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# European Innovation Policy through the European Regional Development Fund

A case study of East-Netherlands

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Master Planet Europe  
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## Summary

In this study is analysed how the ERDF (European Regional Development Funding) in East-Netherlands approaches innovation and how this approach is shaped and complemented by European, national and regional policy. This is done by analysing how the targeted intervention approach and the institutional approach are used in the ERDF and adjacent policies. The two approaches are both based on a different argument on how innovation policy makes an impact. By doing this the study contributes to the analysis of European policy and it empirically applies concepts used in theory on innovation and regional economic development. This gives policy makers input for the development of innovation policy and especially for the development of European policy post 2020. For academia this study shows theoretical gaps in the concepts applied and provides suggestions for further research on these concepts. The study concludes that ERDF funding in East-Netherlands is strongly based on the targeted intervention approach. The use of this approach results from the governance structure under which ERDF is implemented. The EU 2020 strategy has been influential in the final shape of the policy, while the national level has a less important role. Innovation policy at the regional level complements the ERDF policy because it is also based on concepts from the targeted intervention approach. The institutional policy implemented at the European and national level has weaker links with the ERDF programme.

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*Ewout Dam*

*The Netherlands, June 2017*

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# Abbreviations

CEU	Council of the European Union
CoR	Committee of the Regions
ERDF	European Regional Development Fund
ESI fund	European Structural Investment Fund
ESF	European Social Fund
EP	European Parliament
EU	European Union
GS	Gedeputeerde Staten
LSE	London School of Economics
NIS	National Innovation System
NRF	National Reform Programme
NWO	Nederlandse Organisatie voor Wetenschappelijk Onderzoek
OP	Operational Programme
Operational Programme	Referring to the ERDF Operational Programme of East-Netherlands
R&D	Research and Development
RIS	Regional Innovation System
RIS3	Regional Innovation Strategy Smart Specialization
S3	Smart specialization
SMEs	Small and Medium enterprises
TKI's	Topconsortia voor Kennis en Innovatie
TRL	Technology Readiness Level

## 1. Introduction

In the last two decades innovation proliferated as a research topic in social and economic research. The percentage of scholarly articles talking about innovation has significantly increased. Before long-run economic change was studied mostly by looking at capital accumulation and the functioning of markets (Fagerberg, 2005). The popularity of innovation as a policy objective has risen correspondingly. This has been caused by an increased focus on the importance of technological innovation for long-run economic growth by scholars and also increasingly by policy makers (Edler & Fagerberg, 2017). Moreover, increasing globalization and international competition have increased the importance of innovation for policy makers. There is the fear to be less innovative in comparison to other countries and regions, which would cause a loss of economic welfare in relation to these competing countries and regions.

In the same way this can be seen in the strategy the European Union (EU) adopted in 2010. The European Commission identified in this Europe 2020 strategy that the EU has lower growth rates compared to its main economic partners. Moreover, the competition from growing economies in the rest of the world is increasing. According to the Europe 2020 strategy, smart growth is necessary to increase economic growth and to stay competitive in the global economy. According to the EU 2020 strategy to achieve this the EU should develop its economy based on knowledge and innovation (European Commission, 2010).

Empirical research has shown that factors such as knowledge, skills, financial resources and demand for technology are important for innovation. When the market does not provide these factors sufficiently there is a system failure. From this idea that the system can fail in providing the necessary input for innovation, the system of innovation approach has developed (Edler & Fagerberg, 2017). This approach considers innovation as a dependent variable resulting from a system consisting of links between factors such as knowledge, skills, finance and production (Fagerberg, 2005; see chapter 3 for a more detailed definition).

From this concept of the innovation system a European policy method developed. This method was based on the idea that regions need to construct their own regional advantage. By actively improving the innovation system a region would be able to increase its competitive position (European Commission, 2006). It developed into a method where the government prioritizes specific sectors in which the region has a competitive advantage. Within these sectors the government strengthens linkages of knowledge exchange and cooperation among firms and knowledge institutions (Foray & Goenaga, 2013). This policy method has been an example of policy running ahead of academic theory (Foray et al., 2011).

The EU gives an important role to the national and regional level to use this approach to actively work on innovation (European Commission, 2011). A major policy tool for these investments at the national and regional level is the EU's Cohesion Policy. Cohesion Policy invests a major share of the EU budget at the national and regional level. Between 2014-2020 the EU spends 509 billion euros (47% of the budget) on smart and inclusive growth. Of this budget 367 billion (34%) is spent on Cohesion Policy<sup>1</sup>. Within Cohesion Policy innovation investments are for a major part made through ERDF (European Regional Development Fund) (Committee of the Regions (CoR), 2016). These investments are done under shared management, meaning that the rules are set at the European level but the management and exact implementation is done at the national or regional level (European Commission, 2016B).

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<sup>1</sup> Cohesion Policy consists of the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund.

The impact of ERDF policy on innovation is however not undisputed. There are opposing views on the effectiveness and results of EU policy. Studies evaluating the impact of the European Union development effort (of which ERDF is an important instrument) have had conclusions from no impact, to limited impact and to varied results across different development sectors (Rodríguez-Pose, 2013). In the academic literature there is a strong discussion about economic and innovation policies and their effects on regional development, especially if they do not cause institutional change. A large share of the literature argues that a focus on institutional development is important for economic development and innovation (Hall & Jones, 1999; Acemoglu, Johnson & Robinson, 2001; Storper, 2013; Rodríguez-Pose, 2013; European Union, 2016).

The literature review conducted for this study found little research on the relation between the policy idea to construct regional advantage and the importance of institutional development for innovation. Both are used in EU innovation policy (European Commission, 2011), however the approaches have not been extensively empirically researched. Studies on this are important to get a better insight on the impact on innovation of ERDF policy at the national and regional level. This study aims to make a start with this research by studying the innovation approach used in ERDF policy and how this approach has been shaped and complemented by European, national and regional policy and how through these policies the approach towards innovation is constructed.

This has been done for the ERDF programme in East-Netherlands. The Netherlands is an interesting case because all their ERDF programmes focus on innovation. The ERDF programme in East-Netherlands has innovation as its only priority (OP Oost, 2014). Moreover, the Netherlands is an illustrative case because it is one of the five innovation leaders in the European Union as measured by the indicators of the European Innovation Scoreboard (formerly Innovation Union Scoreboard), set-up to measure the progress on reaching the Innovation Union strategy targets (European Commission, 2017B). It could therefore be an interesting example for future research in regions with lower innovation levels to compare ERDF innovation policy implementation.

This study makes a contribution to the literature and gives input to policy makers by studying the innovation approach used in ERDF innovation policy and its implementation at the regional level. The contribution is two-fold. Firstly, the study analyses the innovation policy approaches used at the European, national and regional level related to ERDF. This will give an overview of the approaches to innovation present in EU policy relevant to the ERDF programme. Secondly, the study analyses how these policies and their approach to innovation have shaped the ERDF programme at the regional level. This is important to understand because it explains why the specific innovation policy approach used in ERDF results from the current EU innovation policy structure. The main question of this research therewith is:

**How is the approach towards innovation of ERDF funding in East-Netherlands shaped and complemented by EU, national and regional policy?**

1. Which policies are relevant to the development and implementation of the ERDF funding programme in East-Netherlands?
2. What approach towards innovation is used in the policies identified in sub question 1?
3. How do the policies identified in sub question 1 shape the ERDF approach towards innovation?
4. How do the policies identified in sub question 1 complement the ERDF in stimulating innovation?

The analyses of this study focus is on the ERDF programme in East-Netherlands and adjacent policies relevant to the development and implementation of the ERDF programme. The study has applied document analysis and interviews with policy makers from the field to get a good understanding of the ERDF policy. This information has been used to analyse the ERDF and adjacent policies innovation approach and how the policies are shaping and complementing the ERDF policy.

## **1.1 Scientific and societal relevance**

### **1.1.1 Scientific relevance**

This study uses the theory on innovation system as it has been defined by Edquist (2005). Two different approaches on how linkages in the system can be strengthened are used. The first approach is derived from theory which states that institutional development is the basis for economic growth (North, 1990). Here the theory is that by decreasing transaction costs economic growth is created. This idea can also be applied to the innovation system theory. The improvement of institutions then leads to a decrease in transaction costs for existing linkages and newly established linkages. The second approach has a less theoretical background and comes from planning practice. These are the concepts of constructing regional advantage (Cooke et al., 2006) and smart specialisation (Foray & Goenaga, 2013). This research uses both theoretical approaches to innovation to understand the way ERDF innovation policy in East-Netherlands developed its approach to innovation and as well how this has been shaped by and is being complemented by other policies.

In the literature review conducted for this study very little evidence of comparative research between the two approaches has been found. This study aims to contribute to this field by providing an overview of the two approaches and using them to analyse ERDF innovation policy. This study shows how the current policy approach of ERDF innovation policy has been shaped by the policy structure of the EU. This can function as a starting point for future research and policy analysis. Rodriguez-Pose (2013) studied an overview of Cohesion Policy research and concluded that there is a lot of doubt about its impact on economic development. Further research on the mechanism in ERDF innovation policy and improved policy analysis are therefore necessary. This research can be a starting point for further analysis into these innovation approaches and their economic effects.

This study has also contributed by showing theoretical gaps in the innovation concepts by applying these concepts in a policy analysis. To achieve this purpose this the study has used concepts from the theories of both approaches. The application of these concepts to policy documents has shown gaps in the literature of these concepts. Some of the concepts have been kept very abstract and need further contributions to become more suitable for practical application. This study contributes by identifying opportunities for further research on these concepts.

### **1.1.2 Societal relevance**

For policy makers, it is hard to draw lessons from academic literature. Scholars disagree on the best approach and research for specific empirical questions is often lacking. Moreover, because of political consensus and practical problems, policy does not mirror theoretical thought. Some policy is a mix of different theoretical views, while other policy is not grounded in theoretical thinking at all (Deffaa, 2016). Despite the lack of a perfect fit between policy and academic theory, policy has a rhetoric and a line of arguing. It often has a different logic compared to an academic argument, however in a specific period of time certain theoretical lines of thought often have influenced a specific policy more than other theories. Understanding which theoretical lines of thought are dominant in certain policies is important to identify possibilities for theoretical and empirical

contribution from academia. Moreover, it is possible to point at certain weakness and strengths from of a policy by applying different theoretical views on it.

The economic crisis has slowed down economic growth, at the same time regional inequalities are still large, so it is important to critically evaluate current policy and develop strong post-2020 policy (European Union, 2016). The European Commission in cooperation with the London School of Economics (LSE) held a conference on 21-22 April 2016 in London named 'Reassessing economic development policies for regions and cities'. The aim was to create a dialogue between academics and policy makers discussing regional economic development theory, evidence and policy. The preparation of the post-2020 Cohesion Policy is starting and the organisers of the event believe that "good policy needs to build on the strong foundations of evidence and analysis (European Union, 2016, p.2)". This study contributes to this analysis of Cohesion Policy by analysing the approach to innovation applied by the ERDF programme and how it has been shaped and is being complemented.

A problem with EU policy making sometimes is, as argued by Martin (2012 in Budd, 2013), that the economic governance of the EU suffers from policy hysteresis. Policy hysteresis is the path dependent tendency of policy by not changing as fast as circumstances are changing. Budd (2013) sees the danger that Europe 2020:

*"may be just another top-down strategy that reinforces the policy hysteresis of the Lisbon Agenda and actually will reinforce 'business as usual'. Furthermore, the tendency to develop policy silos which are very difficult to integrate into a strategic and operational framework (Budd, 2013, p. 287)".*

One major comment is that the role of cohesion policy in implementing the Lisbon Treaty was not critically and sufficiently analysed (Budd, 2013). It is therefore important to critically analyse European policy and therewith help to improve the policy for the post-2020 funding period. Especially since the EU has designed a special 'strategic approach', it is important to have a good understanding of how this approach works out in practice.

This study on the implementation of ERDF innovation policy in East-Netherlands contributes to the policy evaluation by showing how this ERDF innovation policy has been developed and how it is related to other European, national and regional innovation policies. This study shows how the innovation approach of the ERDF Operational Programme in East-Netherlands results from the current EU policy structure and how related policies approach innovation. Policy makers can use this information for future policy development.

## 1.2 Reading guide

The second chapter will discuss some important elements which are necessary to understand the context of the research. This includes an explanation of the arguments behind the EU's choice for the focus on innovation, the path from the innovation vision towards actual policies implemented and the explanation of the East-Netherlands region for which this research makes a case-study. The third chapter consists of a theoretical discussion of the theories used in this research. This includes an introduction to the concept of innovation system and two perspectives derived from this which focus on innovation stimulation, the institutional perspective and the targeted intervention perspective. The fourth chapter explains the methodology applied in this research. It gives an argumentation for the choice and explains how the analysis has been done. The fifth chapter discusses the results from the document analysis and interviews. These results are discussed in the sixth chapter based on the research question. This is followed by chapter 7 which gives a short conclusion to the research, a discussion of the limitations, the implications this research has for policy makers and the chapter gives some suggestions for further research.

## 2. Context

In this chapter the context of the research is explained. Firstly, the reasons for the choice of the EU to focus a large share of its budget and programmes on innovation are discussed. Secondly, Cohesion Policy and how the EU moves from its broad innovation strategy towards implementation through ERDF funding are examined. Thirdly, the structure of these ERDF programmes in the Netherlands is discussed together with the arguments for the choice of the East-Netherlands as a case study for ERDF innovation policy implementation.

### 2.1 Innovation in the EU

As has been discussed innovation is an important objective of the EU 2020 strategy. The reason for the European Commission to focus on innovation in this strategy is two-fold. Firstly, because of the crisis, global competition and demographic change, innovation is necessary to compete with the rest of the world, create new jobs and keep up the current standard of living. Secondly, innovation helps to tackle major societal challenges such as climate change, energy and resource scarcity and health and aging (European Commission, 2011). The current bottle necks of better exploiting the innovation potential of the union are unfavourable framework conditions and fragmentation of effort. The unfavourable framework conditions come from “poor availability of financing, costly patenting, market augmentation, outdated regulations and procedures, slow standard setting and the failure to use public procurement strategically (European Commission, 2011, p.9)”. The fragmentation of effort is caused by bad alignment of national and regional research and innovation systems. There is overlap and duplication of policy. The solution to this, as proposed by the Innovation Union Flagship Initiative, is to better pool efforts and focus on excellence and by creating a true European Research area (European Commission, 2011).

There are 5 main EU goals in the EU 2020 strategy (box 1). These are the main targets to create smart, sustainable and inclusive

growth. These targets are complemented with seven flagship initiatives, which help to achieve the targets with a wide range of actions at national, EU and international levels. In these flagship initiatives, the EU elaborates on how it will use all its instruments to achieve the EU 2020 goals. This includes the single market, financial tools and external policy tools (European Commission, 2010).

