as an improvement in Horizon 2020 compared to FP7. Alternatively, the amount of “red tape” might have improved, but not sufficiently for Norwegian intermediaries to consider it worth to participate, whereas in other countries that might be different.

Only 2 per cent of Norwegian firms have more than 50 employees, meaning most firms in Norway qualify as being an SME (Finans Norge, 2017). These firms typically encounter more difficulty in obtaining financing than larger firms and combined with more strict capital requirements for banks in Norway, the lending from Norwegian banks to these firms has increased only fractionally in the last few years (Finans Norge, 2017). By using the InnovFin SME Guarantee signing to increase their overall lending activity, Innovation Norway is effectively treating it as it would an increase in normal lending coming from the national budgets. That is undoubtedly positive for innovative firms.

SMEs have a prominent place in innovation firm theory, because of their dominating position in most countries' economies. However, in an economics of innovation perspective they traditionally do not belong in either camps. As they are not nascent ventures, they do not require intervention to survive the “valley of death”, wherein costs are higher than revenue,

and they are not large firms who put far more emphasis on research and development (OECD, 2000). Following, however the logic of competitiveness and innovation, small and medium-sized enterprises must compete with other SMEs, and the only way to successfully compete is to be innovative. But as an Italian study of SMEs found: “innovative firms outperform non-innovators, but better performing firms are also more likely to innovate and devote more of their resources to innovation” (Love and Roper, 2015, p. 30). Therefore, considering the real impact of the SME Guarantee by Innovation Norway to the innovative power of Norwegian SMEs is both difficult and inconclusive. It is clear, however, that supporting more enterprises by offering debt financing is positive overall.

The two InnovFin SME Guarantees signed by Norway are not unique in a European setting. In fact, the SME Guarantee is by far the most popular InnovFin product in terms of number of deals signed (Panteia et al., 2017). The numbers I am about to present are outdated, originating from late 2016, and I have been informed that signings have been made since, I still present them because they show clear trends. The SME Guarantee at one point constituted 109 signings in all European member and associated member countries, whereas the second most popular instrument was the MidCap Guarantee with 5 signings in amongst all member and associated member countries (Panteia et al., 2017). An interesting point of contention then is: does every European sign it because they suffer from the same funding gap, or is there a systemic fault in the InnovFin instrument line that prohibits the signing of other instruments than the SME Guarantee to an equally big degree?

Naturally, this is interesting for a couple of reasons. The SME Guarantee specifically targets SME financing, and while those are numerous in Norway and Europe, in general, it is an instrument that does not address the entire life cycle of a company. In other words, there have been no signatures by other financial intermediaries than Innovation Norway, no funds, or any thematically oriented firm, institution or individuals. In the interim evaluation of InnovFin, the authors themselves state that:

innovative enterprises have differing types of financing needs at different stages of their development, starting with the need for risk capital during the early stages and progress to various forms of equity and debt finance as projects are commercialised and businesses expand. (Panteia et al., 2017, p. 74).

InnovFin is meant to address each of these stages, as illustrated in figure 5.1.

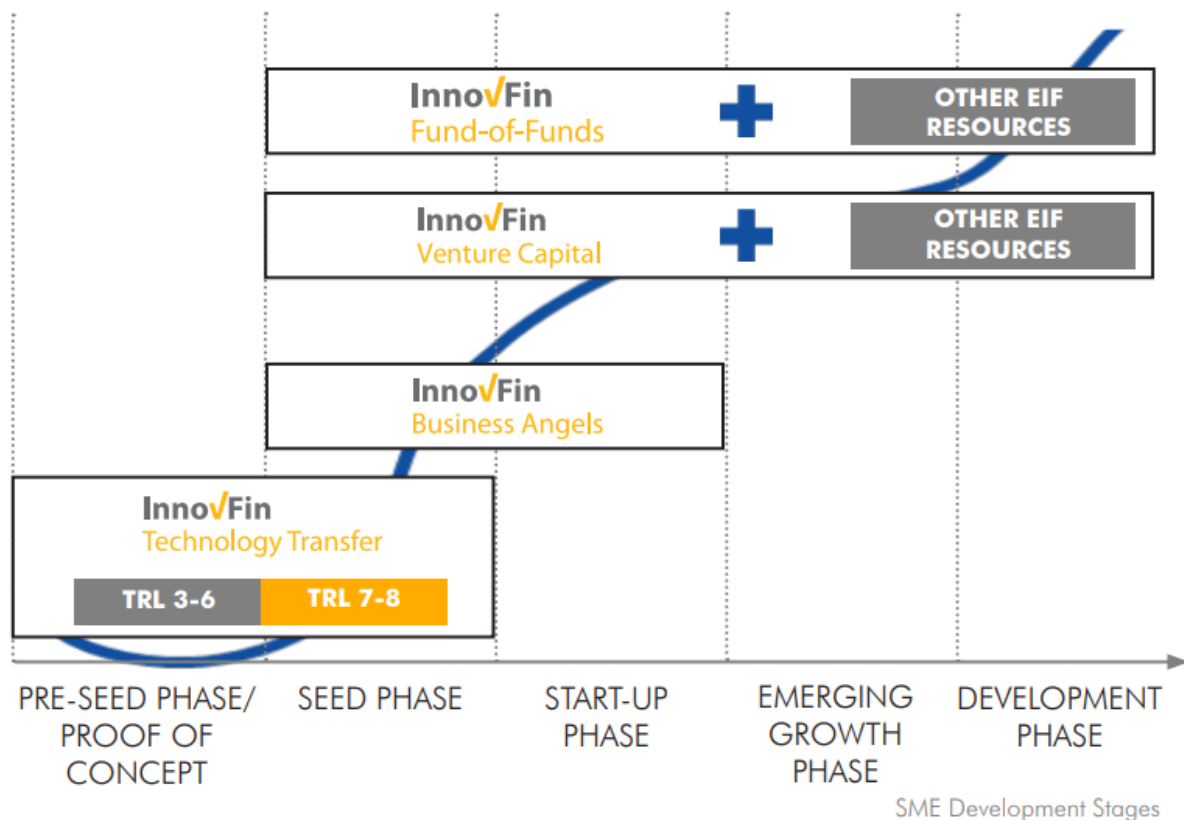


Figure 5.1. InnovFin instruments compared to the life cycle of a nascent firm. Source: EIF, InnovFin Equity overview.

There may be a multitude of reasons, again, for why no signings have been made privately by venture capital funds or other stakeholders. Or indeed why there has not been made signings by financial intermediaries on a public level for these instruments. Although my informant (1) was confident there will be signings in the near future.

The private Norwegian financial sector for early stage financing is small. In fact, it is smaller than all our neighbouring countries, and comparable Western-European countries. Since 2007, according to the Norwegian Venture Capital Association (NVCA), their members, which constitutes a large segment of the venture capital scene, have made 167 investments on average per year in the venture stage, and almost half of that in the seed stage (Menon Economics, 2017b). And the 2017 InvestEurope private equity report shows venture capital in Norway as percentage of GDP is just between Spain and Ukraine, far behind the European average, and also far behind Denmark and Sweden (Invest Europe, 2018). Keep in mind, however, that these numbers might be prone to the cyclical nature of private equity fund

raising and spending. That means some years might be different to others, as funds run for a number of years. Regardless, the indication is that Norwegian venture capital is not particularly prominent in any sense of the national systems of innovation.

The relative size of the Norwegian early stage financing sector should indicate that some InnovFin Equity instruments would be highly popular in Norway. Yet no InnovFin Equity deals have been signed as of May 2018. I offer a few reasons for why this might be the case, based on the data I have gathered.

The InnovFin Equity instruments' popularity in Norway might be suffering because of Innovation Norway's prominence. The Norwegian policy implementation system, in this instance Innovation Norway, appears to be particularly well suited to offer equal or identical instruments as what the early stage instruments of InnovFin offers. In all likelihood due to Norway's marginal venture capital and pre-seed sector, public money has for a long time been used to fill this financing gap (Menon Business Economics, 2013).