For innovation, the most important flagship is the Innovation Union flagship initiative. Innovation is at the core of the Europe 2020 strategy. The innovation strategy of the EU is explained in the flagship initiative of Europe as Innovation Union. Together with ‘Youth on the Move’ and ‘a digital agenda for Europe’ it is expected to contribute to the aim of smart growth. It has moreover been closely developed with the flagship initiative on ‘an industrial policy for the globalisation era’ which aims at ensuring a strong, competitive and diversified manufacturing value chain for especially SME’s (European Commission, 2011). This Innovation Union Flagship Initiative is the operationalization of the EU 2020 strategy in which the proposed innovation policies by the European Commission are presented.

#### **Box 1: EU headline targets in EU 2020 strategy**

- 75 % of the population aged 20-64 should be employed.
  - 3% of the EU's GDP should be invested in R&D.
  - The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction).
  - The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree.
  - 20 million less people should be at risk of poverty.
- (European Commission, 2010, p. 3)

## 2.2 From strategy to implementation

One of the tools to stimulate innovation mentioned in the Innovation Union flagship initiative is the funding available through Cohesion Policy. The Innovation Union flagship initiative explains that programmes financed by Cohesion Policy could contribute to reach the innovation targets of the EU 2020 strategy. This paragraph discusses how Cohesion Policy is used for the implementation of the innovation strategy at the EU level. It is important to note that innovation is not the only policy priority of Cohesion Policy, as will be further elaborated on in this paragraph.

### 2.2.1 Cohesion Policy

Cohesion Policy is the EU's main investment policy with a budget of 351.8 billion euros to be invested between 2014-2020. It is therewith the main EU funding for regions and cities to reach the EU 2020 goals. Cohesion Policy consists of three main funds: the European Regional Development Fund (ERDF), European Social Fund (ESF) and the Cohesion Fund. The Cohesion Fund is only available for regions with a GDP lower than 90 percent of the EU average. The ESF aims at improving employment and education opportunities for citizens and to support people at risk of poverty or social exclusion. There are 11 funding priorities (figure 1) towards which Cohesion Funding Policy is directed. These are related to EU 2020 targets (European Commission, 2014). The eligibility of regions for Cohesion Policy funding is based on NUTS 2 regions (for more information on NUTS regions see: Eurostat, 2017).

Of the budget for Cohesion Policy 55.8 billion euros are spent on ESF and ERDF in competitiveness regions (CoR, 2016). Competitiveness regions are regions with a GDP of more than 90 percent of the EU average (European Commission, 2017D). The East-Netherlands are funded under the competitiveness regions of Cohesion Policy.



Figure 1: The 11 funding priorities for Cohesion Policy. Source: European Commission, 2014, p. 5.

For funding on innovation, ERDF is the most important funding policy in Cohesion Policy. The focus of ERDF funding is on the Innovation and Research, the digital agenda, support for small and medium enterprises (SMEs) and the low carbon economy (priorities 1-4 in figure 1). In the more developed regions, at least 80 percent of the funds needs to focus on at least two of these priorities (European Commission, 2017C).

The regulation for ERDF has been drafted by the European Parliament (EP) and the Council of the European Union (CEU) and it was adopted in 2013. The overarching aim of ERDF is to reduce disparities and to support the development of various regions, especially the more backward and less favoured. At the same time ERDF should contribute to the goals of the EU 2020 strategy focusing on the four priorities, as mentioned in the previous paragraph (EP & CEU, 2013). ERDF therewith has the

responsibility of creating equity (between regions in the EU) and creating growth (making more efficient use of resources) (Farole et al., 2011).

These goals however do not naturally reinforce each other. Promoting growth and reducing disparities clash (Farole et al., 2011). For example, to gain maximum growth, investments are made in the most thriving regions. However, these investments could increase disparities of these regions with less thriving regions. An in-depth discussion on these issues is beyond the scope of this paper. It is important to understand that the implementation of the Innovation Union Flagship Initiative is not the only strategy influencing Cohesion Policy. It is blended mainly with the goal for Cohesion Policy to reduce disparities, which sometimes clashes with the goal of becoming the most innovative region in the world. Moreover, the focus on innovation does not only come from the flagship initiative. For example, the focus on smart specialization by Cohesion Policy is not only initiated by the Innovation Union flagship programme (McCann & Ortega-Argilés, 2015), this also happens through policy briefings and other channels.

### 2.2.2 The Operational Programme

The implementation of innovation measures in Cohesion Policy is through Operational Programmes funded by ERDF (note: ERDF also funds cross-border cooperation; however this is not part of this research). These Operational Programmes are drafted by the national and/or regional level under the regulation set-up by the European Commission. The EU provides (partial) funding for these programmes and therefore needs to accept the final Operational Programme before implementation by the member state (European Commission, 2014).

Figure 2 shows the path of policy from the Europe 2020 strategy towards implementation at the level of the Operational Programme. As can be seen the incentive is given by the EU 2020 strategy and then translated towards the regional level through Cohesion Policy and ERDF. The national and regional level then adjust it to their regional needs and preference.

An Operational Programme funded by ERDF is only one of the many policies of the EU. This study of the ERDF innovation policy therefore only studies one of the multiple policies contributing to the EU innovation target (for examples of more policies see: European Commission, 2011). This policy has a specific structure and is therefore not representative for all EU innovation policies. Every policy has a different structure. Moreover, within ERDF each Operational Programme is different because they are initiated top-down by the EU but adapted to the national and regional circumstances and preferences.

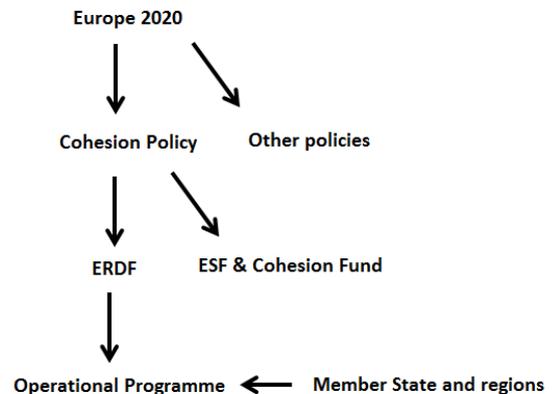


Figure 2: from Europe 2020 to implementation. Source: author's own.

### 2.3 The Operational Programme East-Netherlands

The Netherlands is divided into four ERDF Operational Programme areas. In total, they get 507 million euros of ERDF funding for the period 2014-2020. This amount of money is complemented with at least 507 million euros from the Dutch government or other parties, otherwise it will not be

granted. The money is spent by four regional programmes Northern Netherlands, East-Netherlands, Southern Netherlands and Western Netherlands (Dutch government, 2017B). In table 1 the total ERDF budgets for the four Operational Programmes are shown.

**Table 3: The four operational programmes in the Netherlands and their ERDF expenditure. Source: SNN, 2014; Kansen voor West, 2014; OPZuid, 2014; OP OOST, 2014.**

	Name of programme	Total ERDF budget spend on innovation, innovation for a low carbon economy and running costs of the programme
Northern Netherlands	Samenwerkings-verband Noord Nederland (SNN)	€ 103,541,823
Southern Netherlands	OPZuid	€ 113,627,056
West-Netherlands	Kansen voor West	€ 189,847,057
East-Netherlands	OP Oost	€ 100,302,292
<b>Total</b>		€ 507,318,228

The case study for this research is the Operational Programme funded by ERDF in East-Netherlands (NUTS 1 region). In figure 3 the East-Netherlands region is shown in blue. It consists of the province of Gelderland and the province of Overijssel.

In this study the choice for the Netherlands is made because they are one of the innovation front runners and because these regions focus all their ERDF funds on innovation. They are one of the 5 innovation leaders in the European Union as measured by the indicators of the European Innovation Scoreboard (European Commission, 2017B). For a first analysis of the alignment of ERDF innovation policies with other innovation policies it is useful to start with a front runner,

which according to the EU statistics are most innovative.

This gives an insight on how front runners are implementing innovation policy and it might function as an example for followers. Another advantage is that the Netherlands is one of the economically stronger countries in the EU. This means that they have chosen to invest their money in improving their innovation position in general and as an additional priority innovation for a low carbon economy (Dutch government, 2017B). All their ERDF budget is therefore spent on innovation. This makes it a good case for researching the implementation of EU innovation policy through ERDF.

All Dutch regions indicate a higher than average score on innovation according to the Regional Innovation Scoreboard. According to this scoreboard the East-Netherlands is a strong innovator (European Commission, 2016C). The choice for the East-Netherlands is made because it was most optimal for the researcher regarding travelling and access to respondents for the interviews. Further research can focus on other Dutch regions to see if there are differences in ERDF implementation.



**Figure 3: ERDF region East-Netherlands. Source: Authors own based on Wikipedia, 2017.**

### **3. Theoretical Framework**

The theory used in this study is the system of innovation theory. This theory is used because it considers innovation as a new product or process resulting from links in society between different companies, entrepreneurs, R&D institutes and public bodies (Fagerberg, 2005). This is similar to the line of thought the European Commission has on innovation in the EU. One of their main arguments to focus on innovation is the lack of exchange of knowledge and the availability of research results to companies (European Commission, 2011). Moreover, in the EU 2020 strategy it is stated that the EU wants to increase innovation by: "promoting innovation and knowledge transfer throughout the Union (European Commission, 2010)." The EU makes herewith a choice to focus on strengthening linkages which transfer knowledge. However, in the academic theory there are two different ways of thinking about how to improve these linkages in the innovation system.

There is the institutional approach, which is a generic approach improving the framework of the innovation system and there is the targeted intervention approach which aims at improving specific linkages between knowledge institutes and companies. This study uses both approaches to get an understanding of which approach is being used in the policies and how this is related to the academic thinking on innovation. The Innovation system, the institutional approach and targeted intervention approach are discussed in this chapter. This is done by first discussing the concept of innovation and innovation system. Secondly, the link between the innovation system and policy is discussed. Thirdly, the two theoretical approaches for the generation of innovation are discussed.

#### **3.1 System of Innovation**

##### **3.1.1 What is innovation?**

Before discussing the meaning of a system of innovation it is important to define what innovation is. Innovation is the introduction of a new product or process into practice. It is different from an invention which only means the creation of a new product or process. In innovation the introduction into practice is important. In modern society, this would generally mean the introduction to the market. It requires therefore multiple resources such as market knowledge, finance for production, production skills and facilities. Innovation is a long-lasting process. A new idea or invention can be done but it might take many years before it appears in the market. Moreover, the process does not end when a product has been introduced to the market. The process and technology can be continuously improved (Fagerberg, 2005).

##### **3.1.2 System of innovation**

Innovation was for a long time seen as a black box inside firms. In the system approach however this idea is rejected this notion and it is argued that innovation is heavily dependent on external resources. These include for example institutions (laws, regulations, rules, habits etc.), political processes, public research infrastructure, financial institutions and skills (labour force, education). The systematic approach means that all these factors are not working independently but are linked to each other. Innovation results from the strength and the well-functioning of these linkages. The system is similar to a network, however it has a more enduring character and patterns are stronger embedded (Fagerberg, 2005).

In the academic literature on innovation, the innovation system approach has been popular in the last decades. This popularity can be explained through increased international competition, the emergence of successful clusters and industrial regions in many parts of the world and the fact that other regional development models and policies have shown their shortcomings (Doloreux& Parto,

2004). The innovation system approach however has no commonly shared definition (ibid.). Different variations of the innovation system coexist in the academic literature. The definition used in a study is dependent on the question one is asking (Edquist, 2005). The innovation system however shares the idea that innovation is seen as an endogenous process where the production of new or combination of old knowledge leads to innovation.

Often the concept of innovation system is used in a narrower sense focussing on local cooperation's of firms and regional clusters (Cooke, 2001). These definitions are closer Porter's (1998) definition of a cluster, which are:

*"Geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions [...] in particular fields that compete but also co-operate (Porter, 1998, p. 197 in Cooke, 2001, p. 951)."*

The innovation system theory would then focus on the linkages and knowledge exchange within these clusters (Doloreux & Parto, 2004). However, in this study a broader definition has been deployed. This has given the possibility to include both the institutional approach and the targeted intervention approach as policy options to increase the linkages in the innovation system. Edquist (1997 in Edquist, 2005) defines the innovation system as:

*"All important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion, and use of innovations (Edquist, 2005, pp. 183)".*

This innovation system is function differently depending on the reasoning of the targeted intervention approach or the institutional approach. The institutional approach mainly focusses on changing the institutional factors within the system. Institutions are however defined more broadly than Edquist (2005) has done (see paragraph 3.3). The targeted intervention approach uses these factors as the context and focuses on specific linkages within this innovation system context.

### 3.1.3 Geography of the innovation system

The theory on innovation system was originally developed by economists. For these economists, each nation had its own innovation system. This national system of innovation was seen by for example Freeman as the whole "network of institutions in the public and private sectors whose activities and interactions initiate, import and diffuse new technologies (Freeman, 1987, p.1 in Edquist, 2005)". Economic geographers started using the innovation system concept and added more geographical components to the definition. Their focus was mainly on the Regional System of Innovation (RIS). Here the notion that knowledge was mainly transfused locally played an important role (Cooke, 2001).

Two geographical characteristics of the innovation system are important to consider for this study. Firstly, scale plays an important role in innovation. Geographically close elements of the system interact easier and more frequently. For example, discussions often take place face to face. This can be at the local technology club or at the bar. Further, companies are more likely to know which similar firms are working in the same city or region than on the other side of the world. Another point is that specific characteristics of the system are set for certain scales. For example, certain intellectual property rights regulations, labour laws or competition laws are set a national level. Secondly, innovation has the tendency to concentrate. The most famous example of this is Silicon Valley. It has been one of the most innovative and dynamic regions in the world producing a large share of all innovations worldwide (Asheim & Gertler, 2005).

The border of an innovation system is dependent on the elements focused at. Moreover, a choice needs to be made on the required strength of the linkages and which to exclude. The boundaries of the system can be defined among others at cluster level, regional level or national level (Asheim & Gertler, 2005). For this research, two levels will be most important. These are the national level at which important decisions on the institutional framework for an innovation system are made and the regional innovation system on which European funding is spent. In figure 4 different innovation systems are shown. The national system of innovation is important for this study because it is at this level that the institutional framework is set. The institutional approach mainly focusses at these institutions and therefore the national level is important. The targeted intervention approach is mainly related to the regional innovation system. This is because it is at the local level where, according to the RIS theory, the most important knowledge exchange takes places which is at the basis of innovation (Cooke, 2001). The global, technological and sectoral systems in the figure are not directly relevant for this study.

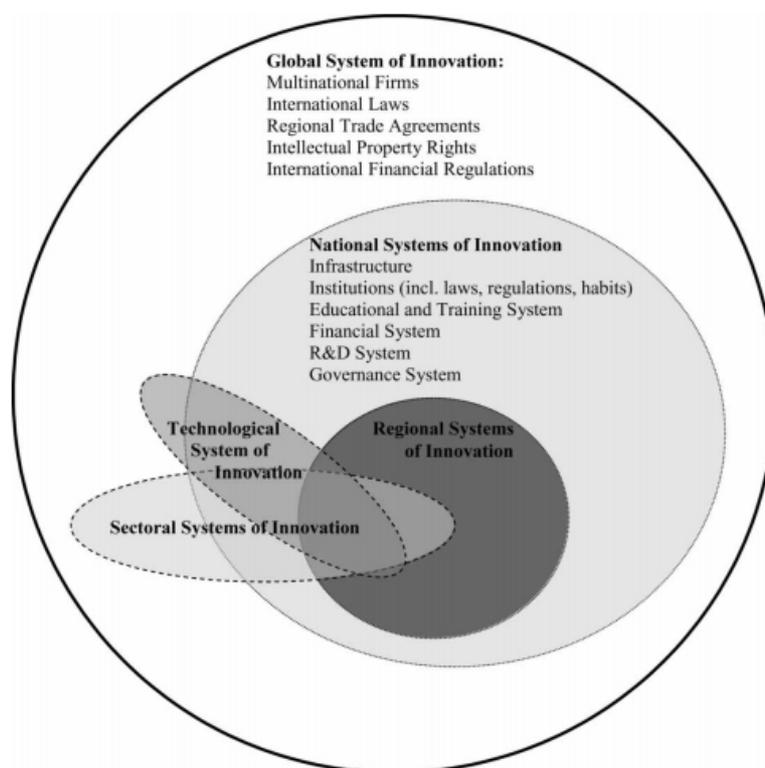


Figure 4: Relationship between global, national, regional, sectoral and technological systems of innovation. Source: Frenz & Oughton (2005) in Asheim et al. (2011, p. 884)

### 3.2 Policy and the innovation system

The literature on innovation is concerned with the mechanism behind innovation. There is a wide variety of theories on what is important for innovation and what process in society are behind innovation. This paragraph discusses the relevance of the innovation system approach to analyse the EU innovation policy and what implications different theoretical approaches have for innovation policy design.

The Innovation Union Flagship Initiative logic corresponds to an extent with the thinking on the innovation system, as has been discussed at the beginning of this chapter. They focus on the lack of exchange of knowledge and limited access for firms to access R&D (European Commission, 2011). Two different approaches on how to strengthen these linkages can be identified. Firstly, there is the institutional approach focusing on the framework or the conditions. This is a more generic policy which improves the framework of the linkages in the system. The focus on institutions in this approach is derived from the theory on institutional development for economic growth. This theory argues that the general reduction of transaction costs in society leads to increased economic output and innovation capacity (North, 1991). The theory is mostly applied to the economy in general but in this study, it has been applied to the innovation system. Many authors have researched and argued for the importance of institutional arrangements of a country or region for innovation (Hall & Jones, 1999; Acemoglu, et al., 2001; Rodríguez-Pose, 2013). Second is a focus on specifically helping prioritized sectors or companies to get access to knowledge and finance. This is the targeted intervention approach. The targeted intervention in the innovation system is built upon the idea of constructing regional advantage (Cook et al., 2006) and smart specialisation (Foray & Goenaga, 2013).

Figure 4 shows that a focus on institutions is more relevant when looking at the national system of innovation. The targeted intervention approach is mostly applied to the regional system of innovation (Cooke et al., 2006). This research focusses on the implementation of policy at the regional level through ERDF funding. It is therefore likely that a targeted intervention approach is used. However, institutional policy making at the national level forms the context for action at the regional level. The research uses the focus on the two approaches to get an understanding of how this (institutional) context at the national level and the targeted intervention approach are used in ERDF policy.

The policy options for creating innovation are shown in figure 5. At the top are policies which define the institutional framework. These policies influence every action taking place in the innovation system and are the context in which the other two policy options take place. The institutional framework also influences other factors in the economy. These are however not discussed in this study, the focus is on the influence of this on the innovation system. The non-discriminatory policies are general policies. These do not target specific firms, educational institutions or links in the innovation system. They provide funding for Research and Development and education throughout the whole Innovation System. This means the policy does not prioritize firms with more innovative potential or institutions with more 'promising' knowledge. This is in contrast with the third policy option, the targeted policy. Targeted policy identifies and selects desirable areas for intervention. It discriminates more promising technologies and links in the innovation system. Therewith it takes a risk by prioritizing sector for the policy to focus on (Foray & Goenaga, 2013). This research focusses on the institutional framework and the targeted intervention approach because these are both relevant to the Innovation Union Flagship Initiative while both having an opposing approach to the innovation system and policy implication. Non-discriminatory policy such as R&D funding and education are benefiting the innovation system for both approaches and sectoral policies are not mentioned in the Innovation Union Flagship Initiative (European Commission, 2011).



Figure 5: Policy options for innovation. Source: author's own

### 3.3 The institutional approach

One approach to make the linkages within the innovation system more efficient is by changing institutions. There is a wide variety of definitions for the term institutions (Beugelsdijk & Maseland, 2011). One of the more common definitions is to define institutions as the 'rules of the game' in a society. Institutions in this definition are "humanly devised constraints that shape human interaction (North, 1990, p. 477)". These constraints do not change overnight. They have a certain permanency in society. Through this permanency, they are able to influence human interaction. They form the context at which human interaction takes place, while simultaneously human interaction has an impact on this institutional context. This makes their permanency relative. Through interaction informal institutions are constantly under development (Scott, 2001). The definition of institutions here can be applied to the definition of innovation system by Edquist (1997) as discussed in paragraph 3.1.2. The relevant institutional factors would then be '*all important institutional factors that influence the development, diffusion and use of innovations (based on Edquist, 1997 in Edquist, 2005)*'.

Institutions are at the basis for economic development because the institutions such as laws, order, property rights, codes of conduct, trust, taboos etc. form the context for economic interaction. Effective institutions raise the benefits gained from cooperation. Transaction costs are lower when institutions are stronger, which means that more cooperation is possible. This can be seen throughout history where the development of institutions has enabled states to capture the gains of trade. The development of stronger and more complex institutions made it possible to trade with strangers from far distances. It pushed trading possibilities beyond traditional kinship trade (North, 1991). These transaction costs can also be lowered for the linkages in the innovation system.

There is an important difference between informal and formal institutions. Informal institutions are less tangible compared to formal institutions. They are not formally written down but constructed through the behaviour in interaction between actors in a system. Examples of informal institutions are norms, attitudes and social capital. It also includes trust among actors, their willingness to cooperate and to share knowledge (De Soysa & Jütting, 2006). The national government does not have direct influence on these informal institutions. They change slowly through human interaction and are hard to influence (Marošević et al., 2014). Formal institutions on the other hand are official and written down in legislation or agreements. They are formal rules such as constitutions, laws, property rights (North, 1991) and regulations and contracts (Acemoglu, Johnson & Robinson, 2001; Hall & Jones, 1999). These formal rules are enforced by officials representing the state such as courts, judges, police, bureaucrats etc. (De Soysa & Jütting, 2006).

It is often hard to define its exact influence of formal institutions because also other factors play a role in innovation outcome. For example, the decision of a person to become an entrepreneur is dependent on the legal framework. If it is easier to register a product and introduce it to the market it is more likely the person will do so. At the same time, as shown by Beugelsdijk (2007), culture also plays an important role. If entrepreneurial behaviour is a stronger part of the culture it is more likely a person will become one. Beugelsdijk (2007) provides the example of a higher level of market entry and exit of firms in the United States and the United Kingdom compared to the Netherlands and Germany. The difference can partly be explained by a stronger entrepreneurial spirit in Anglo-Saxon countries. At the same time the type of regulation in the Netherlands and Germany makes firm entry harder which reduces the number of new firms (Beugelsdijk, 2007).

It is hard to change informal institutions and culture through policy. The formal institutional framework is easier to influence for policy makers (Rodriguez-Pose, 2013). This includes policy as mentioned in the example of reducing regulation for firm entry. The research therefore focuses on the formal institutional framework. The term institutions will refer to formal institutions as discussed in this paragraph.

### 3.4 The targeted intervention approach

The targeted intervention in innovation system focuses more on the Regional Innovation System compared to the national innovation system. It is at the more regional and local level where policy makers can intervene and change the system through targeted interventions. This research uses the term targeted intervention because in contrast to the institutional perspective it aims at specific measures which intervene in the linkages of the innovation system. The idea of targeted intervention has developed from the theory on innovation systems and evolutionary economy. Besides the theoretical background the approach is very much formed by the EU heterogeneous environment and regional setting. The approach responds to challenges faced with innovation policy design in the European Context (McCann & Ortega-Argilés, 2015).

In EU policy, this is often called the constructing regional advantage approach. This approach is an alternative to one-size fits all regional policy. The one-size fits all policy has often been applied by for example trying to create new growth industries or trying to copy Silicon Valley (Asheim et al., 2011B). The theory on constructed advantage gives an important role to the public sector and favours public-private partnerships. The aim of intervention in the innovation system is to reduce connectivity deficits through targeted interventions in the system. The idea is to create and pro-actively construct competitive advantage instead of waiting for it to develop (European Commission, 2006).

The approach gives an important role to individual actors and agencies from the triple helix in innovation. Triple helix consists of the government, industry and the knowledge institutes. The concept is based on the idea that there is increased interaction and interdependence between these three spheres. Knowledge produced at universities and other R&D centres is increasingly being demanded by industry. However, this knowledge does not transfer easily without interference from the government. For knowledge to transfer an active role from all the 3 spheres in the triple helix is necessary. The presence of creative people in these spheres and bringing these people together are at the core of innovation (European Commission, 2006). Besides the importance of the triple helix, regional development is considered as a path-dependent development. This means that the history of the region is decisive in the future possibilities and growth path of the region. The development of a region using its existing path, according to the report of the European Commission (2006), is to be done along three dimensions. These are related variety, differentiated knowledge bases and distributed knowledge networks.

Related variety means that knowledge spill overs are only likely to happen between two different sectors when they are complementary in competence (Asheim et al., 2011B). By building upon different sectors already present in a region and which are likely to have knowledge spill overs among each other, less risk is taken while there is an increased chance for successful policy outcomes (European Commission, 2006). Distributed knowledge networks have become more important in society because of disintegration of firms and more globally distributed knowledge networks. Knowledge on how to create parts of a product is spread among different suppliers. Firms are interdependent on each other's knowledge and on different types of knowledge (ibid.).

Behind the concept of differentiated knowledge bases is the argument that innovation not only comes from technological complex research. Different types of knowledge are used in different sectors and industries. Three different types of knowledge are present analytical, synthetic and symbolic. Synthetic knowledge is where innovation takes place by combining existing knowledge. This requires cooperation, trust and a common social framework. This requires a well-functioning system where actors search together for practical solutions. Analytical knowledge is where innovation comes from formal and codified science and fundamental research. This requires research and the investment to increase understanding of complex technologies. Symbolic knowledge is more creative and informal. It requires expression of culture and creative cooperation (European Commission, 2006).

When making innovation policy based on related variety and differentiated knowledge bases a platform approach is used. This means that the focus is not on the most successful sectors in general but it should be a policy strategy specially designed and adapted to the regional context. It builds on specific regional assets and history (Asheim et al., 2011B).

From the idea of creating regional advantage the policy concept of smart specialisation has developed. Smart specialisation is the EU policy name for the process of identifying and selecting the technologies, fields or sub-systems which are to be favoured to increase innovation. They need to choose distinctive and unique fields of specialisation. This means that the policy makers take a risk by prioritizing specific industries or firms. Future development and successful fields are unknown so by targeting policy on a limited number of areas risks are unavoidable (Foray & Goenaga, 2013).

The right level of support under smart specialisation is the growth of new activities. It therefore does not target a single firm but neither a whole sector. It tries to stimulate cooperation and knowledge exchange to explore, experiment and discover new opportunities. The policy starts with entrepreneurial discovery, which is different from innovation as it tries to identify opportunities for innovation and R&D within one sector or between different sectors (Foray & Goenaga, 2013). Smart specialisation therefore is: "setting priorities in a smart specialisation perspective involves identifying (and also constructing) those entrepreneurial discovery projects or new activities aiming at exploring, experimenting with and learning what an industry or subsystem should do in terms of innovation and R&D to improve its situation (Foray & Goenaga, 2013, p. 7)".

### 3.5 Conceptual framework

In the previous paragraphs of this chapter the two different approaches and their theoretical foundations have been discussed. These concepts have been used in the research when analysing the documents and the interviews. In this paragraph, it is explained how the concepts from these approaches are related and how they have been understood and used in this research. This is done by firstly showing how the targeted intervention approach and institutional approach are related to the concept of innovation system. Secondly, for both the approaches the most important concepts for this research are explained using table 2 and table 3.

Figure 6, which is based on the literature discussion of this chapter, shows the innovation system concept used in this research. Inside the innovation system interaction takes place between firms, knowledge institutes and the government. These interactions are shaped by the institutional framework which shape the way the interaction takes place. The institutional approach focuses on this framework. Institutional policy is this policy which focusses on changes of the box as a whole. These are changes which change the way the system functions as a whole. The targeted intervention approach does not deal with the box as a whole. It targets at the links (shown as arrows in the figure) for individual cases. This means that not the system as a whole changes but for example only the link between one (or more) firms with a knowledge institute change.

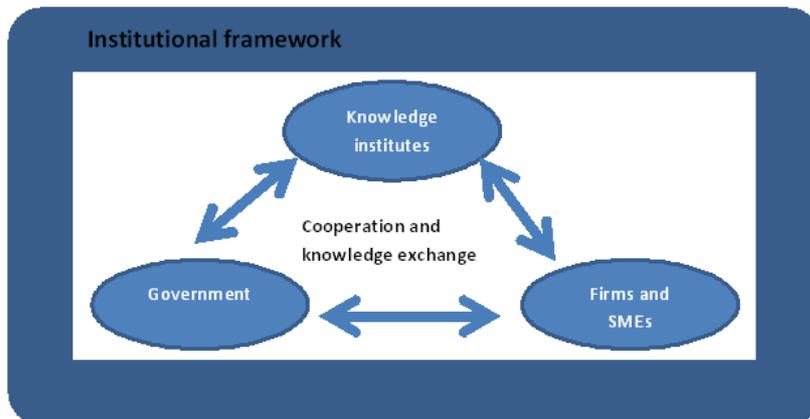


Figure 6: The innovation system with the institutional framework and cooperation inside this framework. Source: author's own.

In table 2 the most important concepts for the institutional approach used in this research are summarized. The concept of formal institutions for innovation is broad. In the literature review no literature has been found which splits these formal institutions and discusses different institutional elements which can benefit innovation.

Table 4: Institutional approach concepts used in the research. Source: author's own based on previous paragraphs.