The stated rationale for InnovFin is: "the scale of demand for financing, combined with the limited supply of public resources, means that additional capital flows need to be leveraged to fill the gap" (Panteia et al., 2017, p. 25). The conceptualisation of "limited supply of public resources" is not considered a market failure, but rather a failure of governmental response to a market failure. This is an important distinction, and important to remember in the case of Norway. In the national system of innovation, Norwegian banks did not suffer particularly following the financial crisis. And when the bust-period came following a decrease in the price of oil and gas, it was the offshore industry that took most of the hit. In other words, the public resources' availability through Innovation Norway, and thus the rationale for InnovFin was not affected greatly.

The one-size fits all strategy on which InnovFin is built is not particularly well suited to the Norwegian financial ecosystem. Informant 1 used this parable specifically relating to IT systems and reporting, but it is an observation that is equally fitting to all InnovFin instruments. Crucially, this is not necessarily negative. The availability of a wide range of products, ranging from proof of concept funding to large multi-million-euro equity financing does not require each country to take advantage of all instruments. Nor does it automatically qualify a firm receiving early stage funding to later receive later stage funding.

As previously alluded to timing is likely to have played a part in why no InnovFin Equity instruments have been signed yet in Norway. Innovation Norway works together with funds who are raising funds, together both of them can work with the EIF to get additional capital. And then, as per the requirements of InnovFin, the funds must be raised in partnership with private capital in the country (Informant 1).

Whether InnovFin is going to have any enduring effect on innovatory power in Norway is highly uncertain. But the InnovFin SME Guarantee will allow Norwegian banks to offer funding to approximately 350 more firms, which undoubtedly is positive for the overall economic growth. As in most European countries, SMEs are important in Norway. They also appear to have a penchant for debt financing rather than equity financing (Informant 4). As a result there are numerous potential applicants which can expand their products and hire more people, increase wages which is positive for the economic growth and prices, and of course put new products into new markets, and employ new processes.

The second InnovFin deal signed to Norway, as of May 2018, and the only private deal, is a €300 million loan to Viking Heat Engines under the InnovFin Large Projects instrument (Informant 1). It was administered entirely by the European Investment Bank, without any intermediary support offered by Innovation Norway. That is the normal process with debt financing to a single firm of this magnitude, and the firm is additionally located with most of its activity in Germany making it more natural not to consult with a Norwegian entity regardless.

The InnovFin Advisory group is a highly interesting concept. As previously mentioned it operates under the European Investment Bank with two different sets of clients. The group advise financial intermediary institutions in the different member or associated member countries in Horizon 2020. And they are tasked with dealing directly with firms in order to improve their bankability, their receptiveness to funding, and how to organise in order to secure private, national or EU-funding in the future. This is referred to as the capacity-building part of Advisory (Panteia et al., 2017, p. 72). But the Advisory group also prepares studies on financial activity and prospective themes of interest in the future for the European Investment Bank and finance in Europe in general; on topics such as the circular economy and access to finance-conditions for firms in various sectors (Panteia et al., 2017, p. 22).

A point of debate in my interviews has been the extent to which InnovFin Advisory works. Their second task, capacity-building on a firm-level, has for different reasons been of a limited character. To the point where it has not been used at all in Norway (Informant 1). For a variety of reasons, from budgetary to practical, their role today largely revolves around dealing with financial intermediaries, in the case of Norway, Innovation Norway. In the evaluation of InnovFin, the Advisory group is described as “a small team” (Panteia et al., 2017, p. 72). This substantiates my informant’s view that for budgetary and practical reasons InnovFin Advisory is simply too small to operate on a firm level in each member and associated member state (Informant 1). The role of the Advisory team has quietly been evolved into one where information dissemination through the national financial intermediaries are emphasised. However, the ambition to do more than merely being a knowledge hub is still there (Informant 1).

Smart capital is not exclusively an innovation theoretical concept, however knowing how to apply financing and forming the enterprise to best take advantage of financing is an important part of entrepreneurial finance. As one of my informants said to me, showing an interest in providing smart rather than dumb capital is not particularly original. It is a necessity (Informant 3).

Besides, Norway is not likely to be very negatively affected by this development (Informant 3). Innovation Norway has since its inception been tasked with a similar task as what InnovFin Advisory were meant to do; provide smart capital and competent capital (Informant 1). In other words, Innovation Norway already does what InnovFin Advisory offers. Thus, other countries are more likely to be negatively affected, countries where whose policy implementation systems are more under-developed. The Norwegian national innovation institutions are perceived to be very competent and qualified to offer the same services to potential and actual recipients (Informant 3), while some European countries are more reliant, and could gain more by InnovFin Advisory support.

It is noteworthy that numerous parts of InnovFin appears to be either superfluous or unnecessary in the case of Norwegian firms, or the policy implementation system. While Horizon 2020 and InnovFin are prestigious projects, nation states have invested vast amounts of money to participate and to fund it. Because of these large sums, the responsible persons in

the European Commission, EIF and EIB are preoccupied with making sure each country are able to recuperate those sums, somehow. Consequently, if there is to develop an impression of difference in being able to utilise these instruments and programmes amongst countries, that will ultimately reflect poorly on the programme (Informant 1). Thus, InnovFin needs to be visible, it needs to be used.

An interesting observation that has been made by my informants and myself is how InnovFin is used in Norway presently in the face of path dependency influences on our business structure and industrial composition.

5.1.2. Eurostars in innovation theory

In this part of the analysis I apply the theoretical approach of innovation for growth, the uncertainty of innovation financing and what it means for the funding agency in Norway, the Research Council of Norway, as well as the role of SMEs in innovation under Eurostars. Especially interesting pertaining to Eurostars, compared to InnovFin, is the role of the state, because of the difference in funding structure between the two programmes. Finally, some obstacles in Eurostars are analysed, in relation to the governmental rule and regulation system, which are possibly prohibiting Eurostars from reaching even more firms.

Innovation as growth

Eurostars-2 funding recipients are small and medium-sized enterprises who are performing research and development, together with another Eurostars-partner. Crucially, Eurostars is open to all sectors and lines of business. And while SMEs by many are considered the real engine of the economy, ensuring employment, driving innovation and indeed growth (OECD, 2009). The particular SMEs who typically participate in Eurostars are not the ordinary small and medium-sized business. They belong to the niche among SMEs whose expenditure on research is more than ten per cent of their revenue, or where more than ten per cent of their staff are actively engaged in R&D.

In other words, this segment of Norwegian SMEs relies on knowledge as the foundation for their competitiveness. The projects they are engaged in in Eurostars, as well as their ordinary day-to-day business, are thus based on using knowledge to make more money. What Eurostars essentially does is to accept part of the risk by participating and offering funding up to 70 per cent in some cases, and up to 6 MNOK. By taking on some of the risk Eurostars encourages the firms and institutions to find new knowledge, use it to commercialise and take their project to market. And in turn attract alternative investment, so they can hire more staff, grow and contribute to the local economy (Informant 4).

Increasing the growth of individual firms which collectively increases the economy is at the heart of innovation as a growth policy.

In this instance, compared to InnovFin, funding is not an instrument with which to keep firms financially afloat, or to address a funding gap necessarily. However, by offering partial funding on a project basis, the end result is the same. That is new knowledge or know-how which is then commercialisation and can aid in the political goal of expanding economic activity.

Finance in a national system of innovation

The reason Eurostars is administered by the Research Council of Norway, rather than Innovation Norway, is because Eurostars-recipients are fundamentally researching enterprises. Data from Eurostars-1, which ran until 2014, shows that 70 per cent of participants were R&D-performing SMEs, while 15 per cent of participants were universities and other research institutions (EUREKA, 2014).

As pointed out by one of my informants, Eurostars as a programme has a different funding structure compared to Horizon2020 and InnovFin. While the Research Council of Norway (RCN) has a project database publicly available which involves funding sum, it does not distinguish between where the funding comes from, other than that it is indeed a Eurostars-2 project (Informant 4). Coincidentally, approximately 75 per cent of each krone given in Eurostars funding comes directly from the Norwegian government through the RCN. Followingly, the RCN must budget towards Eurostars in each budget period. There are some areas of interest that arises with this approach.