Concepts Institutional approach	Description
Institutional framework	The whole system of formal institutions which define the context in which the interactions take place. Informal institutions are left out for this research (North, 1990).
Formal Institutions	There are constraints written down in legislation or agreements which form the institutional framework. This for example includes: constitutions, laws, property rights, regulations, contracts etc. (North 1991; Acemoglu, Johnson & Robinson, 2001; Hall & Jones, 1999)

In table 3 the most important concepts used when analysing the targeted intervention approach are summarized. These together form the targeted intervention approach. There is not one single and complete definition of the targeted intervention approach. This means there is no checklist stating which concepts have to be included for a policy to be considered as based on the targeted intervention approach. They are mostly elements of the concept which can be found in policies.

**Table 5: : Targeted intervention approach concepts used in the research. Source: author's own based on previous paragraphs**

Concepts Targeted intervention approach	Description
Constructed advantage	Public sector intervenes in the innovation system by pro-actively trying to stimulate interaction and overcoming connectivity deficits. This is done on the scale of single connections by which the institutional context is not changed (European Commission, 2006).
Triple-Helix	Cooperation between the government, knowledge institutes and firms. These are at the core in the thinking on the targeted intervention approach. By improving cooperation and links in the triple-helix, innovation is stimulated (European Commission, 2006)
Related variety	Innovation is more likely to happen between sectors which are compatible and already strong in the region. Knowledge is more likely to cross from one sector to another when both are strong in the region (European Commission, 2006). It is at these cross-roads between complementary sectors that knowledge exchange takes place (Asheim et al., 2011B). This knowledge exchange then might lead to new products.
Smart specialization	Policy concept developed from the theory on constructing regional advantage. Prioritization of specific sectors and the growth of new activities are at the core of this policy concept.
Smart specialization (prioritizing)	In the concept of smart specialization, prioritization is very important. This means the policy makers focus on the most promising sectors in the region and apply its policy on these sectors (Foray & Goenaga, 2013).
Smart specialization (new activities)	The policy goal of smart specialization does not stimulate a sector as a whole. It aims at entrepreneurial discovery projects or the growth of new activities which are at a scale between the single firm and the whole sector. They are thus a cooperation between multiple firms and/or knowledge institutes which together try and find a new process or method or develop this process or method into a new product (Foray & Goenaga, 2013).

## 4. Methodology

In this chapter the methodology used to answer the research question, stated in the introduction, is explained. This explanation consists of three parts. Firstly, the research design is explained. This starts with a discussion on the type of analysis. This is followed by a discussion on the methods applied in the analysis. Secondly, more details on the methods applied are given. It is explained how they were used to gather the necessary information and how this information has been processed. Thirdly, the limitations of the applied method is discussed.

### 4.1 Research Design

#### 4.1.1 Type of analysis

The research is partly exploratory research and partly descriptive. Exploratory research means the research intends to clarify an issue, problem or phenomenon to the author himself and the readers (Saunders et al., 2009). This exploratory part of this research is the analysis of how the Operational Programme has been developed and is being implemented and how this development is shaped by related regional, national and European policies and how these related policies complement the Operational Programme. The descriptive part is where the approach towards innovation of the different policies is described. The author here has a clearer picture on the content and the issues at stake. The descriptive part is important as a basis of the exploratory research. It is however in the exploratory part that the most interesting findings can be found, this however also comes with more uncertainty (Saunders et al., 2009).

The research is based on a single case study. An important reason for this is the research being exploratory. Little knowledge is available from former research on what results can be expected. The focus on a single case gives the time to get a deep and good understanding of how innovation is applied in different policies and how these policies influence the ERDF innovation development and implementation in the selected case. The focus on a single case study gives the opportunity to gain deeper insight into the phenomena compared to a comparative research or a research covering all cases (Yin, 1994). This is also the reason one Operational Programme is selected as a case study. It gives the opportunity to have a deeper analysis with the limited time and resources available.

#### 4.1.2 Methods applied

Two methods have been applied to answer the research and sub-questions. These are a document study and semi-structured interviews with stakeholders involved in the Operational Programme. The document studies have been used to analyse the policy content of the Operational Programme and relating policies. The study of these documents is important because these form the basis for the implementation and formation of the policies. The interviews have been used to complement the document analysis by getting a better understanding of the relation between the different policies and it has given insights on how the development process of the Operational Programme has been.

The document texts only give the formal explanation of the policy which are laid down in text however they do not explain the informal process of developing the Operational Programme. Interviews with stakeholders involved in the implementation and drafting of the Operational Programme have helped to get a better insight in this development process. Interviews are the best method to gather this information because they give the opportunity to get information from actors involved in the process and to give information which has not been laid down in text. In table 4 the

sub-questions are mentioned and it is explained how the two methods have been used to answer these questions.

In the interviews additionally the influence of municipalities and cluster organisations on the Operational Programme was mentioned. However, their influence is mainly restricted to helping define the focus of the Operational Programme on sectors and the type of subsidy instruments used. The approach towards innovation is mainly formed through government policies at the regional, national and European level. For these reasons, the municipalities and cluster organisations have been left out the research.

**Table 6: Research question and sub-questions and the methods used for the analysis done. Source: author's own.**

<b>How is the approach towards innovation of ERDF funding in East-Netherlands shaped and complemented by EU, national and regional policy?</b>		
<b>Sub Questions</b>	<b>Method</b>	<b>Description</b>
Which policies are relevant to the development and implementation of the ERDF funding programme in East-Netherlands?	Document analysis and interviews	This question is at the basis of the research because it defines which policies are connected to the implementation of the Operational Programme. The relevant documents have been defined first through the document analysis. Then during the interviews, a document mapping with all the relevant document identified has been presented. This helped to find other policies relevant to the development and implementation of the Operational Programme.
What approach towards innovation is used in the policies identified in sub question 1?	Document analysis and interviews	For this question, the most important source is the document analysis. In the policy document is explained and written down how the policy defines innovation and what policy tools it uses to enhance this innovation. The interviews have brought some insights and some additional information however the document analysis has been the most important tool for answering this question.
How do the policies identified in sub question 1 shape the ERDF approach towards innovation?	Interviews and document analysis	This question has been answered with the interviews as main source. Here the information of how the policies and regional and national government have shaped the Operational Programme development has been gained to answer the question. This question is mainly about processes. The interviewees are better able to answer how certain practices and ideas are exchanged between policies than the official policy documents. The official policy documents have been used to find the official relation between the policies and to prepare the question for the interviewees.
How do the policies identified in sub question 1 complement the ERDF in stimulating innovation?	Interviews and document analysis	To answer this question both the policy documents and the interviews have been very important. The interviews have given insight in the relation between the Operational Programme and other policies while the documents have given a good insight in what is being done and how innovation is approached. By combining this information and adding some more insights this question has been answered.

## 4.2 Method details

### 4.2.1 The document analysis

The aim of the document analysis is to organize the data and interpret the documents from the perspective of the two approaches to innovation discussed in the previous chapter. The innovation system theory is used to understand the innovation instruments applied in these policies. The document analysis done is based on the policy documents which are relevant for the development and implementation of the Operational Programme for ERDF in East-Netherlands.

The documents are selected on their relevance to the Operational Programme of ERDF in East-Netherlands. These are documents explaining the policy rationale towards innovation at the European, national and regional level. The analysis tried to identify the reasons for the policy implementation, the way it will be implemented and what other policies it relates to. The analysis started with the Operational Programme. From the Operational Programme document, other relevant policies at the three levels have been identified. This has been done by reading the document and defining which relevant policies for implementation and development are discussed. Then by further reading and analysing these relevant policies other policies have been added to the list. For confirmation and some additional remarks a mapping of the selected policies has been presented to the interviewees. This gave them the opportunity to provide deeper information on the relation between the policies and their importance for the Operational Programme. Moreover, it gave some input over documents still missing in the selection. The selected documents and the arguments behind this selection can be found in table 5 in chapter 5.

The document analysis is an interpretive study. The results are gathered by close reading of the document with the aim of grasping the message of the author(s). The approach is systematic, however the text is subjective and might reflect multiple meanings. The text is open to interpretation meaning the understanding of the text is context dependent (Given, 2012). The focus of the document analysis is on the content of the selected documents. It therewith excludes other sources and interpretations and supplementing information from other documents and persons. The document is a channel of communication between a writer/writers and its audience. It is one of the multiple channels of communication (Prior, 2012).

In the case of policy documents, they are the official text of what the policy wants to achieve and what tools it will use. Policy documents contain explicit text but also give implicit information on what is planned to be done and how policy is understood (Julien, 2012). The analysis of the documents aims to understand the meaning of the text and also the information given implicitly. This study aims to retrieve two strands of information from the documents. Firstly, the analysis aims to understand the policies perspectives on innovation. This analysis is done using the concepts from the theory as discussed in paragraph 3.5. These are organized in themes, which have been used to do the analysis. Secondly, the relation of the documents towards the Operational Programme has been analysed. The information on the policies perspectives on innovation has been used to understand the relation of the documents and their innovation approach.

The document analysis has been carried out by identifying themes on which the analyses is based. These “themes” have been identified before the start of the analysis. The themes are based on the concepts derived from the theoretical framework (see paragraph 3.5) and are complemented with more general themes used to understand the general policies and their relation with the Operational Programme. The themes used can be found in annex 2. During the reading and rereading the themes are revisited. This might mean more categories are created or categories are put together. The

document analysis is there with an iterative process where the researcher adjusts the themes and categories to the findings (Julien, 2012).

A systematic approach has been applied to identify these themes in the documents and interpret them. This has been done using atlas.ti which is used to identify and mark the themes in the textual documents. This is a software used for qualitative data analysis. It gives the researcher the opportunity to mark the text using the themes and to query these marks or create groupings and other analyses.

#### 4.2.2 The interview analysis

Qualitative interviews have been used to get a better understanding on the relation between Operational Programme and surrounding policies at European, national and regional level. Moreover, they helped to strengthen the understanding of the policy approach for innovation of the Operational Programme. The interviews built upon the results from the document study and provided more in-depth knowledge. Also, the interviews have helped to identify the documents of relevance for the Operational Programme. Like the documents, the interviews have been analysed using atlas.ti and the themes identified in annex 2.

Interviews are a useful method to gain information about the influence of policies on the Operational Programme because they give access to the knowledge from the actors developing and implementing the policy. Actors involved in the Operational Programme are best able to explain what is happening in practice on the implementation, how the Operational Programme has been developed and what coordination is existing between the national and regional level.

The research intended to do six reviews, however after four interviews the most important information had been gained to answer the sub-questions. To avoid taking time of interviewees unnecessarily, the number of interviews has been kept to four. The first respondents have been selected based on the website of the Operational Programme and the province. The following respondents contact have been gained using the snowball sampling technique. Here the interviewee is asked whether they can provide contact of other persons who can provide more information on the topic (Malterud, 2001).

Semi-structured interviews have been used because these are most suitable to gain the required information. This semi-structure means that questions are prepared beforehand to guide the discussion on the topic. The order of these questions asked can be changed and to gain a more detailed insight other questions can be added during the conversation.

This approach gives the opportunity to gain detailed information on the topic and by adding follow-up questions depending on the answers provided by the respondents more information can be collected. Using the same type of structure for all interviews gives the multiple interviews a comparable focus. This is necessary to collect data on the same issues and get answers in the same direction. At the same time this method allows flexibility in adjust the interview questions when respondents come up with an interesting topic in which the researcher wants to gain a deeper understanding (Malterud, 2001). In this way, the interviews explore the understanding of the individual actors about the social phenomena they are a part of. In this case, this will be the understanding of the ERDF innovation policy and how other relevant policies influenced the development and implementation of the policy (Malterud, 2001).

The interview questions are designed to provide information for the discussion of the sub-question derived from the research question (see table 4). Before the interviews, an interview guide has been prepared which is used as the structure for the interview (see annex 3).

In annex 1 the persons interviewed are presented. The interviews were anonymous therefore only the organisation they work and their position has been mentioned. Their names have been left out. Three of the respondents have been involved in the development of the Operational Programme or are currently responsible for the implementation of the programme. One respondent works at the province of Gelderland as an economic policy maker. This interview has been included to get a better understanding of the alignment between the Operational Programme and the economic and innovation policy of the provinces. This has been restricted to the province of Gelderland because of restrictions in time and resources to include also an interview with the Province of Overijssel. Nevertheless, information has been gained on the alignment between Overijssel and the Operational Programme by interviewee 2 and 3 who both work for this province and are also involved in work outside of the Operational Programme.

### 4.3 Limitations

A limitation of the interviews and document analysis is that it is done from the perspective of a single researcher. This means that both the document study and interviews are based on the interpretation of a single person reducing discussion and reflection. The advantage of a document analysis is here that documents are static. This makes it easier for other researchers to critically examine the document and agree or criticize the conclusions drawn by the researcher. This is harder for the interviews where the conversation is an exchange between the researcher and the respondent. An interview influences the understanding and knowledge of both the researcher and the respondent. It aims at subtracting knowledge from the respondent but at the same time constructs and modifies the knowledge and understanding of the respondent and the researcher. It is an exchange of views between two persons, which are bound to place, time and context. Every interview has a different outcome and every interview will be interpreted differently by a different researcher (Kvale & Brinkmann, 2009). This limitation has been tackled to an extent by the awareness of the researcher of his perspective and opinion. However, complete objectivity is never possible which means it is important for others to be critical to the research and conclusions drawn (Julien, 2012).

This research does not represent the view of all actors involved in the development and implementation of the Operational Programme in East-Netherlands. It is based on a selection of actors from all person involved in the development and implementation of the Operational Programme. These respondents selected provided information to get a deeper understanding of the drafting process and implementation and the relation here with policies influencing this development and implementation. The research will provide a perspective and conclusion based on the theory and information from the interviews, meaning it does not provide a representative view of all actors working with the policy.

By focusing only on a single case study the reproducibility of the research results to infer conclusion about other ERDF programmes is low. Firstly, in the Netherlands there are three other programmes which can be different from the East-Netherlands one. It is even more likely that ERDF programmes in other countries have chosen different priorities from innovation and are embedded differently in the governance system. This is however not a problem for the results of the research. The research does give an insight how ERDF policy can be designed and implemented and it gives the possibility for future researchers to build upon these findings and for policy makers to think about the way their innovation policy has been developed and is being implemented.

Another limitation is the focus of the interviews only at the Operational Programme and provincial level. Actors at the national or European level might have a very different perspective on the implementation of the programme. However, because of limitations in time and resources it is not possible to interview actors at all levels. The choice for the actors working directly with innovation policy at the provincial level and/or with the Operational Programme gives the advantage that in-depth knowledge has been gained. However, because these actors are involved in the programme it is likely they tend to have a more positive attitude about the development and implementation than an outsider might have. The researcher is aware of this problem and has tried to mainly use factual information and skip discussions about effectiveness and results on economic development of the region. The research therefore does not intend to draw any conclusion on the actual economic effects created by the programme. The aim is to construct an analysis of how the Operational Programme is shaped and complemented by European, national and regional policy and what approach towards innovation is constructed through these policies.

When selecting respondents involved with the Operational Programme, the researcher found out that the number of actors involved in designing and implementing the Operational Programme is limited in number. This made it hard to get multiple respondents who are involved in different tasks for ERDF policy drafting and implementation. The snowball technique has helped to solve this problem by asking for other respondents with more knowledge on a specific topic relevant to the Operational Programme. This made respondents more willing to participate and contribute to the research.

The research makes a systematic review of documents relevant to the development and implementation of the Operational Programme in the East-Netherlands and of interviews with actors working at the for the Operational Programme or at the province. Further analysis of documents, literature and more interviews would provide a more informed and balanced point of view. However, a complete overview would be unrealistic due to restrictions in time and resources. This research will therefore provide a first investigation of the topic. Further research can complement and/or oppose the view presented in this research.

## 5. Analysis

In this chapter, the analyses of the document studies and interviews are discussed. These analyses are not presented separately but are presented as a discussion combining the input from both the document and interview analysis. The discussion takes place based on the governing level the policy has been designed. These are the European level, the national level and the regional level. The Operational Programme is discussed separately to give a better understanding of the central document on which the ERDF Operational Programme implementation is based.

Figure 7 shows the position of the relevant documents relative to the Operational Programme and at what level the policies have been drafted. Their relation towards the Operational Programme has been summarized in table 5. This figure and the table help to understand the discussion presented in this chapter.

The discussion of the way these documents shaped en complement the Operational Programme is presented according to the governance level. In Chapter 6 the findings of the analysis are discussed in relation to the research question of this study.

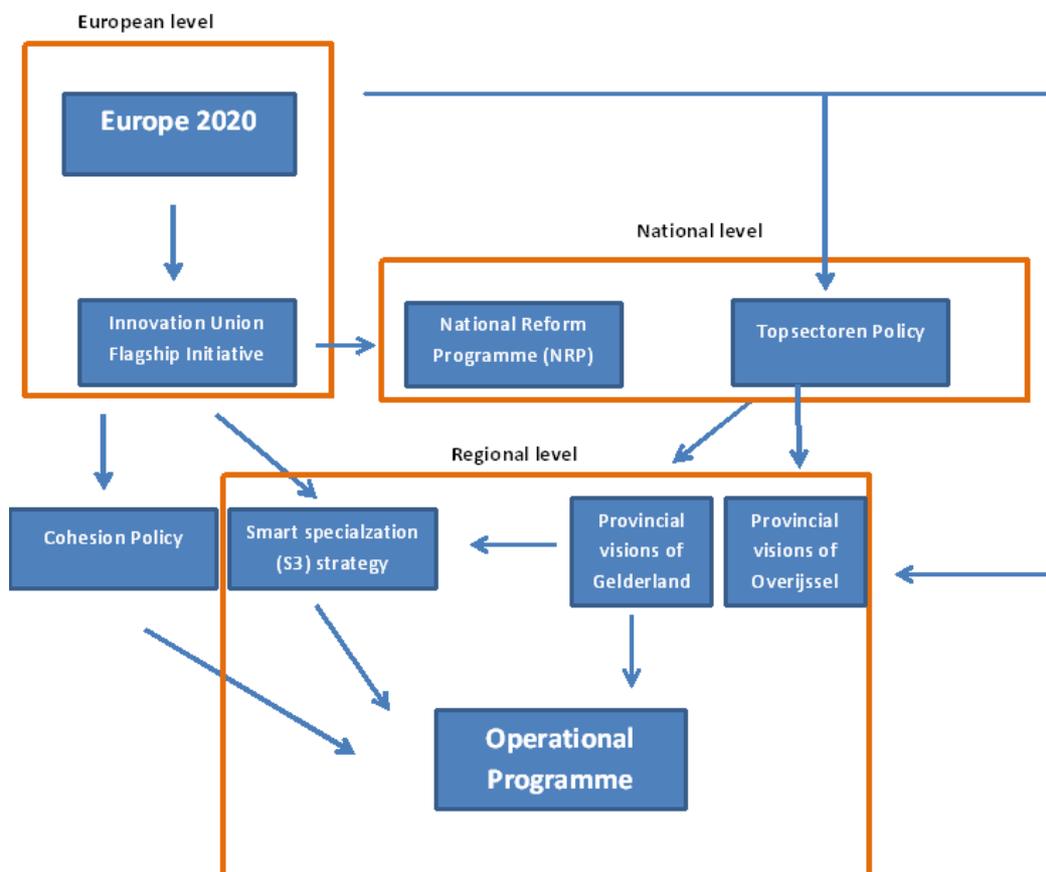


Figure 7: Relevant documents and their position relative to the Operational Programme. Source: author's own.

Table 7: Documents analysed in this study. Source: authors own based on document analysis and interviews.

Policy	Short summary of the policy content	Approach to innovation	Relation to the Operational Programme	Reason of analysing
Operational Programme East-Netherlands	Main policy document. The implementation of the policy is based on the rationale explained in this document.	Provides subsidy to set up clusters and networks or to test new products and concepts for the priorities coming from the S3 strategy. Strongly based on elements from the targeted intervention approach as discussed in the theoretical framework of this paper.	-	Main policy document
Smart specialisation strategy East-Netherlands	Consists of a SWOT analysis of innovation in the East-Netherlands and a selection of the four sectors with most potential for innovation benefiting the whole region.	Prioritizing the sectors with most potential for the region. It approaches innovation as something likely to come from the stronger sectors in the region. This resembles the thinking in the theory on the targeted intervention approach.	Has defined on which sectors the Operational Programme focuses and that valorisation of knowledge is a problem in the region.	Important input by prioritizing sectors focused on in the OP and the focus of the innovation policy.
Europe 2020	Sets out the EU wide vision for 2020. Is the strategic framework on which all EU policy is required to be contributing. Does not include detailed policy actions but sets out the long term path.	Mainly focusses on the lack of finance for R&D by setting the goal that each Member State should spend 3% of its GDP on R&D. Moreover, discusses institutional problems at the EU and national level. Little attention is given to the targeted intervention approach.	Is an important source for the OP to focus on innovation. The OP needs to contribute to the EU 2020 vision and innovation is one of the possible focusses.	Strategic framework under which the OP has been developed.
Innovation Union Flagship Initiative	Operationalisation of the vision laid down in the EU 2020 strategy. Provides specific regulations changes and policy programmes to be set-up. Names ERDF as one of the instruments for innovation policy.	For the ERDF programmes it mentions the S3 strategy to be of importance. This means that for the S3 strategy it tries to promote the targeted intervention approach. For other actions at the Commission and national level there is a stronger focus on institutional change.	Sees in ERDF an important source for innovation policy. Underlines the importance of the S3 strategy at the regional level.	Presents the innovation policy actions resulting from the EU 2020 strategy. Also provides expectations for ERDF policy.

‘Topsectoren’ policy	The ‘topsectoren’ policy is a National policy in the Netherlands from 2011. The policy brings a focus to the Dutch national businesses and innovation policy. The policy prioritizes the sectors at which the Netherlands are most competitive and which have future potential.	There is a strong focus on institutional change at the national level. No specific actions are discussed because these are made for each sector in specific policies. At the national level the Netherlands try to reduce subsidies and move towards support and loans. Besides the institutional focus, stimulating knowledge exchange is seen as an important instrument to improve innovation in these sectors.	The policy has influenced the choice for the prioritized sectors in the S3 strategy and the OP. Moreover, it encourages the funding of networks and clusters such as the health valley and food valley.	National innovation policy framework. Important factor for the S3 strategy and influence on provincial innovation policy.
National Reform Programme	In the NRP the member states discuss the country specific economic and innovation recommendations given by European Commission. It also discusses what developments regarding innovation have taken place in the previous year.	The NRP has a strong focus on structural changes in the institutional framework of the Netherlands. The targeted intervention approach can be seen in the form of the prioritization of the ‘topsectoren’ policy and cooperation in the triple-helix. In the NRP of 2016 the generic track and specific track are distinguished. Where the generic is institutional reforms and the specific track is the focus on triple-helix in the prioritized sectors from the ‘topsectoren’ policy.	Not very strong. The NRP sees ERDF mainly as a tool to encourage the increase in R&D spending in the private sector. No policy recommendations or vision for ERDF innovation policy.	Has been included because it is part of the European recommendations to the national level regarding innovation.
Regional economic strategy of the province of Gelderland 2012-2016 and 2016-2019	Economic strategy forming the framework for provincial economic policy. Limited to four years because of provincial elections. Discusses different topics related to economy. Innovation is an important topic in these visions.	In the 2012-2016 period, strong focus on the ‘topsectoren’ and prioritization of sectors. In the 2016-2019 period this has changed towards a broader focus on SMEs in general. In the 2016-2019 a major weakness in the innovation system is still the availability of finance according to the vision. Voucher schemes and revolving funds are used to increase the availability of finance.	Strong influence both ways. The 2012-2016 vision has been able to influence the S3 and OP programme. The ERDF programme had to be taken as given during the 2016-2019 period.	Forms the provincial strategy which is likely to have an important impact on the development of the OP.

## 5.1 The European framework

The EU 2020 strategy is the framework for the European Commission presenting the EU objectives for the 2010-2020 period. This is the EU's strategic framework meaning that it sets out a coordinated approach for all EU policy. The objective of the strategy is to attain smart, sustainable and inclusive growth. The aim of the EU strategy is to mobilise and coordinate all EU instruments, legal acts and financial instruments to contribute to this EU strategy. Innovation is an important part of the EU 2020 strategy meaning that innovation is incorporated in many EU policies. The ERDF programme, funded by the European Commission, is also aligned with these aims to contribute to this strategy. The EU 2020 strategy is there with the strategic framework under which the ERDF programme has been designed (European Commission, 2010).

An important motivation for the focus on innovation of the EU 2020 strategy is that the EU lags behind of other large countries such as China, Japan and the United States in terms of innovation and R&D spending. The EU 2020 document for example states: " *There is a clear need to improve the conditions for private R&D in the EU and many of the measures proposed in this strategy will do this* (European Commission, 2010, p. 8)".

That the EU has lower levels of innovation is because of lower levels of investment and a difference in business structures and dynamic of the business environment, according to the EU 2020 document. In the EU 2020 document is stated that:

*"Much of this is due to differences in business structures combined with lower levels of investment in R&D and innovation, insufficient use of information and communications technologies, reluctance in some parts of our societies to embrace innovation, barriers to market access and a less dynamic business environment* (European Commission, 2010, p. 5)."

In the EU 2020 document only one policy related to the low levels of investment for innovation is proposed (see paragraph 2.1, box 1). This is because it is a strategy rather than a policy proposal. The strategy proposes what type of policy actions should be initiated to reach the EU 2020 goals, however there are no policies proposed related to this vision in the EU 2020 document.

Proposing these policy actions is done in the Innovation Union Flagship Initiative. Here the EU strategy is translated into policy proposals. This flagship is one of the seven flagship initiatives contributing to the EU 2020 strategy. The Innovation Union Flagship Initiative makes 34 innovation policy commitments for the European Commission, the member states and the regions. The document tries to coordinate and align different innovation policies and tackle European wide barriers to innovation. Most of these commitments, 23 out of the 34, are solely for the Commission. The other eleven are shared between the commission and the member states, only at the member state level or shared between the member state and regional level (European Commission, 2011).

The Commission has therewith a large role in setting up new innovation policy. Most of these policy commitments at European level are focussed on institutional factors. This includes removing obstacles to mobility, reduce complexity of patent applications, promoting open access, reducing paper work and improving the common market regulations. Besides this more institutional focus the Commission is also committed to setting-up new funding programmes for research and innovation at EU level, to create new indicators to measure the performance of the initiative and launch pilots and programmes to stimulate innovation in specific sectors such as eco-innovation and social innovation (European Commission, 2011).

The commitments which are not made for the European level are mostly at member state level. The main expectations from the member states is that they align all the structural funds with the Innovation Union goals, that they improve the functioning of the national innovation system and that they ensure that people get high level education and access to internet. Moreover, the Innovation Union Flagship Initiative expects that the member states focus at institutional change by dealing with bottlenecks in their institutional framework. The member states in cooperation with the Commission need to propose a set of measures which will be carried out. This is done in a National Reform Programme which is reviewed annually based on the member states progress and suggestions from the Commission (European Commission, 2011). Also for the member states most of the commitments in the Innovation Union Flagship Initiative show a strong focus on institutional policy.

The targeted intervention approach is only a small part of the Innovation Union Flagship Initiative. It seen as an approach mainly for the national and regional level, when aligning their Cohesion Funds with the innovation objective. The regions are asked to use their funding based on smart specialisation in which they focus on their 'relative strengths to become excellent (European Commission, 2011, p.22)'. The member states and regions are therefore expected to focus on their strengths and use targeted intervention when funding innovation at national and regional level. This ERDF funding is required to: " *The European Regional Development Fund should be fully exploited to develop research and innovation capacities across Europe, based on smart regional specialisation strategies* (European Commission, 2011, p.5)".

The Innovation Union Flagship initiative motivates the member states and regional level to channel the structural funds towards innovation using the targeted intervention approach by applying smart specialization.

To conclude, the Innovation Union Flagship Initiative has a strong focus on commitments for the Commission, which aims at institutional change complemented by some research funding programmes. This strong focus on the European level results from the little power the EU Commission has over the institutions and spending of the member states and their regions. The Commission does have the power over EU market regulation and intellectual property rights. Moreover, they are able to set-up new programmes and funds. The main power they have over Member States and their regions is through the funding provided through for example ERDF. They try to channel this funding towards innovation. Moreover, it promotes the use of smart specialisation strategies for member states and their regions when using ERDF funding (European Commission, 2011).

## 5.2 The national framework

In the Netherlands, the national level does not have a lot of influence on the design of the ERDF policy. The responsibility for the ERDF implementation has been put with the provincial governments. In the Netherlands however there is a strong cooperation between the provincial and national level. Moreover, the National government has made extra financial means available to influence the focus of the ERDF programmes. Although the regional levels are responsible, this has given the national level two important tools used to influence the Operational Programme. There are two important innovation policies at the national level related to the Operational Programme. The first one is the 'Topsectoren'<sup>2</sup> policy which has been created by the national government to improve its international competitiveness position and to stimulate innovation. The second is the National Reform Programme which the European Commission requires from the member states to discuss their reforms made at national level to stimulate the economy and innovation.

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<sup>2</sup> Topsectoren is the Dutch word for top sectors.