There are no ear-marked funds for Eurostars through the RCN budget in the budget discussions with the Ministry of Trade, Industry and Fisheries. Thus, the amount available to Eurostars-projects on a national level is decided internally in the RCN. This is done because there is to exist a degree of self-governing within governmental agencies. However, there is reason to believe ear-marked funding through the Ministry of Trade would increase Eurostars' ability to fund more projects than it currently is – and thus recoup more international funds at an equal rate. To quote my informant: “The more [funding] we put in, the more we get back” (Informant 4).

Taking into account the innovation for growth policies that have been developed in Norway since the turn of the millennia, it appears paradoxical that the cut-off for Eurostars-2 applicants can be available national budgetary funding, rather than project quality.

In a relatively famous speech for this interested in the topic, Benoît Cœuré (2012) noted that at approximately one third, retained earnings was the main source of finance for SMEs.

Inherent uncertainty in financing innovation

As previously mentioned numerous times, the Norwegian venture capital scene is small (Informant 4). And while the prevailing myth around venture capital is that they love taking risk, they are inherently risk averse. They are risk averse because, while taking risk is how they make money, excessive risk is also a sure-fire way to lose their money, and venture capitalists are not interested in losing money. As my informant (4) also pointed out, R&D-financing takes time. In Eurostars a project can last up to 36 months, and then maximum two years after that until market introduction and commercialisation. In total, the process for a firm can last up to five years (Informant 4). That is more time than most venture capital firms operate with, who often exit an investment after three years.

In this climate, offering stable confines within which the funding is monitored is entirely positive. It also operates as a welcome change from the more exit oriented private risk finance sector, although I am not confident Eurostars or any national entities can offer the same amount of guidance throughout the funding process as a private venture capitalist could.

Path dependence

In Norway there is also an added problem amongst those who otherwise could finance research and development-performing small and medium-sized businesses, which can be explained in path dependency theory. Because of the relative small significance of the Norwegian private financial institutions who could support research and development, they are not particularly adapted to investing R&D (Informant 4). Their experience and competencies are more closely aligned with firms whose domain is offshore; oil, gas, shipping and exploration, as well as property (Informant 4).

As previously mentioned, every Eurostars project requires international cooperation in a consortium. My informant used a very interesting example on South Korean, who participates in Eurostars, where many research-performing SMEs rely heavily on being a sub-contractor to a large conglomerate. In their instance, the reliance on the conglomerate constitutes a weakness in the economy as it is especially prone to cyclical shifts which then reverberates throughout the whole economy (Informant 4). For South-Korean enterprises gaining access to markets outside the peninsula means diversifying their customer base. The parable can also be used on path dependence for Norwegian firms, however. As Norwegian firms cooperate with foreign universities as contractors of knowledge, and firms in other European countries, they establish connections which makes them less reliant upon the Norwegian economy.

Equally true, they gain access to knowledge, and know-how made outside Norway. To take the most obvious example, many Norwegian firms are extremely knowledgeable on oil, gas and offshore issues. By working on projects together with French, German and Italian firms, they gain knowledge and insight into how to operate differently and intrafirm competencies which may steer future project research into different directions than the national norm.

Asymmetric information and moral hazard

While especially the concepts of asymmetric information and moral hazard in Eurostars will be revisited thoroughly in Ch. 5.2.2. under agency theory, it is of such importance I also want to highlight them here (Hall, 2002). The screening process in Eurostars, both on a national and EUREKA-level is specifically created to uncover information which the R&D-performing SME has which the Research Council of Norway and EUREKA-office in Brussels

certainly does not have. In any Eurostars application especially four questions must be answered by the applicants which addresses the asymmetrical information relationship between those who write the applications and the EUREKA-office that decides whether to offer funding or not. The four questions are:

- How will the project be managed and operated, in both the R&D phase and the following commercialisation-phase?
- How will the results from the project be protected?
- How will outsiders to the project, who are not partners or owners in the project, have access to the results?
- And how will the results be utilised in order to extrapolate incoming at market introduction?

There is reason to believe firms are highly likely to provide a truthful representation of their intentions with the funding in Eurostars applications. It would be highly unlikely that all partners and service providers such as universities would feel permitted to be less than honourable in their response. I highlight this because innovative firms often are reluctant to share information about their projects for fear of replication by competitors (Hall, 2002).

Obstacles and the role of the state

A frustration aired by one of my informants was the fact that potentially successful Eurostars applicants in Norway suffers from a paradoxical reason of rejection: they do not have adequate capitalisation. If more than 50 per cent of the initial equity capital in an enterprise is lost, it classifies as an “undertaking in difficulties” (Informant 4). However, as I have shown previously, nascent ventures, especially innovative ones, spend capital at a high rate in attempting to bring products to market. They also face more difficulty in obtaining finance than other firms (Lee et al., 2015). Even after receiving additional investments, small, innovative firms have a tendency to spend high amounts of capital on research and development on their single product or project.

But by doing so, the firm becomes ineligible under European Union law to receive support through Eurostars, or in fact by any public support scheme. The rationale behind the guidelines for government support is that it should be illegal for national governments to

subsidise their own industry, and there is also a point in that public money ought not to be spent keeping unsustainable businesses alive. However, this is not the case in Eurostars. Highly innovative and promising ventures go unfunded because of the nature of their business and the viability of their business plan. In combination with asymmetric information between these undertakings in difficulty and the private financial institutions, or in the case of Norway, the lack of adequate private financial institutions, as well as a generally European reluctance to allow outsiders to take equity positions in their firms, these enterprises go unfunded and face bankruptcy.

In the case of Eurostars, the role of the state must be extended beyond being a financier. It is apparent to me that there are obstacles which are inadvertently put in place, in this case in the form of European-wide regulation, which is currently prohibiting research and development performing SMEs from reaching their potential and provides a real failure on behalf of the governmental systems. Exceptions should and must be made on a case-by-case basis where stringency for undertakings in difficulty is relaxed, allowing potentially important innovatory research activity to be performed.

Equally interesting in Eurostars is that it has absolutely no specified preferable technology, market area or sector in which participants can come from or want to go into. This freedom of choice for the participants provides room for policy intervention by the public policy instrument system. In newer strands of innovation policy academia, government intervention for the common good is lauded (Mazzucato & Perez, 2015; Rodríguez, 2017).

The direction of researchers' education will affect what those engaging in research and development ultimately work on. Consequently, funding more advanced degrees in one area of study and directing potential researchers onto those will be effective at creating researchers who in the future will, as recipients or co-workers on Eurostars projects work in their niche. With the likelihood of one additional chair in sustainable development academia and that person going on to participate in Eurostars being quite low, an alternative is setting a broader agenda policy (Rodríguez, 2017). It is within the governmental policy tool-belt to set agendas to solve grand challenges or put special emphasis on the direction one wishes to go. While any such measures will affect more persons than just those participating in Eurostars, it will also affect them. Mazzucato has multiple times argued for this approach, where mission-

oriented policy set by the State impacts all programmes, and all aspects of public policy-making, in order to reach an ambitious goal (Mazzucato et al., 2015; Mazzucato et al., 2017).

Crucially, the agenda-setting approach is an important tool of influence for Norway, and other European nations because of EU-wide and national rules influence by the Union which pertains to rules surrounding government support for enterprises.

5.2. Analysis 2: a principal-agent view of the programmes

This second part of the analysis shows, using agency theory, some problems that might arise with the implementation of InnovFin and Eurostars in Norway. In these large, international programmes there is not one principal, and not one agent, which further adds to the complexity of relationships among the different actors and the principal. Shove's (2000) work on programmes in agency theory highlights these difficulties, but I also address the costs on behalf of the principal that arises due to goal conflict, the adverse selection of partners, the moral hazard involved in all the relationships within the programmes, and the discussion of trust – and how it is based on nearly half a century of multi-national cooperation.

5.2.1. InnovFin in principal-agent theory

Introduction

The key task of InnovFin is to provide funding for enterprises which will use the money to create growth through innovation. As it is operated collectively by the European Investment Group which consists of the European Investment Bank and the European Investment Fund. In this relationship the EIG will be referred to as the principal, but distinctions will be made when it is exclusively the EIB or the EIF the issues pertain to. The EIG is the principal in relations where the financial intermediaries as well as single firms are the agents. However, because of the importance of the intermediary organisations, their role in the relationship must be discussed further (Braun, 1993).

Principal-agent problems occurs in InnovFin because the European Investment Group, and the European Commission in particular, for European firms to innovate, because they are not in a

position to innovative in the same way themselves. As Braun (1993, p. 137) wrote, they are dependent on the action of someone else. Equally so, the agents are reliant upon the principal for funding to pay their researchers' wages, new expensive equipment and expenses and agrees under contract to spend the funding according to the terms set by the principal.

But in the case of InnovFin Innovation Norway plays a particular double role as the financial intermediary in the products currently signed and offered in Norway. For direct InnovFin products the European Investment Group is the principal and the final recipient firms are the agents, such as the debt financing deal signed by Viking Heat Engines with the European Investment Bank. But as discussed previously the InnovFin SME Guarantee Innovation Norway acts as the intermediary for both innovative firms through the *Innovation Loan* where recipients are the agents. Additionally, the InnovFin SME Counter-Guarantee which backs up the *Growth Guarantee* programme turns the three participant banks into intermediaries. In that case the final recipients, the agents, receive debt financing from the bank. Therefore, there is a complexity to the relations between principals and agents in the Norwegian InnovFin product scene that requires particular scrutiny.

Goal conflicts

In order to look at potential goal conflicts we must look at the stated and probable objectives of each principal, intermediary and agent. Naturally, not all participants publicise their goals, and even when that might be the case, a contextual questioning of the validity of those statements can be undertaken.

The European Investment Group, consisting of the EIF and EIB does not in themselves have policy goals. They are instruments under which the European Commission can perform a variety of financial institution services. Equally true on a national level, Innovation Norway does not decide its own policies, but are wholly owned by the State and managed under the Ministry of Trade, Industry and Fishers. Henceforth, the initial goal conflict evaluation is between the European Commission, whose stated goal represents the European Union's stated goal, and the Ministry of Trade, Industry and Fishers, whose policies are the representation of the Norwegian government's policy goals.

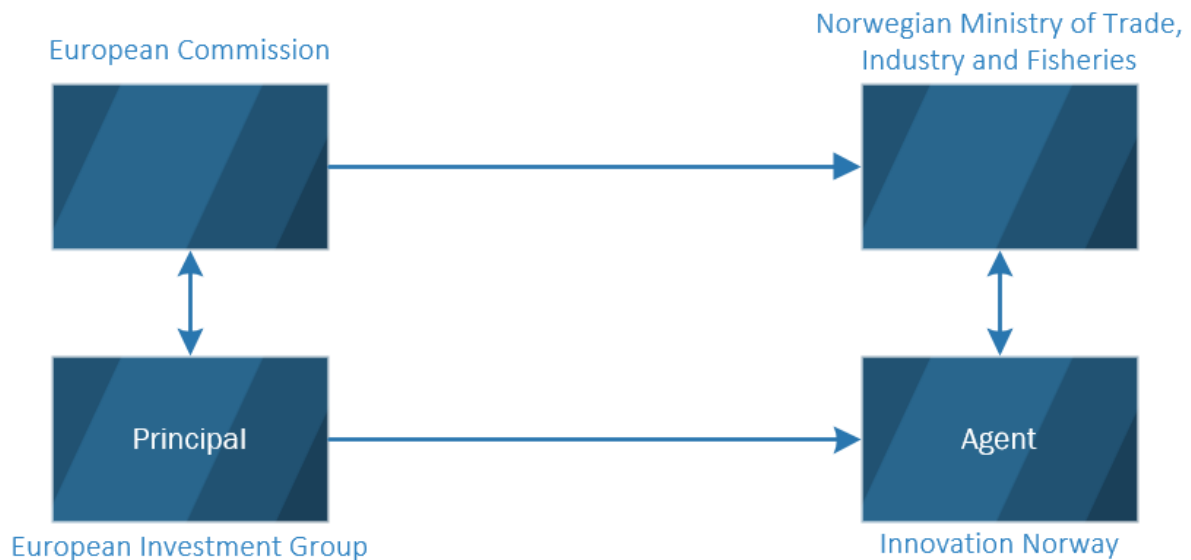


Figure 5.2. The relationship between the European Union and the Norwegian government in relation to their financing and innovation representatives.

The overall goal of the European Commission and the EIB group for Horizon 2020 is to “pursue[...] ambitious objectives, including jobs, growth, and better lives for Europe’s citizens[...]” (European Commission, 2017a, p. 3). And the goal of InnovFin is to address the funding gap that exists for innovative businesses in many sizes and forms, as well as the thematically addressed instruments of finding cures for illnesses and creating a greener energy sector. As such, the goal of InnovFin is to address a subsidiary objective of Horizon 2020. Fundamental in the European objectives is that they are not nation-specific. Norway, on the other hand, has both a publicly stated national strategy and objectives for innovation, as well as objectives for participating in Europe-wide innovation programmes.

On the first topic, there are numerous public reports on how the policy instrument system and the government are to encourage research and innovation amongst Norwegian researchers and firms, in order to create jobs, growth and ensure competitiveness, also in the future. But perhaps the most easily identifiable single policy document within which priorities are made is the national budgets for each year. In the communication surrounding the Norwegian national budget for 2018, there is added emphasis on precisely this. The focus is on higher growth, lowering unemployment, and creating a sustainable society, in Norway (Finansdepartementet, 2018).

As there are inherent differences in areas of interests, where the European Commission is preoccupied with all European countries and the self-preservation of their institutions and

peoples, the Norwegian policies reflect primarily a Norwegian-centric point-of-view wherein Norwegian citizens and enterprises are of importance. In this instance there are inherently only overlapping interests (Van der Meulen, 1998).

At the same time, the Norwegian government policy on European affairs is to a lesser degree conflicting. In the Strategy for Research- and Innovation Cooperation with the EU there is a strong emphasis on synergies that can only be obtained by following the policy initiatives of the European Union (Kunnskapsdepartementet, 2014a).

But goal conflicts exist on all levels in the principal-agent relationship (Rasmussen & Gulbrandsen, 2012). Within the InnovFin SME Guarantee deals signed, which is used to increase lending through Innovation Loans and the Growth Guarantee, the relationships are different. For the final recipient, the firms, the European Union, Commission, and the EIG are not relevant actors. In their case, the funding comes from Innovation Norway or the banks which are guaranteed by Innovation Norway. Through the Innovation Loan instrument Innovation Norway is able to contractually govern the agent, the final recipient, by requiring the agent to use the funds in an agreed upon way. The principal uses contracts because the agent to a large degree can have conflicting goals than the lender. The contract ensures the goal conflict is aligned sufficiently with sanctions written into the contract if misappropriation of funds occurs.