The 'Topsectoren' policy has become the national businesses and innovation policy in 2011. The policy has been created for the Netherlands with the aim of staying competitive and at the same time dealing with societal problems like global warming and aging. These societal problems are the challenges for the Dutch government in cooperation with researchers, entrepreneurs and firms to work on together. The focus is on the nine sectors in which the Netherlands are 'world-class'. These are High tech Systems and Materials, life sciences & health, agro & food, water, chemistry, horticulture & starting – materials, creative industry, energy and logistics. According to the Dutch government the policy, focusing on these nine sectors, will both help to deal with these societal problems and to keep Dutch as one of the innovation leaders in the world (Rijksoverheid, 2017).

The 'Topsectoren' policy uses a wide variety of instruments including investments, fiscal policy and improvements in regulation and other barriers. Moreover, it gives a central role to cooperation of triple-helix partners in which the government will take a leading role by bringing partners together and stimulating cooperation (Rijksoverheid, 2017). The focus on the triple helix and the prioritization of the sectors together with stimulating cooperation is linked to the theory of targeted intervention approach. However, at the same time there is a focus on reducing barriers and regulations to stimulate innovation. This shows an institutional focus of the policy.

The general 'Topsectoren' policy is more a strategic framework like the EU 2020 document. It does not include many specific policy actions or discussion of possible instruments. These are elaborated on for each sector specifically. It is beyond the scope of this paper to discuss each of the sectors and the policy instruments applied. Important is to the understanding that the focus is two-fold. Firstly, the policy is stimulating cooperation and prioritization, while secondly the policy aims to improve regulations and reduce barriers for all sectors and for sectors specifically.

The institutional change elements in the 'Topsectoren' policy are more important compared to the targeted intervention elements. The starting point of the 'Topsectoren' policy is that : *"the government does not steer with rules and subsidies, but that Dutch firms get the space to be entrepreneurial, to invest, to innovatie and to export (Rijksoverheid, 2011, p. 3)<sup>3</sup>"*. The aim in 2011 of the policy was to give less subsidies in exchange for lower taxes, less and easier regulation, more access to finance for firms, better use of the knowledge infrastructure of the private sector and better connection of fiscal policy, education and diplomacy with the needs of the private sector (Rijksoverheid, 2011, p.3). The main idea is to reduce and simplify regulations, which corresponds with the institutional approach.

At the same time, there is also a discussion on the connections in the innovation system and the importance of improving the knowledge exchange between knowledge institutes and the private sector through targeted intervention. Moreover, the policy prioritizes nine 'top sectors' for the Netherlands . Here the concepts of prioritization, triple-helix and related variety are used showing the policy uses concepts from the targeted intervention approach. There is especially a strong focus on related variety and the prioritization. The nine prioritized sectors are adapted to the specific Dutch strengths and weakness. This is an important part of targeted intervention approach when prioritizing for innovation (Asheim et al., 2011B).

Despite these concepts from the targeted intervention approach can be found, the 'Topsectoren' policy itself is not a targeted intervention policy. This is because the policy does not focus on the creation of new activities and does not pro-actively try to construct a regional advantage. There is no focus on single connections but more a focus at the general institutional framework. The policy mainly wants to reduce barriers and legislation limiting the growth in these sectors. The 'Topsectoren' policy therefore does not clearly use a targeted intervention approach. It does

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<sup>3</sup> Quotes from the 'Topsectoren' policy, the provincial visions and Operational Programme have been translated from Dutch. For the original quote see the corresponding page of the documents.

prioritize sectors but mainly aims at reducing barriers for these sectors instead of pro-actively trying to stimulate and create new activities.

The 'Topsectoren' policy has influenced the prioritization of sectors in the Operational Programme and has brought forward the focus on innovation for the Netherlands and its provinces. Besides this the 'Topsectoren' policy uses another important concept which explains the relation of the Operational Programme towards other subsidy and financing instruments. This is the idea of 'knowledge, skills and profit'<sup>4</sup>. According to this idea the government creates a framework in which knowledge can develop into a profitable product. The Dutch government wants to do this by replacing subsidies with credits and a knowledge infrastructure which serves the economy and society (Rijksoverheid, 2011, p. 10). This is also the way of thinking which is present in the Operational Programme. The ERDF funding fits within this chain where knowledge develops into a profitable product. Although the programme is still focused on subsidies instead of loans or other tools as the 'Topsectoren' policy aims at.

The National Reform Programme is, in contrast to the 'Topsectoren' policy, not initiated by the member state but is required to be drafted by the member state every year for the European Commission. The Commission every year gives macroeconomic recommendations to the member state. Mostly these consist of adaptations to the institutional framework to improve the economy, business environment and innovation. In the NRP, the member states discuss their progress of the Commission in the previous year.

The analyses has been done for the thematic chapter on research and innovation for the NRP of 2011 (the first one) and 2016 (up until now the last one published). Besides this chapter there is one chapter based on macroeconomic coordination and one on thematic coordination including besides innovation the themes of labour market reforms, energy, climate and mobility, education and social inclusion (Ministerie van Economische Zaken, 2011). These are not focuses on innovation and therefore not included in the analysis.

The NRPs are focused on actions by the national government. They contain little discussion on the actions taken by the ERDF programme. In the NRP the ERDF programme is mainly seen as a tool to increase private and public R&D expenditure. "At European level, the Horizon 2020 framework programme and the European Fund for Regional Development stimulate private and public R&D expenditure. The government is deploying resources for State Co-financing (Ministerie van Economische zaken, 2016, p.9)". There is no discussion on the effectiveness of the programmes and what results they have achieved. Therewith little connection between the NRP and the Operational Programme is present.

The NRP mainly focusses on institutional change at the national level. The NRP is therefore not very important for the Operational Programme. There is no direct influence on the Operational Programme level. As interviewee 1 stated<sup>5</sup>:

*"It sometimes comes across however the direct effects is limited. The moment you develop the Operational Programme for East-Netherlands you restrain yourselves for the implementation years. So when an recommendation comes the question is what can we do with it? This is more something relevant on the national level than that the ERDF programme is changed because of it (interviewee 1)".*

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<sup>4</sup> Translated from the Dutch phrase: kennis, kunde, kassa

<sup>5</sup> The interview quotes have been translated from Dutch to English. Original quotes can be found in the interview transcripts.

### 5.3 The regional framework

At the regional level the Operational Programme is drafted for the province of Overijssel and the province of Gelderland, which together form the East-Netherlands region<sup>6</sup>. The process of drafting the Operational Programme is done in cooperation between the two provinces. Their innovation vision and policies therefore have a strong influence on the Operational Programme. The provincial visions for economy and innovation are laid down in their economic visions which are drafted every four years after the provincial elections. In these visions the provincial government elaborates on their economic priorities and plans for the coming four years. For the province of Gelderland for 2012-2016 this is the 'Economic vision for the Province of Gelderland towards a sustainable, innovative and internationally competitive region' and for 2016-2019 this is 'Working on the economy of the future Circular, Innovative and International'. For the province of Overijssel for the period of 2012-2016 this is 'Implementation Framework Regional Economy 2012 - 2015, Strengthen, innovate and connect' and for the period of 2016-2020 there is no wider economic vision. Different smaller policies have followed up the 2012-2015 vision for the province of Overijssel. For the drafting of the Operational Programme the visions for 2012-2016 were more important because this is the period the Operational Programme is also drafted. After it has been drafted the Operational Programme cannot be drastically changed for the 2014-2020 period (interviewee 1, interviewee 3, interviewee 4).

The document analysis has been done for the provincial vision of the Province of Gelderland for both periods. The focus on one province gave the possibility to make a more detailed analysis of the document study and to include an interview with someone involved in the development of the vision. The province of Gelderland has been chosen because it has a vision for both periods. The province of Overijssel has multiple documents for the 2016-2019 period, which makes a document analysis of the vision more complicated. Two of the respondents are however employed at the province of Overijssel and have therefore been able to give information on the alignment of the Operational Programme with the provincial vision.

Knowledge and innovation are an important focus for the provincial economic visions. The provincial vision for 2012-2016 for Gelderland is inspired by two policies, which have also influenced the development of the Operational Programme. This is Europe 2020 strategy and the 'Topsectoren' policy of the Dutch national government. Europe 2020 and the Innovation Union Flagship Initiative fit well with the vision of the province, as discussed in the introduction of the vision document (Provinciale Staten Gelderland, 2011, p. 3). According to the vision "*Innovation is the key for increasing labour productivity of labour in the Province of Gelderland, also it forms the basis for new products, processes and services. These are necessary to be able to compete globally*" (Provinciale Staten Gelderland, 2011, p. 5)". This writing shows large resemblance with the reasoning of Europe 2020 and the Innovation Union Flagship Initiative where innovation is important to keep up with the global competition. The 'Topsectoren' policy has been important to bring a focus on innovation. The strong cooperation between the national and regional government has given the 'Topsectoren' policy a strong influence on the province (interviewee 2).

Food, health and energy and environment technology are prioritized in the provincial vision of Gelderland for 2012-2016. These are also sectors the national government prioritized in the 'Topsectoren' policy.

The province has incorporated the Operational Programme in its policy by both focussing on innovation and prioritizing the same sectors. Moreover, the province provides other instruments complementing the ERDF programme by focussing on different stages in the innovation process or

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<sup>6</sup> Not an official governmental region in the Netherlands, only used for cooperation in European Programmes

providing additional funding instruments for actions not covered by ERDF. The province of Gelderland for example provides different instruments such as subsidies, grants, setting up-networks and providing support to SMEs (interviewee 4). Interviewee 2 describes the relation between ERDF and regional economic policy as:

*“Everything what is done in the Operational Programme for ERDF we also have as regional policy in Overijssel. In that regard, the complementation is seamless. The European Programmes helps us to realise parts of our own policy but only for economic policy.”*

Most of the complementing policy instruments are based on the idea of constructing regional advantage. The policies focus on stimulating single firms or networks. The province intervenes in the innovation system by trying to support SMEs and knowledge institutes. They use policy which does not change the institutional framework but supports single links in the system. Most of the provincial policies therewith include elements of the targeted intervention approach. The province does not use any institutional policy.

An example of this complementing provincial policy is the support of the province for other stages of the innovation process. The Operational Programme focusses on projects if their innovation process is in between the research phase and the market introduction phase. The programme does not fund fundamental research but also not the market introduction. The funding is aimed at the experimental phase to prepare a technology for future market introduction, test products or to see if there is a demand for a developing product (interviewee 1). This is linked to the technology readiness level (TRL) developed by the NASA. They developed a model which ranges from 1 to 9 in which 1 is fundamental research and 9 is introduction to the market (interviewee 2). The Operational Programme focusses on the TRL 4 to 8 (OP-Oost, 2014). The provincial levels then complement the ERDF programme by for example supporting companies to find or connect to funding for TRL level 1 to 3 and by setting up revolving funds which deal with TRL level 8 and 9 helping products to be introduced to the market (OP-Oost, 2014). Another example is the voucher system which has been set-up in Overijssel. These are smaller grants for SMEs to create a business case or a feasibility study for a new product or process. This is too complex for ERDF but the province of Overijssel sees it as an important additional subsidy to stimulate innovation (interviewee 3).

According to interviewee 3 the reason that the Operational Programme fits well within the provincial vision is because the provinces get freedom to define the focus of the programme. There is the possibility for the region to choose its focus and choose for which ‘challenges’ it wants to use the ERDF funding. Interviewee 3 describes it as: “I see it this way, the European Commission has given us the tools to refine the policy but kept the room to identify the need in the region where most can be gained by cooperation and tackling the challenge”. Europe according to this view does not tell the region exactly what to do but makes the region refine and think what the major challenge for the region is and how to prioritize sectors and topics for focusing the funding available.

This strong complementation might be weakened when provincial elections have taken place after four years. This can be seen by the focus of the economic vision of the province of Gelderland. In the 2012-2016 economic vision the same sectors had been prioritized, while in the 2016-2019 provincial vision the focus had been expanded to all sectors. This means that the view of the province on what innovation to support has changed. The province moved from the idea of supporting the strongest sectors and prioritizing these to stay internationally competitive to focus more at innovation which contributes to create employment opportunities and more jobs (interviewee 4). The Operational Programme however has been put in place for 7 years so it could not be adapted to the changed focus of the province of Gelderland. The economic vision had to take the ERDF policy as given. This means that the provincial instruments, which now focus on all sectors and on creating jobs and

employment opportunities, is not in line with the Operational Programme in the same way as it has been in the 2012-2016 period.

The shift from the provincial vision towards the Operational Programme has been made using a S3 strategy. In the S3 strategy, the bottlenecks for higher levels of innovation in the region are identified and the most important sectors for innovation have been prioritized. Officially, the S3 strategy is only used for the Operational Programme. This was decided when the S3 was written, that it would only be written for the Operational Programme (interviewee 2). The focus of the S3 strategy is therefore not decisive for other innovation policies in the region.

The S3 strategy starts with a SWOT analysis of the region regarding innovation. This SWOT deals with different strengths, weaknesses, opportunities and threats. The weaknesses and threats include a wide variety of problems. It includes for example limited critical business mass, missing links in the road network and relatively few foreign enterprises. According to the S3 strategy the major bottleneck to reach higher levels of innovation is the need of more *valorisation*, which is the introduction of new products and services. It is the final step in the process of innovation where knowledge is transformed into products and processes (GS Gelderland & GS Overijssel, 2013).

The reason to focus on valorisation is because the smart specialization strategy picked the relatively low R&D expenditure, the relatively low labour participation and low productivity of higher educated people and the weak spread of innovation power across SMEs as the major bottlenecks for higher innovation levels. This has led the smart specialization strategy to conclude that the most important focus for ERDF should be valorisation of knowledge present in the region and improving the connection of SMEs with the knowledge infrastructure in the region (OP Oost, 2014, p. 4).

Actions dealing with institutional change, which are identified in the SWOT of the S3, are left out by focussing only on valorisation. The SWOT analyses identifies institutional problems, however the operational programme only focusses on a selection of problems identified by the SWOT. The S3 strategy therewith identifies institutional bottlenecks but does not see them as something to create policy for.

Besides this focus on valorisation and connection the knowledge infrastructure the S3 strategy prioritizes four sectors for the East-Netherlands. The four sectors prioritized in the S3 strategy are Agro & Food, Health, High-Tech Systems & Materials (HTSM) and Energy & Environmental Technology including biobased economy (EMT)). These sectors were already present in the economic visions of the provinces. In these visions the provinces had already laid down the sectors they thought were important. The Operational Programme incorporated the already prioritized sectors from the provincial visions and narrowed down these choices to four. This means that some sectors, such as the chemical industry for Overijssel, were not taken into the programme (interviewee 3).

An important cause for the prioritization of these sectors is the requirement of the European Commission to base the Operational Programme on the S3 strategy. The use of the smart specialisation strategy for ERDF is encouraged in the Innovation Union Flagship Initiative and put as a requirement by ERDF regulation (interviewee 1). This forced the politicians in the East-Netherlands to make choices for the Operational Programme. This has been important because politicians often prefer to keep their options open to include more actors and keep everyone satisfied (interviewee 3). Besides the requirement of the S3, the 'Topsectoren policy' of the national government was an important reason for this prioritization.