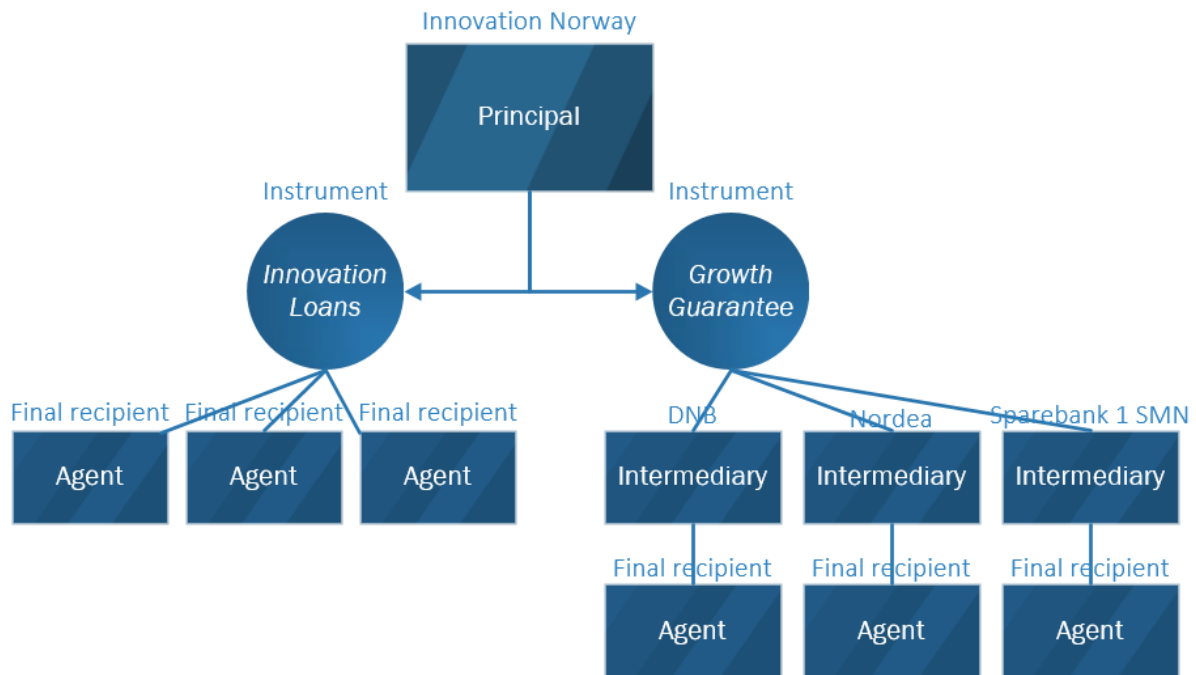


Figure 5.3. A principle-agent overview of how the InnovFin SME Guarantees signed in Norway reach the final recipients.

In the case of the *Growth Guarantee*, the role of the intermediary banks become relevant. It is of course difficult to specifically conclude what the goal of each final recipient is, however with the financial institutions, the intermediaries, it is easier. Each bank is a large company, and they have a fiduciary responsibility to increase shareholder earnings. Increasing shareholder earnings is principally done by increasing profits and reducing costs. Innovation Norway made reducing reporting and monitoring costs on behalf of the banks a priority, by accepting to perform those tasks in-house (Informant 1). Therefore, the goal of the bank is for the final recipient to repay all of the loans with interest. With this conclusion in mind, the setup of the *Growth Guarantee* specifically ensures a minimisation in goal conflict. The proxy performs tasks that are close to their core areas of business, lending, while fulfilling Innovation Norway's goal of increasing lending to small and medium-sized enterprises.

Adverse selection

Another key problem in agency theory is that of adverse selection, which means the principal has difficulties selecting the most appropriate agent (Guston, 1996). The problem arises because the principal has insufficient information about all the available agents or is inexperienced on the specific market or sector in which the agents operate. Obtaining that

information is also costly and time consuming for the principal. Throughout Horizon 2020, and therefore also InnovFin, the problem of adverse selection is initially solved through the use of National Contact Points. In Norway National Contact Points are employees of the Research Council of Norway, Innovation Norway, and also the Norwegian space Centre.

In the age of digital banking, a house loan can be granted in under a day. However, being granted debt or equity finance from Innovation Norway through one of their national instruments can take up to a year (Informant 1). While there are many processes which go on during that year, a key piece of work is the due diligence into what the recipient firm does, what their market position is, and based on that whether or not to fund their venture. And the Research Council of Norway knows the R&I-performing companies and research institutes better than any other public institution in the country. When performed in-house the due diligence performed by the EIG takes up to six months, and consists of researching the project eligibility, the technical viability of the project, the social and environmental impact, as well as the financial situation of the agent. By using the National Contact Points, the European Investment Group reduces the cost of finding agents whose goals are aligned with those of the Commission.

However, the European Investment Fund and the European Investment Bank also deals directly with final recipients for products. While the Viking Heat Engine debt financing instrument is the only one used as direct funding for Norwegian enterprises so far, more will be signed in the near future (Informant 1). Typically, the larger the deal, the more the instrument is signed directly with the final recipient, the agent. Because these deals, in Viking Heat Engine's case €300 million, are so large, the relative cost to uncover the correct agent with which to engage with is smaller. In other words, the due diligence is less costly relative to the size of the loan. If the EIG were to deal directly with every small recipient of debt financing, or every final recipient of venture funding through the InnovFin Venture Capital instrument, it would require a substantially bigger organisation. In smaller engagements, the National Contact Points are used for guidance, working alongside the EIG in different aspects of the due diligence to reduce costs on behalf of the principal.

Crucially, the concept of adverse selection is in existence before any contract has been signed between the principal and the agent (Guston, 1996). Unlike in the case of goal conflict, the principal cannot make contractual assurances on behalf of the agent that it is the most suitable

agent among the plethora of competitors fighting for funding. But another piece of pre-deal work that is done to attract and choose the best agent is done through advertising and information campaigns. The extensive and thorough information found both on European websites on Horizon 2020, and InnovFin, as well as Norwegian policy instrument system websites aide the principals in drawing in first of all a multitude of agents to select amongst. And by the virtue of what the information the principals project actually contains, a self-selection is made by the agents. That can help ensure the best suited agent applies.

Theoretically, the concept of adverse selection implies that there could always be a possibility, even once an agent has been selected, that another agent is in existence which could provide a result more aligned with the goals of the principal. Ergo, adverse selection is practically endlessly costly to uncover fully. Albeit not perfectly knowledgeable, Innovation Norway has a good reputation for its contacts with the business sector in Norway, especially those for whom InnovFin is relevant (Informant 3). This familiarity is perhaps the most useful, and cost-saving way for the principal, both when it is the EIG and Innovation Norway themselves, to address this issue.

Moral hazard

Selecting the most appropriate agent is important because selecting an agent who does not act according to either the preferred goals of the principal nor the contractual obligations upon which the funding was awarded can be very costly to the principal. In finance theory the concept of moral hazard is particularly prominent. The vast majority of the responsible persons in the EIG, and probably also in Innovation Norway will then be very familiar with its significance in being able to cause great havoc in a principal-agent relationship. Moral hazard is essentially cheating on an agreement on behalf of the agent, due to the information asymmetry that exists between the principal and the agent. While there is no public information on the amount of cheating in InnovFin in particular, and especially in Norway, on behalf of final recipients, I shall instead draw your attention to the conceptual basis on which cheating is prevented by the principals.

Moral hazard occurs when the agent has an incentive to cheat on the agreement, within the confines of the legal room the agreements between the principal and the agent. If that is the case, is not only rational, but incentivised that the agent should cheat. Thus, moral hazard is

not the result of perfunctory agent, but rather a reasonable utilisation of an obfuscate agreement and relationship. Accordingly, the most effective method for avoiding moral hazard is to ensure there is no such room for moral hazard to occur at all. That is why professionals work tirelessly to make sure legal repercussions will take place if an InnovFin deal is cheated upon. Specifically, both Innovation Norway in their InnovFin-funded programmes, and the EIG are extremely competitive programmes where the selection is based on the accountability of the applicants. Once funding is awarded there are also monitoring systems in place, which is especially important as InnovFin- and Horizon 2020-money is originally public tax-payer funds from the individual nations.

The question that then remains is, why is this relevant in principal-agent problems under InnovFin? In reality, moral hazard in terms of actual cheating, misappropriation of funding and intentional shirking is not believed to be particularly common among professional enterprises and institutions dominated by researchers, public institutions and so forth. But the concept explains perfectly why there are such advanced monitoring systems, and follow-up from national and European agencies, no matter how fastidious it may seem.

Trust

The reason National Contact Points works is because there is an element of trust between the principal and them. There is an absence of the usually high level of tension that exists in a principal-agent relationship because of the omnipresent issues of adverse selection and moral hazard (Gulbrandsen, 2005). That must be attributed to the intangible concept of trust that exists between policy instrument systems on a national or supranational level. And as Gulbrandsen (2005) has pointed out, trust is a likely replacement of costly monitoring systems to prevent moral hazard. However, trust is merely the result of an accumulation of positive experiences. Between nation states, or between supranational entities and the member countries which constitutes it, trust remains a key element for reducing costs associated with monitoring one another. Those who sit in committees under different priorities in Horizon 2020, and who regularly have contact with all other member nations are in no doubt that the Norwegian policy instrument systems are seen as capable and professional (Informant 3).

The long-standing and incomplete monitoring relationship that Van der Meulen (1998) is referring to suits relatively well to that of European funding in Norway. Agents are likely to

act in a trustworthy manner because they know there will be another chance of receiving funding, and there will be another Framework Programme in which they want to participate and receiving funding from. Trust, in this case, is a projection by the principal of what he wishes to expect from the agent over time, but also becomes an ideal. The ideal is the idea of how the agent thinks he should behave in order to continue to enjoy the trust of the principal.

Programmes

A point that the Commission themselves likes to advertise is the added value of research and innovation activity and funding organised through Horizon 2020, and in the programmatic fashion which is it today. In the most thorough evaluation of Horizon 2020 to date it is argued that: “Horizon 2020 produces demonstrable benefits compared to national and regional-level support to R&I in terms of scale, speed and scope [...]” (European Commission, 2017a, p. 11). This notion of additionality is a key contention in organising in programmes, which Shove (2000) also has argued. Thereby, organising in programmes “promise to ‘add value’ such that the resulting combination of projects is more than the sum of the parts” (Shove, 2000, p. 371).

In this instance, both InnovFin and the debt financing instruments offered by Innovation Norway are programmes which help the respective principals reach their goals. As a means to provide added value, InnovFin has been lauded by the evaluation as performing sufficiently to the task (Panteia et al., 2017, p. 12). The added value of the SME Guarantee which Norway has signed is that it allows the financial intermediaries to enter new markets which they previously considered too risky (Panteia et al., 2017, p. 13). In other words, the principal has, by using the programme, modified the actions of the agent to make choices it would otherwise not make, but is doing so because it is incentivised.

5.2.2. Eurostars in principal-agent theory

Introduction

The role of the Research Council of Norway in Eurostars is fundamentally different to Innovation Norway in InnovFin. Highlighting principal-agent problems in the Eurostars

cooperation in Norway is in many ways simpler than InnovFin, there are fewer instruments, components and intermediaries. But the role of the RCN is also more obtuse, where in some cases it is a fully-fledged intermediary whose role clearly impacts the relationship between the principal and the agent, and yet it also has no real decision power through which it majorly affects the principal.

First, a clarification is necessary of the role of the principal, EUREKA, and the intermediary, RCN, in this relationship. All final funding decisions are made by EUREKA, even though, in the case of Norway, only approximately 25 per cent of the total project funding is EUREKA and EU money. The role of the intermediary, the National Project Coordinator (NPC), is predominantly to support applicants through the process, and upon application delivery send a confirmation to EUREKA that the enterprise in question is Norwegian and qualifies to receive Eurostars in Norway (Informant 4). The latter part of that is of interest. Because of the funding structure of EUREKA requiring direct funding with national support from Norway, and indirectly the NPC. Without the seal of approval from the intermediary, the applicant is unable to even apply.

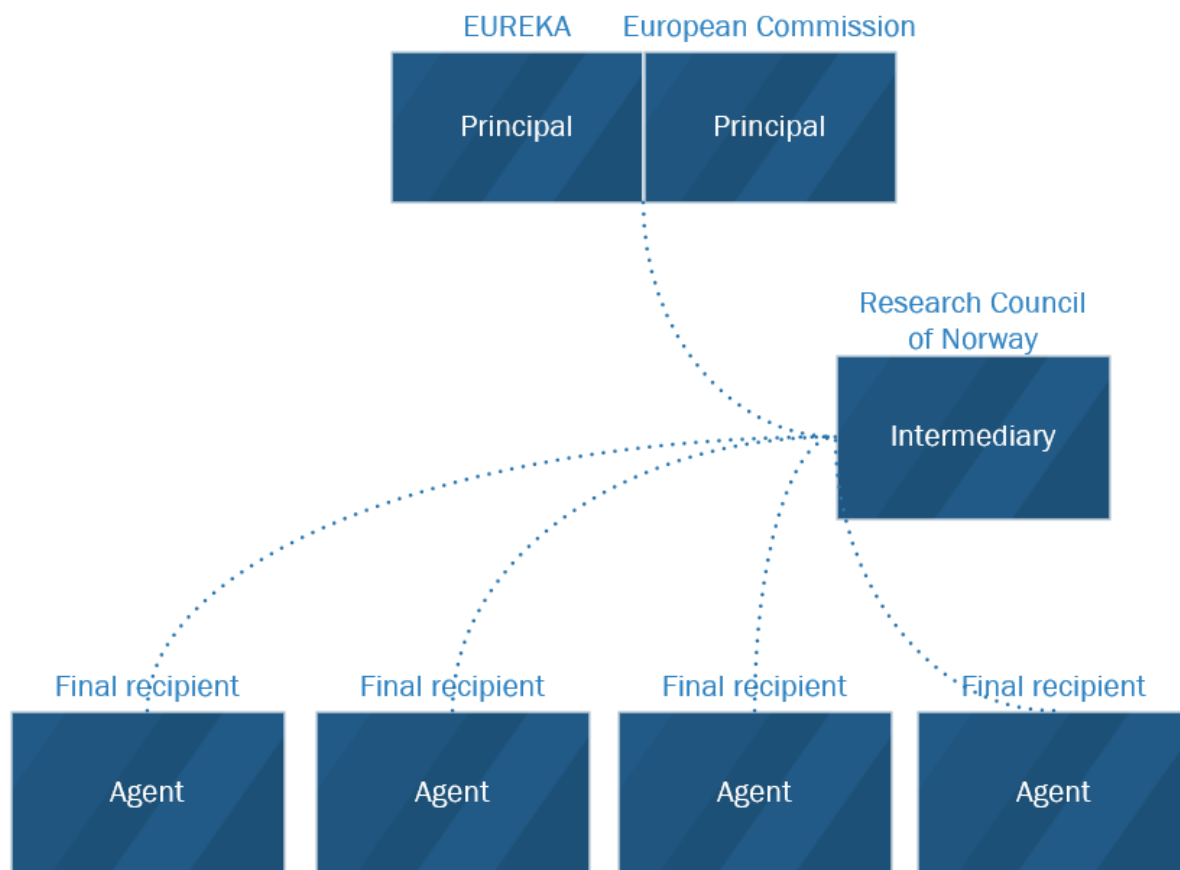


Figure 5.4. The normal role of an intermediary agency in a principal-agent framework.

The figure above, Figure 5.4., illustrates this relationship, and is normally the hierarchical setup of an intermediary in a national setting. The RCN has been delegated the responsibility to intermediate on behalf of the government and should be viewed as the extension of the State. But the RCN is not a principal in this conceptualisation. The RCN does not fund the final recipients, and except for when it decides there is no longer a budgetary possibility to acknowledge the final recipient is eligible for national funding, it does not make the funding decision on basis of the application.

Because of this important distinction, the intermediary role of the RCN is different than the model represented in Figure 5.4. Instead there is a dual relationship where the agent deals both with the principal and the intermediary, as represented in Figure 5.5. In this type of relationship, the intermediary has more of an enabling and authorising position than as part of a traditionally principal-agent theoretical role to reduce asymmetric information, even though that too is affected.