*“At this moment in time the Netherlands had the ‘Topsectoren’ policy and both the national government and the provinces agreed that this was important. Moreover, Brussels said you need to strengthen what is strong and then automatically you end up at these top sectors. Besides, the national government is also financial partner for the programme and who puts in money also co-decides (interviewee 2).”*

The ‘Topsectoren’ policy and the requirement of the S3 strategy were thus important for the prioritization in the ERDF innovation focus. The actual decision for these sectors was based on political choice (interviewee 2) and the S3 strategy (interviewee 3).

The S3 strategy uses element of the idea of constructing regional advantage and smart specialization as discussed in the theoretical framework (European Commission, 2006; Foray & Goenaga, 2013). The strategy chooses four sectors to focus on which means it takes a risk by prioritizing these above other industries. It chooses to strengthen the strong sectors and therewith chooses to give less attention to other sectors (Foray & Goenaga, 2013). The S3 strategy stimulates cooperation and knowledge exchange within the triple-helix. A special table to analyse and find cross-overs (GS Gelderland & GS Overijssel, 2013, p. 17) is created. Here the concept of related variety is indirectly present. It combines each of the four prioritized sectors with the other to find possible cross-over industries for development.

The S3 strategy however does not discuss what policy is necessary to connect SMEs with the knowledge infrastructure and improve valorisation. That the policy will use the targeted intervention approach is not the only possible outcome of the analysis presented in the S3 strategy. The S3 however mentions that its main tool for implementation is Operational Programme of East-Netherlands 2014-2020. No discussion takes place on why the Operational Programme is the most suitable policy to solve the problems identified by the S3 strategy (GS Gelderland & GS Overijssel, 2013).

## 5.4 The Operational Programme

The Operational Programme is the central document for the implementation of ERDF funding in East Netherlands. In the document, the type of projects to be subsidized, the prioritized sectors and how much of the budget is distributed among the different priorities are defined. During implementation, further focus is added to the Operational Programme with the use specific rules and requirements for each trench of subsidy available for beneficiaries.

The Operational Programme will stimulate higher levels of innovation in the region by tackling two major weaknesses for innovation in the East-Netherlands identified in the S3 strategy. Both are related to the valorisation of knowledge. Firstly, there is the problem for SMEs to connect to the regional knowledge infrastructure (OP Oost, 2014, p. 10). Secondly, the lack of financial means for SMEs to bring products to the market is seen as a major argument for the programme (OP-Oost, 2014, interviewee 1, interviewee 3). The approach the Operational Programme uses to deal with these bottlenecks is by targeted intervention in the innovation system.

This targeted intervention is done by funding for two different actions by SMEs, firms and knowledge institutes. The funding is provided for setting up or improving clusters and network and for the testing of new concepts and products (OP Oost, 2014, p.27). These subsidies are based on concepts from the targeted intervention approach. By using subsidies targeted at a single link in the innovation system such as cooperation’s between SMEs and knowledge institutes, development of a product

with multiple firms or setting up a network, the policy tries to construct a regional advantage. The subsidies are the tool to intervene and stimulate specific linkages.

The Operational Programme constructs a regional advantage based on three important concepts from the targeted intervention approach theory.

Firstly, the concept of triple-helix is present and subsidies are used to strengthen specific linkages within the triple-helix. The operational programme provides funding for two different actions by SMEs, firms and knowledge institutes. The funding is provided for setting up or improving clusters and networks and for testing new concepts and products (OP Oost, 2014, p.27). This funding is spent on creating specific linkages between SMEs and knowledge institutes or on testing single product by providing finance, which is not available without government action. The creation of linkages is the clearest example of targeted intervention approach because it improves one specific link within the innovation system. The funding of concepts and product is a targeted intervention especially when it involves cooperation between different partners. If a product from a single company is funded it involves targeted funding aimed at one company no linkages outside of the firm are stimulated in this way.

Secondly, there is a strong focus on prioritizing as part of the smart specialisation theory. The policy makers take a risk by prioritizing specific sectors and by providing subsidies for specific firms (Foray & Goenaga, 2013). The operational programme has chosen four sectors for which funding is available. Therewith it prioritizes these sectors above other sectors in the region. It does not fund these sectors as a whole but challenges them to come up with projects involving cooperation and experimenting with new products. The project which are the best according to the secretariat and the committee of experts will be funded. This fits very well with the idea of smart specialisation as discussed by Foray & Goenaga (2013) who argue that a good smart specialisation approach does not target a single firm but neither a whole sectors. It aims at stimulating experimentation, cooperation and knowledge exchange in between these two. This is what the programme does by funding network and experimentation activities for a number of SMEs and knowledge institutes. It aims to use subsidies for new activities and taking a risk by funding only specific sectors and a limited number of activities.

Thirdly, the focus on related variety is incorporated into the programme. This means that new activities are created by using the strengths of the region. The argument here is that new products and knowledge are more likely to derive if they build upon the existing strong sectors and combine these sectors with sectors that are likely to give spill overs (Asheim et al., 2011B). The operational programme does this by focussing on cross-overs of the four prioritized sectors, with each other and with complementary sectors. These complementary sectors are other industries such as ICT, water, creative industry, chemical industry and manufacturing industry (OP Oost, 2014, p.10).

The Operational Programme has based its subsidy policy on concepts from the targeted intervention approach. It stimulates single connections in the innovation system based on these concepts. The main point where the Operational Programme is not in line with the theory of the targeted intervention approach is their focus on the lack of finance as a problem for valorisation. The theory on the targeted intervention approach mainly focusses on the problem that knowledge is not brought together (European Commission, 2006; Asheim et al., 2011B). The lack of finance does not require targeted government interventions. However, in the Operational Programme the argument that there is a lack of finance is combined with the targeted interventions in knowledge exchange (interviewee 1). This means that sometimes also single firms can gain access to finance to develop their product. Thus, the approach of the Operational Programme shows strong resemblance with the targeted intervention approach from the theory, except that the lack of finance for SMEs is an important argument in the policy.

The most important policies shaping the ERDF Operational Programme approach towards innovation are the EU 2020, the smart specialization strategy and the regional policies. The EU 2020 and the ERDF money made available are the reasons for the Operational Programme to be set-up. The EU 2020 sets the framework for the EU's policies including ERDF. The ERDF programme provides money for investments to be made fitting in this EU 2020 framework. The EU gives a selection panel from which the Operational Programme can pick its investment priorities. From the S3 process becomes clear which priorities are the most logical for the region to be focussed on (interviewee 3).

In the policy logic it is the S3 strategy which makes an analysis of the region and the choice for what investment priority the region will focus on and how. In reality, however politics also play an important role in the choice for the investment priority. From the 11 Cohesion Policy investments priorities, the ERDF Operational Programme only focuses on innovation. The focus on innovation is decided upon by the S3 analysis and political bargain between the national government, the provinces, municipalities and cities. Interviewee 2 describes the choice for the focus on innovation as:

*“The Netherlands are of course one of the smaller countries in the EU and in the Netherlands there is a strong cooperation between the regions, provinces and the national government. In shared consultation between the national government and the provinces is decided to focus on innovation, actually for hundred percent (interviewee 2).”*

The choice for innovation from the multiple priorities possible (figure 1) is made together with all the provinces and the national government. Then the provinces of Overijssel and Gelderland decided to prioritize four sectors for the East-Netherlands region. This choice was based on the political programmes of the regions (interviewee 2) and the S3 strategy (interviewee 1, interviewee 3).

## 6 Discussion

In this chapter, the sub-questions for the study as phrased in the introduction are discussed. This discussion of the sub-question is based on the information gained from the analysis presented in the previous chapter. Sub-question 1 which asks: 'Which policies are relevant to the development and implementation of the ERDF funding programme in East-Netherlands?' has been summarized in table 5 in chapter 5. This table has summarized the most relevant policies for the development and implementation of the Operational Programme. These policies have formed the basis of document analysis and interviews. Sub-question 2,3 and 4 will be discussed in this chapter using the information gained from these analyses.

### 6.1 The policies approach towards innovation

This paragraph discusses the second sub-question of this study: "What approach towards innovation is used in the policies identified in sub question 1?"

The ERDF Operational Programme policy logic is based on concepts from the targeted intervention approach. The policy does not deal with changes in the institutional framework in the region. An important reason for this is that the regional government has no institutional powers in the Netherlands. They are not able to change the legislative framework, labour laws or regulations for setting up a firm. In the Operational Programme, there has been no consideration to use an institutional approach instead of the targeted intervention approach.

The ERDF policy logic fits the governance structure in which the policy is developed. The regional level does not have competence to change the institutional framework in the region. This competence lies partly at the European level and for a larger part at the national level. The targeted intervention approach is therefore a suitable method for the EU to provide the regions with an instrument to contribute to the EU 2020 strategy. The EU can't enforce institutional change in member states but they can contribute to innovation by making funds available. The targeted intervention approach is a useful instrument to spend these funds at the regional level.

It can also be seen that the innovation approach of policies results from the governance structure when looking at the other innovation policy used by the provincial and the national level. The provincial policies are also based on concepts from the targeted intervention approach. They do not use an institutional approach but focus on constructing regional advantage by using subsidies, revolving funds and setting up a business support structure in the provinces. They however do not focus as much on the prioritized sectors, related variety and creating new activities as the Operational Programme does. They are therefore trying to construct regional advantage but not only by focusing on new activities but more through supporting business in the region in multiple ways.

The national and European policies have a much stronger focus on institutional change. In the Innovation Union Flagship Initiative, many proposed policies focus on institutional change at the national and European level. The NRP which is been drafted to discuss the progress on innovation at the national level also focusses on the institutional framework of the Netherlands. It does not discuss possible changes of innovation policy of the ERDF or provinces. The 'Topsectoren' policy does prioritize sectors, which is important in the targeted intervention approach but does not aim at proactively creating new activities. It aims at creating a strong institutional framework for these sectors to develop.

The approach towards innovation is different for different governance levels. The provincial level does not have a competence in changing the institutional framework and uses the targeted

intervention approach. The national and European level which do have competence to change the institutional framework do mainly focus their policy on changing this institutional framework.

## 6.2 The development of the Operational Programme

This paragraph discussed the third sub-question of this study: “How do the policies identified in sub question 1 shape the ERDF approach towards innovation?”

The ERDF innovation policy of East-Netherlands is shaped most strongly by the EU 2020 strategy and the regional policy of the provinces of Overijssel and Gelderland. The European Commission made ERDF money available for the regions to contribute to the EU 2020 strategy. This has given the two provinces the possibility to use this money to work on one or more challenges the Commission has made the ERDF money available for. The topic the two provinces choose to work on has been decided upon by political discussion of which the direction has been laid down in the economic vision of the region and the S3 analysis of the East-Netherlands drafted as a preparation of the ERDF Operational Programme. The provinces here had a certain bandwidth in between which they could develop the programme. These are the requirements the European Commission created in ERDF regulations based on the EU 2020.

The national government has influenced the drafting of the policy through its ‘Topsectoren’ policy. There is a strong cooperation between the national and regional governments in the Netherlands. Moreover, the national government made extra money available for the ERDF policy and therewith gained influence on the policy direction. This way the national government coordinated that all Dutch ERDF programmes focus on innovation and that they prioritize sectors from the ‘Topsectoren’ policy.

The targeted intervention approach is seen as a suitable tool for ERDF policy. The Innovation Union Flagship Initiative has supported the use of smart specialisation at the national and regional level. This has been incorporated in the ERDF legislation, which now requires a S3 strategy to be drafted for each programme. This S3 strategy has a strong targeted intervention approach based policy logic. It has stimulated the focus on the triple helix, the creation of new activities and prioritization of the sectors with the highest innovation potential in the region.

From the policies shaping the Operational Programme only the parts about targeted intervention approach, prioritization and steering towards a focus on innovation have been important. The parts on institutional change, such as most of the NRP, major parts of the Innovation Union Initiative and ‘Topsectoren’ Policy, do not discuss the Operational Programme. This is because of the different approach to innovation and that institutional change does not fit within the policy approach of the Operational Programme.

## 6.3 Complementing policies to the Operational Programme

This paragraph discussed the third sub-question of this study. This is: “How do the policies identified in sub question 1 complement the ERDF in stimulating innovation?”

The Operational Programme is a one of the many innovation programmes contributing to the Innovation Union Flagship Initiative. There is little connection between the ERDF funding and other initiatives of the European Commission. The main alignment taking place is the focus on innovation. Most of the other policies and programmes proposed in the Innovation Union Flagship Initiative focus on institutional change at the European level or are research and innovation programmes set-

up independently from ERDF (European Commission, 2011). ERDF is therewith one of the many programmes contributing to innovation in the EU but it is not aligned in a more detailed way. The only EU programmes specifically mentioned is Horizon 2020, which together with the Dutch national finance for Scientific research (NWO) and the TKI's created for the 'Topsectoren' policy, finance the TRL 1 to 3 which is complementing ERDF by financing all phases in the innovation process (OP-Oost, 2014 & interviewee 2).

The province of Overijssel and Gelderland do complement the ERDF policy. They have integrated the ERDF policy in their economic and innovation visions. The complementing policies the regional level provides are other subsidies (voucher schemes etc.), revolving funds, cluster and network organisations and through the development of business parks. These are all non-institutional policies which try to stimulate innovation and complement the ERDF Operational Programme.

The reason for the provincial economic policies to complement the Operational Programme is two-fold. Firstly, the provinces are responsible for the development of the Operational Programme. To make good use of these funds it is likely that they try to use the funding to complement their own economic vision. Secondly, the province has little power to change institutions in contrast to the national level. They are therefore more likely to use tools which have the policy logic of the targeted intervention approach. This approach can be applied with the mere use of funding. It does not require the power to change institutional arrangements. The Operational Programme fits within the policy toolbox the provinces have been using more often. This makes it easier to design complementing policies and align the Operational Programme with these.

Besides the important of influence of the provincial level on the development of the Operational Programme also the complementation during implementation is strong. Provincial instruments made available complement the ERDF approach and make use of what is already being done by the ERDF programme. The main problem here is that the provincial government only governs 4 years while the Operational Programme runs for 7 years. This might lead to a lower fit of the provincial policy with the ERDF policy, as has been the case in Gelderland.

The complementation with the institutional policies including the EU 2020, Innovation Union Flagship Initiative and the 'Topsectoren' policy is on the shared focus on innovation. The Innovation Union Flagship Initiative has stimulated the focus on innovation. The institutional policies in from the Flagship Initiative then complemented the Operational Programme by stimulating innovation which improves the framework in which the Operational Programme operates. The 'Topsectoren' policy complements this framework more specifically by focusing on institutional factors of the same sectors as the Operational Programme focuses on.