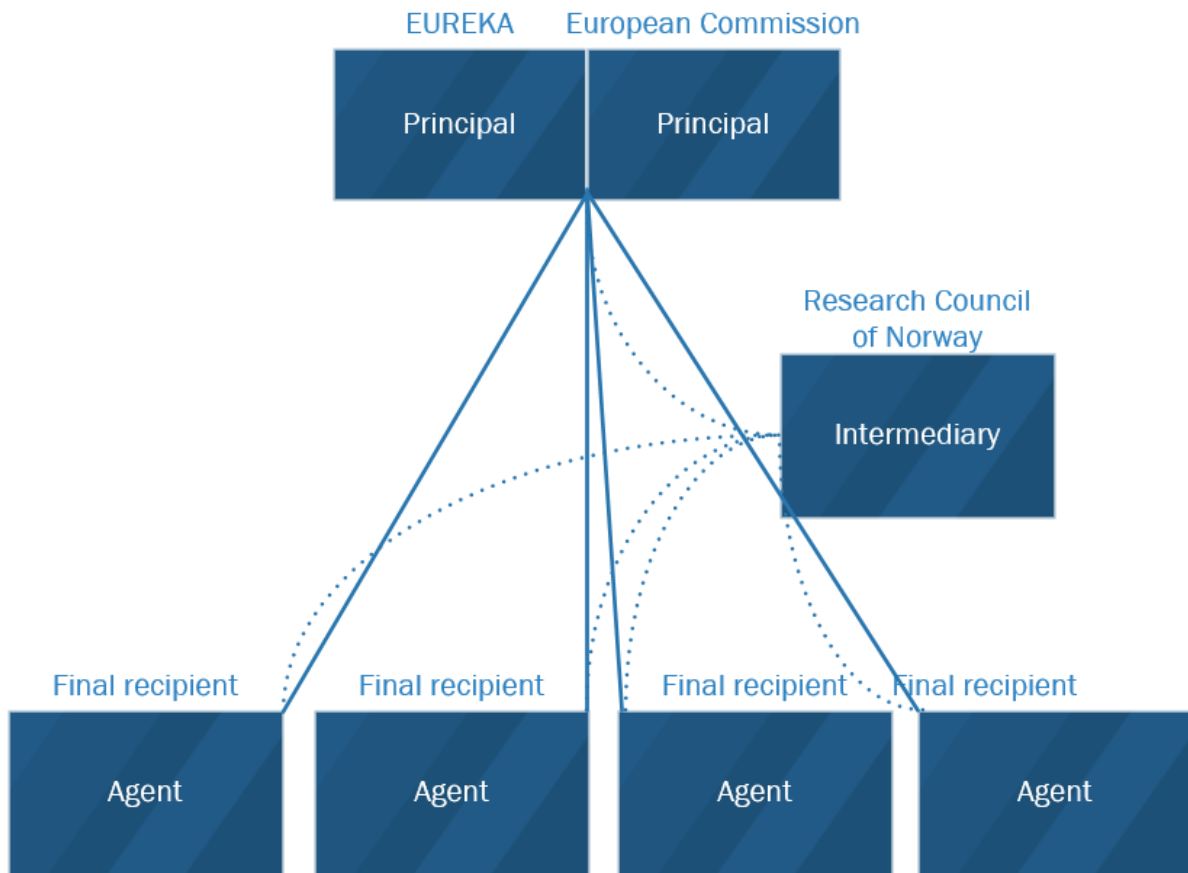


Figure 5.5. The most accurate representation of Eurostars relationships with the services of the intermediary in a principal-agent framework.

Goal conflicts

Much of the work on avoiding the presence of a goal conflict in Eurostars is done by leaving the overarching goal relatively secondary in the programme. Eurostars is fundamentally in place to ensure research and development-performing can obtain financing for the projects they themselves want to do. This is referred to as a bottom-up method of organising the programme, and results in specific applications for projects for which funding is either granted or not. Naturally, the goals between the principals and the agents deviate on the level with which emphasis is placed. The principal organises to increase knowledge creation in the member countries, and cooperation between project participations across borders. Whereas the agent is both obligated, and likely naturally inclined to first and foremost be preoccupied with the well-being and future prospects for the enterprise. At least more so than a grand vision of being a participant in a system where employment and economic growth are important indicators and results.

Minimisations of goal conflict is ensured by letting the real goal of the principal come as a consequence, and be subservient, of the goal of the agent. In this way, it would not be necessary for EUREKA to have any explicitly stated goals, because the agents are not more inclined to act differently by knowing the goal of the principal. And while the agent does not have a *carte blanche*, and the freedom to pursue the goals it might have, the goal deviation is relatively less significant thanks to the bottom-up approach. The notion of self-serving goals on behalf of the agent also fulfilling the goals of the principal leads to a relationship where there is a decreasing necessity of outcome-based contracting (Eisenhardt, 1989, p. 62).

Adverse selection

The monitoring systems in Eurostars meant to address adverse selection is relatively straightforward. The agent must first ensure eligibility through contacting the RCN, the intermediary, who both helps establish whether it is indeed viable to pursue funding from EUREKA and the RCN. Naturally, as in any effort to uncover adverse selection, both the principal and the intermediary incurs a cost by sifting through the agents, some of whom will be rejected, but mainly the screening process is done to ensure project viability, and end-commercialisation (Informant 4).

The Research Council of Norway has a duality in its role in combatting adverse selection. First of all, as a national entity with whom research and production-performing SMEs are in frequent contact, they know the market better than anyone. This allows them to know which recipients are likely to be plausible candidates. Noticeably, the cost of decreasing the information asymmetry between the principal and the agent is not born by the principal, but by the intermediary, and by extension the Norwegian state. The monitoring system is in this context the cost for the intermediary in order for the principal to participate. It is not unlikely that if the cost was not born by the intermediary, the principal would not be inclined to offer its services.

However, the RCN maintains absolutely everyone that contacts them pursuing Eurostars funding will be guided (Informant 4). Secondly, there is a threshold whereby the RCN have to make priorities based on project quality. Due to the nature of the funding, where approximately 25 per cent comes from EUREKA and the Commission, and something akin to 75 per cent comes the RCN budgets, and therefore the national budgets of Norway, not

everyone can be approved. Unfortunately, that means some otherwise perfectly good projects are rejected. Albeit, not because of an information asymmetry between the intermediary and the agent.

Moral hazard

Once a project receives funding through Eurostars, it is not a shut case for the principal and the intermediary. A crucial part of the work done by the RCN in Eurostars in Norway is following up the projects to ensure the previously mentioned deadlines of 36 months, and 24 months later market introduction points are met (Informant 4). But the RCN are unable, and probably unwilling, to follow the firms who receives funding apart from the specific projects on which the funding is based. I say this because in insurance theory moral hazard equates to increasing risk exposure while insured by another party. Transferring this to the SMEs who receive financing through Eurostars, there is an existing likelihood of issues such as bankruptcy, cyclical trends leading to different projections of income than in the inception of the project. The running of the firms is therefore a key area of interest to the principal, as well as ensuring the project is viable financially.

As previously alluded to, monitoring is the most effective way to ensure moral hazard is kept out of the relationship. Again, all of the monitoring after the final funding decision is made by the principal, is taken on by the intermediary.

Limitations

There are, of course, limitations to principal-agent theory, as there are with any representations of reality. While the framework offers some key insight into both InnovFin and Eurostars from different policy perspectives, and it shows the work implemented to ensure the entire hierarchical system moves towards a common goal, and where deviations from the explicitly stated goals are kept minimal. But, as in any theoretical representation the reality is immensely more complex. Relationships cannot be defined within organisations, but on an intrapersonal level, which makes up all organisations. Personal motives and irrationality makes individuals act different than what is expected within their organisations. However, the Framework Programmes have been running for decades now, and Eurostars for more than ten years. The realistic minimisation of goal conflict, asymmetric information, adverse selection,

and moral hazard are dealt with in risk assumptions, which while are based on realistic expectations, are difficult to model. Financing innovation is a fundamentally risky endeavour, and while principal-agent problems show what might happen, and what might help in keeping the agent aligned with the principal, human behaviour is erratic and incalculable. The same individual emphasis that has been of such importance in innovation and entrepreneurial theoretical foundations, are missing when principal-agent is applied to these complex organisations.

6. Discussion and conclusion

This final chapter will first offer a concise discussion on the role InnovFin and Eurostars plays in the context of the Norwegian-European finance ecosystem. Additionally, in brevity, a reflection of the study's ability to productively answer the research questions with a critical outlook on improvements in both the theoretical framework and the methodological approach. Before some concluding remarks, I also wish to convey some policy implications suggest by my study for both the European Union and Norwegian decision makers.

6.1. On the Norwegian-European innovation finance ecosystem

Norway has a small, but to a large extent well-functioning capital market (NOU 2018:5, 2018). A lot has been said, written and theorised concerning the reasons for why there are so few highly valuable entrepreneurial ventures in Norway. Seemingly, the majority of those who voice their opinion on why emphasise a lack of risk taking venture capital, as shown by Kortum and Lerner (1998). That context has definitely been used to explain the meteoric rise of high-technology start-ups in the US, and the lack thereof in Europe. Recent contributions, instead focus on the type of capital, rather than the quantity available (Mazzucato & Perez, 2015).

In the case of Norway, a significant portion of venture capital is public money. Either through Innovation Norway or directly owned companies by counties, regional ventures, or the Ministry of Trade, Industry and Fisheries. On one hand, this allows the public capital to be easily influenced by policy decisions, meaning it is responsive to the type of mission-oriented policies which are becoming more and more popular among policy makers, and are championed by influential innovation academics like Mazzucato. On the other hand, because the European capital composition, in countries like Germany, France, and the United Kingdom, is so different to the Norwegian one, it means programmes and instruments designed for the whole European Union do not necessarily fit perfectly to the environment in which it is meant to operate. This is also a notion which the Union has drawn criticism on in the past (Fagerberg, 2015).

Even taking into consideration that the Norwegian venture capital and innovation financing sphere is relatively small, InnovFin and Eurostars is not a particularly sizable contribution compared to the economy as a whole. However, for the individual firm whose project funding is reliant upon the EU-programmes, it is crucial. Foreign financing has been of vital importance for Norwegian innovative companies for more than a century (NOU 2018:5, 2018). Norsk Hydro is arguably the most prominent firm, whose innovations created a Norwegian industry that still survives to this today, who relied on Swedish, French and American financing in its early stages. In particular, the reliance and importance of EU-financing to the individual firm is a field which deserves further research, and recognition. This is especially interesting as there needs to be a broader discussion on which programmes Norway ought to participate in.

This has not been a comparative study of which of InnovFin and Eurostars is objectively better at providing financing for Norwegian innovative firms. However, that is an interesting line of enquiry. To date Eurostars has been able to fund more individual firms than InnovFin has in Norway. But in defence of InnovFin, it will continue to offer debt financing for years to come. And in essence, InnovFin is not what Norway is participating in Horizon 2020 for. The programme offers vastly more than risk finance, addressing the whole value chain of what contemporary innovation scholarship considers important.

In many ways, participating in Horizon 2020 has become unavoidable for other reasons than innovation. Firstly, it is a programme to which there is attached a great deal of prestige, which means a potential net loss of contingent investment due to poor Norwegian participation, that is not likely to affect the probability Norway will participate in future Framework Programmes too. Secondly, that is to the detriment of other, smaller, programmes. Although Eurostars offers knowledge intensive enterprises funding to pursue their projects, an argument can be made for why such programmes can either be implemented into more prestigious programmes or abandoned altogether.

6.2. On the research questions

Throughout this study, I have attempted to answer two research questions. The first of which is: why do Norwegian policy makers wish to provide and offer InnovFin and Eurostars financing to Norwegian innovative enterprises? Asking why may appear to invite convergence, but I am more interested in illuminating reasons for why InnovFin and Eurostars are attractive programmes to participate in. Specifically, whether the basis for offering the programmes to Norwegian enterprises are based on economic and innovation theory. The research question is fundamentally inquisitive into the realm of Norwegian innovation financing, and what warrants participation in the two programmes. In order to appropriately address the research question, I have used innovation theories such as innovation as a growth policy, wherein I have shown that innovation can either be ‘a’ growth policy, or ‘the’ policy. I have showed that inherent uncertainty, which is normally applied to innovation in general, although I use it for innovation financing in particular. I have illustrated the role of finance in a national system of innovation and argued for why InnovFin and Eurostars should be regarded as reasons for why there is a shift towards a multinational innovation system.

The second research question is: how is InnovFin and Eurostars implemented in Norway? The implementation of any multinational programme requires infrastructure and organisations which cooperate in order to make the programme functional and productive. In Norway the practical aspects of programme implementation have been awarded to Innovation Norway and the Research Council of Norway. Both to illustrate how the two programmes work, and the problems surrounding their implementation and operationalisation, I have used principal-agent theory. While clearly a conceptualisation and not an accurate representation of reality for those whose occupation it is to implement InnovFin and Eurostars in Norway, principal-agent theory shows unambiguously the problems that may arise in the relationship between the parent organisations and the Norwegian intermediaries. But it more importantly it shows how those problems are dealt with. Interestingly, the two programmes have different practical solutions to minimise problems, which has helped offer fruitful analysis of their workings.

Both research questions have been addressed by collecting data by interviewing key persons at all relevant national institutions. It has been a demanding process, but possibly also the most practically rewarding. It placed me in positions I had not suspected I would find myself

in, but also allowed me to reflect on the process as it was ongoing. Additionally, a large source of information has been key documents produced by national and multinational entities, which has been intriguing to compare, while also revealing extensive information. It is my firm belief that I would not have been able to answer any of the research questions at hand, had I not employed both methods of data collection.

6.3. On policy implications for future EU initiatives

Norway is not very different from other European countries in terms of which InnovFin instrument it most prefers. European decision makers need to find out whether this is because of the superiority of the SME Guarantee, or the other instruments' poor design and implementation.

The composition of InnovFin instruments put to use by Norwegian innovative firms will in all likelihood change within the remaining duration of Horizon 2020. A similar study as this done in 2020 will most likely find that there has been an increase in even more debt financing instruments used in Norway, particularly larger ones done directly with the European Investment Bank. But, in all likelihood also smaller debt financing deals via Innovation Norway. InnovFin is incredibly complex, and requires the entire national apparatus to pull towards a common goal. If the EIG and the Commission wants to see more equity financing deals signed, there will need to be a large shift away from the funds to the individual deals, perhaps something akin to the Eurostars system implemented through Innovation Norway.

As previously mentioned, the amounts of firms whose business model appears to be more modern than the European Union rules and regulations are suffering from a perplexing reason of funding rejection. The undertakings in difficulties regulations does not need to be removed as a whole, the purpose of it is to prevent moral hazard and does that well. However, it does not take into account the nature of contemporary innovation business models, which burns through cash very quickly because being first to market is among the most important assets a firm can have.

Finally, the recurring theme of European Union criticism, to the point of obscenity, is the difficulty in creating policies that fits equally well into all four corners of the Union. Granted,

this is more of a lamentation than a policy recommendation, as I am quite confident there are few things surrounding innovation that have kept EU law makers and bureaucrats awake the last decades than precisely this.

I think Jan Fagerberg (2005, p. 14) put it best:

[...] since the factors that influence innovation differ across industries, policy makers have to take such differences into account when designing policies. The same policy (and policy instruments) will not work equally well everywhere.

6.4. On policy implications for Norwegian decision makers

It is apparent that not being a fully-fledged member of the European Union is not particularly beneficial with regards to Norway's policy impact on Horizon 2020 and future Framework Programmes. Because of Norway's status as an associated member, any potential impact on future Framework Programmes must be brought forth before its inception, as Norway cannot affect any part of the programme while it is in effect. While I certainly do not wish to engage in a discussion on whether Norway ought to be a member of the European Union, it is apparent that the outsider status has some implications for Norway. Shaping any part of Horizon 2020 requires meticulous planning beforehand, up to three years in advance, as confirmed by two of my informants. It is equally true that in the economic climate of today, when entire markets can be created and suddenly constitute a sizable economy in and of itself, Norway is not able to affect processes of importance within the European Union which particularly pertains to the Norwegian economy.

Eurostars is not utilised to its fullest extent in Norway, however in this case the issue is entirely of Norwegian policy makers' own making. In a society where there is an increasingly bigger focus on research, innovation and knowledge-creation, it would seem to be an easy policy prioritisation to increase funding to the Research Council of Norway specifically designated for Eurostars. Especially when that emphasis is pushed by the very same policy makers who decides the RCN Eurostars budgets. And for once in innovation policy making, the equation is rather simple: for every million kroner added to the national Eurostars budget

specifically for funding, European funding will increase with two-hundred and fifty thousand kroner (Informant 4).

As previously alluded to the perception amongst the policy instrument system might determine future participation in Europe-wide innovation programmes. Ultimately, decisions made by policy makers in Norway has the ability to strongly impact Norwegian innovative firms' possibility to obtain foreign public financing. The decision to discontinue participation in the COSME programme shows that budgetary priorities will continue to be a determinant of Norwegian participation in innovation programmes. However, as Framework Programme 9 comes closer to fruition the decision looks less and less likely to be of great importance. Future EU programmes are heading in a direction of being compounded into ever larger programmes swallowing the smaller programmes into it. Whether that is a good idea is another debate entirely, as several smaller programmes are currently performing sufficiently well, albeit perhaps lacking the necessary publicity.

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