Despite the shared focus on innovation no feedback or coordination takes place between the ERDF policy and the institutional parts of the 'Topsectoren' policy, Innovation Union Flagship Initiative and the NRP policies. They are implemented separately from each other without official feedback or coordination regarding institutional arrangements. Institutional bottlenecks for the ERDF programme are not officially coordinated to higher levels. The S3 strategy has been drafted only for the Operational Programme. It is not used as a tool to make an analysis and strategy for the whole regional innovation system. A SWOT has been made for the region but these results are not dealt with officially in any other provincial or regional policy. This means that the institutional bottlenecks identified in this S3 strategy are not dealt with in a systematic way.

## 7. Conclusion

The targeted intervention approach applied in the ERDF funding in East-Netherlands is most strongly shaped by the EU 2020 strategy and regional policy. The national level has been of less importance. Complementation is mostly done at the regional level because there similar instruments are used derived from targeted intervention approach concepts. The national and European level are more focused on institutional change, which does not fit the position of the ERDF programme in the governance structure.

The analysis done in this study has shown that the approach to innovation differs in the different policies. The national and European level focus more on institutional change, while the region is more focused on the targeted intervention approach. The ERDF Operational Programme is also based on the targeted intervention approach. It is adapted to the practice of policy implementation and therefore does not perfectly resemble the theory but most concepts from the theory can be found in the policy. It uses the targeted intervention approach to stimulate innovation in East-Netherlands by providing subsidies for knowledge exchange and improving the technology of an innovation.

An important reason for the focus on the targeted intervention approach is the governance structure in which the programme has been set-up. The regional level is at the end of the policy chain and has little power to influence the innovation policies higher up. The institutional framework has been set at the European and national level. The provincial level needs to operate within this framework without changing the context. The targeted intervention approach is a suitable policy tool to stimulate innovation without changing the context.

The use of the targeted intervention approach is strongly influenced by the EU 2020 strategy and Innovation Union Flagship Initiative. Firstly, by requiring the ERDF funds to focus on the thematic objectives of the EU 2020 strategy the choice for regions to use the funds for is narrowed down. The European Commission stimulates the regions to focus their ERDF funds on innovation to increase international competitiveness. Secondly, the Innovation Union Flagship Initiative has stimulated the ERDF policy to make use of smart specialization strategies. This requirement has also been taken into the ERDF regulations. This has strongly stimulated the use of the targeted intervention approach concepts for ERDF policy at the regional level.

At the provincial level the Operational Programme funds are a large share of the total available budget. On the European level the Operational Programme is small. The Operational Programme is one of the many innovation policies from the EU 2020 strategy and the Innovation Union Flagship Initiative.

The impact of the ERDF Operational Programme on economic development and higher innovation levels of the region and the EU as a whole is not measured. The subsidies are spent using the targeted intervention approach but the aggregated impact of all these small interventions is unknown. This chapter presents some policy implications derived from the conclusion presented in this chapter and presents some suggestions for further research. Moreover, some limitations of the applied methodology and theory are discussed in paragraph 7.3.

### 7.1 Policy Implications

This study does not aim to argue in favour or against the approach used by ERDF. It puts the innovation approach of ERDF innovation policy in context. This has been done by researching its approach to innovation and its relation with other innovation policies at EU, national and regional level. Four policy implications of this study are presented, based on the conclusion presented at the

beginning of this chapter. Policy makers at the EU, national and regional level could consider these implications in the preparation of the new Cohesion Policy after 2020.

Firstly, the provinces of East-Netherlands have embedded the ERDF Operational Programme into their own policy priorities. Their own policies complement the ERDF programme and the provinces are actively involved in establishing clusters and networks to improve innovation. Policy makers in other European regions could possibly take lessons from this alignment and cooperation at the regional level.

Secondly, the targeted intervention approach is used when implementing ERDF innovation policy. There is a logic behind it which is based on increasing the competitiveness of regions. As discussed in this study (see paragraph 3.3) changing the institutional framework is another way of stimulating innovation. There is little discussion on how the targeted intervention approach complements institutional change and vice versa and how this can be improved. This discussion is important because the focus of ERDF policy on innovation should be more than just an alignment of ERDF policy with the EU and national focus on innovation. It should be used as an efficient instrument complementing national and European innovation policy.

Thirdly, the discussion should also include the necessity to focus ERDF on innovation. The development of the targeted intervention approach is a result of the governance at the regional level in the EU. Policy makers should think about the reasons to use ERDF as an instrument to promote regional competitiveness instead of reducing disparities by focusing on policy which for example provides the region with most economic growth or jobs. The province of Gelderland already changed their economic vision and policies more towards employment and jobs for the region. This discussion is important to prevent the policy hysteresis of Cohesion Policy (Martin, 2012 in Budd, 2013). It should not be the case that ERDF is used as an innovation policy because it already existed in the previous period and has now been aligned with the objective of stimulating innovation to stay competitive at the international level. If the EU wants to stimulate innovation a policy most efficient to reach this objective should be designed.

Fourthly, the targeted intervention approach could be an alternative to institutional change. Changing institutions is a hard and long process. Institutional change impacts the whole system of member states in the EU (Rogdriguez-Pose, 2013). Policy makers should ask the question if they want the whole system to change, which will likely affect other fields. The targeted intervention approach is an alternative tool to stimulate innovation while not radically changing the system. Currently however empirical proof about the effectiveness of the targeted intervention approach and its impact on economic development is lacking. Further research and empirical proof of the effectiveness of the targeted intervention approach is necessary (see paragraph 7.3).

## 7.2 Limitations of the research

This study has certain limitations based on the available resources to the researcher (time, access to interviewees), limits to the available theory and former empirical research and from the method and theory chosen for the research. Some of these limitations are unpreventable such as the limited studies done on the targeted intervention approach, while other limitations are caused by the choices made by the researcher at the beginning of the research process. Five major limitations and their implication for the research are discussed in this paragraph. It is not an extensive discussion of all limitations of the research but a selection which the researcher has considered as most important.

Firstly, the choice to use both targeted intervention approach and the institutional approach have prevented the research to study one of them more in-depth. The choice to use both meant that the

research has been a comparison of how both approaches are used in European innovation policy. A focus on a single focus approach would have given the opportunity to delve deeper into the theory and the use in policy practice. For example, in this research it has been noticed that the ERDF policy does not only focus on creating new activities at cross-over sectors as Foray & Goenaga (2013) argue in the theory. The focus on two approaches has prevented the researcher from further analysing this difference and the consequences this has for the innovation theory and policy. A research using one single theory could have analysed this in more detail. The choice for both theories has however enabled the researcher to show the contrast in innovation policy logic and how these approaches are applied in different governance circumstances.

Secondly, in this study four interviews have been included focused on the regional level and mostly the Operational Programme (except one interview with someone involved in provincial economic policy). This has limited the view of other actors at the European and national level to present their view on innovation policy and ERDF. Limiting the number of perspectives on the ERDF Operational Programme gained through the interviews. A complete critique and discussion of all strengths and weakness is however not the aim of this research. The interviews carried out at the Operational Programme level have been chosen to get a good understanding of how the policy has developed, what approach to innovation it uses and how it is implemented. The inclusion of interviewees from the Operational Programme and provinces was therefore most suitable.

Thirdly, there is little literature on the targeted intervention approach and the concepts used in this theory. The targeted intervention theory is a relatively new theory, which has evolved from policy running ahead of theory (Foray et al., 2011). Little empirical studies on S3 strategies and regional innovation policies have been carried out. This makes it hard to use the concepts from the targeted intervention approach and related them to the actual policy. The policy is based on some of the concepts as operationalized in paragraph 3.5. More available research on the meaning of these concepts for innovation policy and development would strengthen the findings of this study. Moreover, the theory of smart specialization and constructing regional advantage is based on European policy. This study also found that provincial policies strongly resemble with some of the concepts of the targeted intervention approach however their policy logic is a little different. This is for example the case for the revolving funds and the idea of 'knowledge, skills and profit'. These concepts are not discussed yet in theoretical discussion because these theoretical discussions are based on the European innovation policy. It has therefore not been possible to theoretically discuss the relation between these policies and the ERDF policy.

Fourthly, the institutional framework is an abstract concept of which most elements and their relation to innovation have not yet been researched. This made it hard to operationalize the right institutional factors relevant to increasing innovation. Often the link between institutional change is not direct and involves multiple other fields. For example, if it is made easier for SMEs to hire and fire employees this will not directly affect innovation levels in the short term. It might take effect in the long run, however this is not certain. Moreover, it might cause tension with other fields such as labour market protection. This made it hard to determine which institutional factors are important and in which way they influence innovation.

Fifthly, the case study of East-Netherlands gives the result of an ERDF policy in one specific region and it is likely that ERDF innovation policy in other countries is implemented and complemented in a very different way. Conclusions drawn based on this case study can therefore not be copied to all ERDF innovation policy. However, they can function as a comparison or to draw lessons.

### 7.3 Suggestions for further research

This study has applied two different approaches to innovation policy and has shown what approach the ERDF in East-Netherlands uses and how this policy development has been shaped. This can be used as a basis for further studies and policy analysis of EU Cohesion Policy. Moreover, by applying the two approaches this study has identified weaknesses in the concepts from these theories. Further research can develop these concepts and improve their applicability to empirical research. Based on the conclusion presented in this chapter and the limitations discussed in the previous paragraph, some suggestions for further research are given. These suggestions can contribute to future policy analysis and develop the theory and concepts of the targeted intervention approach and the institutional approach applied in this study.

This study has shown how the targeted intervention approach is used as a policy method in ERDF policy. The study however has not evaluated the impact of the approach on innovation in the region. Current evaluations of ERDF innovation funding are mostly done by counting the numbers of SMEs supported and the numbers of networks established (Managementauthoriteit Oost-Nederland, 2017; interviewee 2). There is however no method to evaluate the amount of 'innovation' generated by a programme. Further research can contribute to finding methods to evaluate the targeted intervention approach and its impact on regions. This is important for policy makers and their accountability for the policy implemented.

Further research can also contribute by doing more empirical research on the institutional approach. The current concept of institutions in the theory is very abstract and institutional factors influencing innovation have not been researched individually. More empirical research of institutional factors influencing innovation can contribute to further develop these concepts. This will help to make the theory less abstract and more fit to make innovation policy analysis.

Another point is that the provinces in the Netherlands use instruments which are based on concept from the targeted intervention approach, such as constructing regional advantage. However, the targeted intervention approach and especially smart specialization are based on the European policy practice. Development of concepts fit to the provincial context and discussion about innovation policy on this level is can contribute to a better understanding of the provincial policies implemented and to develop the theoretical concepts for multiple contexts.

The last suggestion is that further research could study the relation between the targeted intervention approach and the institutional approach more in-depth. The European and national level have a strong focus on institutional policy, while the regional level is focuses on the targeted intervention approach. In the policies and theory there is however no discussion on how the two approaches complement each other. Further research could study this complementation. This could for example be research on which institutional setting is beneficial for a policy based on the targeted intervention approach.

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## Annexes

### Annex I: List of interviewed persons

Respondent nr	Organisation	Function
1	Province of Gelderland	Programme manager for ERDF
2	Province of Overijssel	Involved in the development of the ERDF programme.
3	Province of Overijssel	Programme manager for ERDF and accountholder of revolving fund for innovation
4	Provincie Gelderland	Economic policymaker for the province

## Annex II: Themes used for the document analysis

Theme	Description	Elements included:
General Info	This part of the text discusses general info of the policy. This is information not directly related to the innovation system of institutional approach but relevant to understand the policy aims.	
Europe 2020 and Innovation Union	This part of the text refers to a link with Europe 2020 or the Innovation Union Flagship Initiative	
ERDF	This part of the text discusses the policies actions and discussions of ERDF funding and policy.	<ul style="list-style-type: none"> <li>- Cohesion Policy</li> <li>- ERDF</li> </ul>
National Policy	This part of the text discusses the link of the document national policies on innovation.	<ul style="list-style-type: none"> <li>- National Reform Programme</li> </ul>
Regional Policy	This part of the text discusses what the approach of the policy is towards the region and regional policies.	<ul style="list-style-type: none"> <li>-</li> </ul>
Innovation general	This part of the text discusses the policies understanding of innovation. These are not specific policy measures such as the institutional approach or targeted intervention. These are rather discussions on how the concept of innovation is understood by the policy.	
Institutional approach	This part of the text discusses policy measures aiming at institutional measures.	<ul style="list-style-type: none"> <li>- Changing regulations</li> <li>- Removing barriers to market access</li> <li>- Reducing administrative actions for businesses</li> <li>- Creating a more dynamic business environment</li> </ul>
Sector wide policy	This part of the text discusses policy which are not targeted interventions but aim at sector wide interventions.	<ul style="list-style-type: none"> <li>-</li> </ul>
Not sector-specific policy	This part of the text discusses policy actions which are not sector-specific.	<ul style="list-style-type: none"> <li>- R&amp;D</li> <li>- Research volumes</li> </ul>
Targeted intervention approach	This part of the text discusses policy measures aiming at targeted intervention measures.	<ul style="list-style-type: none"> <li>- Smart specialization</li> <li>- related variety</li> <li>- differentiated knowledge base</li> </ul>

		<ul style="list-style-type: none"> <li>- triple-helix</li> <li>- distributed knowledge networks</li> </ul>
Infrastructure	This part of the text discusses innovation in relation to infrastructure. Such as the connectivity of business parks, cities and rural areas.	
Access to finance	This part of the text discusses the problem of firms to not have access to finance for innovation. This is seen as a market failure	
Commitments for the member states	This part of the text discusses a commitment made in the Innovation Union Flagship Initiative.	<ul style="list-style-type: none"> <li>- European Commission commitment</li> <li>- Member state commitment</li> <li>- Regional Commitment</li> <li>- European Commission and member state commitment</li> <li>- Member state and regional commitment</li> </ul>

## Annex III: Interview guide

### Introduction

#### 2. Introducing questions:

- What is your relation to the Operational Programme?
- When did you become involved in the programme?

#### 3. Getting to know OP-Oost

- How is the OP-Oost programme developed?
- How does the daily business of OP-Oost function?
  - How does the governance of OP-Oost function?
- Why does the Operational Programme focus on innovation funding?

#### 4. Innovation system

- What is the role of the triple helix concept in the programme?
- Why are sectors prioritized for the Operational Programme?
- What is the role of institutions in the Operational Programme?
- How is innovation stimulated by the programme?
- Does the Operational Programme provide feedback on institutional problems encountered?
- What is the role of cross-overs in the Operational Programme?

#### 5. Related policies

show figure with policies identified in the document analysis

- Do you have any policies to add which are important for the implementation or development?
- What is the link of the OP with ... (refer to each of the policies in the figure)?
- How has the .... policy shaped the development of the OP?
- How does this policy come back during the implementation?
- How does the innovation approach of the OP relate to the innovation approach of ....?

#### Summarize conclude interview