The government as actor in open innovation

How the Dutch government stimulates open innovation

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Preface

In order to finish my master Business Administration, master track Innovation and Entrepreneurship, I conducted a research on the stimulation of open innovation in the Netherlands. In my pre-academic year I followed for the first time an innovation course and I was directly interested in this subject. It was directly clear that I want to follow the master track Innovation and Entrepreneurship. Therefore, it was great to get the opportunity to conduct a research on this matter within the University of Twente.

The objective of my research was to get a better view on the role of the government in stimulating open innovation within companies in the Netherlands. Therefore, I systematically assess the existing Dutch (open) innovation policies. This study also has been accompanied by quite some interaction, because I conduct interviews with policy makers, policy performers and companies to evaluate the existing innovation policies. This was very informative and very enjoyable for me. These conversations give me the opportunity to look inside companies and the government.

My graduation assignment has been facilitated to a large extend by my supervisors of the university, especially Dr. F.L.M. Faems. It was very enjoyable to do my research at the Operations, Organizations and Human Resources department. My graduation became more pleasant because of the enjoyable coffee and lunch breaks with members of this department. I would to thank Dries Faems who took a lot of time by reading my concepts every time and provided very useful feedback each time. Every meeting motivated me to get more out of this research. Ineke Jenniskens has been a great support as well because of the input in this research and the useful suggestions she provided.

Last but not least I would like to thank my family and my friends for providing me excellent relaxation moments. Especially I would to thank my girl friend Mariëlle for your understanding, support and for providing me with a setting that enable me to keep going on. All these pleasant moments made this half-year period an absolute great finish of my student years!

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Executive Summary

Over the past years there has been a shift from closed to open innovation in management literature. A lot of attention has paid to the open innovation paradigm. Research on open innovation has mainly focused on companies and knowledge institutes. However, innovation system literature identifies a third important actor, namely the government. With this thesis I want to focus on this important actor of open innovation. Therefore, this study systematically assess the Dutch politics on open innovation. In this research is made a distinction between generic and programmatic policies. Generic policies focus on short term results, participation is individually or a collaboration between companies and/or knowledge institutes. The results are only for the participants. A programmatic policy has the objective to realize a goal in the future. Programmatic policies are an impulse to start an initiative which will be further developed by the market. The focus of this thesis is on the generic (open) innovation policies.

Following from this study is that the Dutch politics on open innovation offers space for improvements. A list of eight recommendations has been made up, which contribution can be found in stimulating a more open manner of innovation in the Dutch knowledge economy. These are:

1. Stimulate with open innovation policies the creation of interactions and networks between companies.
2. Enlarge SBIR Pilot with more budget and make this open innovation policy applicable to every start up and SME.
3. Focus in open innovation policies more on the use of created knowledge which is available in knowledge institutes.
4. Stimulate companies more to participate in fundamental research.
5. Try to interest companies in open innovation with more open innovation policies which focus on the outside-in process and reduce open innovation policies which focus on the coupled process.
6. The government should actively participate in innovation projects and help companies to develop new ideas and not only giving subsidy.
7. The government should use different instruments like subsidies, innovation advisors like Syntens, government as customer of innovation and an electronically knowledge bank.
8. The government should companies make more aware of the necessarily of open innovation.

The conclusions which form the basis for these recommendations are clarified briefly below. 1) With open innovation policies the goal of creating public-private interactions and networks is only reached in doing research and not in the development and commercializing of open innovations. It is also important that there will be created networks of companies in order to develop and commercialize open innovations. 2) To strengthen start ups and SME's the government have to invest more to reduce the risks of start ups and SME's. To enlarge SBIR Pilot with more budget and to make this open innovation policy applicable for every start up and SME, the government reduce these risks. 3) Companies recognize the need for open innovation, but only participate in open innovation when it is necessary for the production process. Because companies do not actively collaborate with knowledge institutes other than is necessary for the production process, companies do not know which knowledge is available and do not use this

knowledge. 4) Open innovation policies stimulate especially the research stage of open innovation, while companies especially invest in the development stage of open innovation. In order that companies could invest and produce in the future it is very important for a knowledge economy that new created knowledge will be used to produce new products and services. 5) The government is especially stimulating the coupled process of open innovation, while companies use especially the outside-in process of open innovation. To interest companies in open innovation the government must stimulate the outside-in process with open innovation policies. When companies participate in these open innovation policies the government must try to stimulate these companies to participate in the coupled process of open innovation. 6) The government can play an important role in open innovation. This is not only giving money but support companies in the development of new ideas. 7) There can be identified a gap between the instruments the government want to use and the government really use. This aspect is strong related to the role of the government in open innovation, the government should participate more actively in innovation projects. 8) There can be concluded that the different methods to inform companies about innovation policies have no effect when companies are not aware of the long-term effects of open innovation.

The Dutch government also recognize some limitations of the generic open innovation policies and therefore there are developments in the Dutch open innovation policies. Nowadays the focus of open innovation policies is to stimulate public-private collaboration, the so called programmatic policies. To wrap up, the current generic open innovation policies offer space for improvements. A start has been made to capture these limitations with the introduction of programmatic open innovation policies.

Table of content

Introduction

Motive

Industrial research on innovation applied the policy that hiring the best possible people and stimulating them to generate intellectual property would provide the most effective route to technological innovation. "Companies have to generate their own ideas that they would then develop, manufacture, market, distribute and service themselves"[1]. Based on the belief that tapping as many bright people as possible can translate in more innovative ideas, industrial research has widened its scope to become more collaborative and open minded. Chesbrough (2003) describes an innovation paradigm shift from a closed to an open model. In the open innovation model organizations commercialize external as well internal ideas by deploying outside pathways to the market. In a knowledge economy like the Dutch one, it is important to combine external knowledge with internal knowledge in order to develop new insights. Developing new knowledge and technologies is important to stay competitive in a knowledge economy.

In order to combine internal and external resources to develop new insights, products and processes, organizations move outside the boundaries of the organization. If organizations move out of the single organization, lateral relationships across boundaries become more important. To understand these relationships the concept of innovation system is introduced. An innovation system is the system of interactions between industry, government and academics in the process of development, diffusion and use of knowledge in the innovation process (Lundvall, 1985; Freeman, 1987; Nelson, 1993). The term innovation system points attention to the broader institutional, societal and economic environment in which the activities of knowledge creation, knowledge diffusion and exploitation take place (Lundvall, 1992).

Open innovation scholars have mainly focused on the role of companies and knowledge institutes in innovation systems. However, innovation system literature has identified a third important actor, namely the government. Government policies have a direct impact on the innovation environment in which companies operate and the R&D productivity of a country/region through the creation of institutional factors such as the legislation with respect to intellectual property, competition and taxation policies, and government spending in research activities (OECD, 1997). By stimulating collaboration between companies, universities and the government, policy makers can contribute to a higher innovative capacity of the innovation system.

The objective of this thesis is on the identified third important actor, the role of the government in open innovation. In order to analyze the role of the government the focus of this thesis will be on the Netherlands.

Research objective

To analyze the role of the government in stimulating open innovation in the Netherlands the next research objective is formulated.

"In this thesis we want to get a better view on the role of the government in stimulating open innovation within companies in the Netherlands. In order to do so, we systematically assess the existing Dutch innovation policies and conduct interviews with policy makers, policy performers and companies to evaluate the existing innovation policies."

[1] Henry W. Chesbrough. The erea of open innovation, 2003

Research questions
To analyze the formulated research objective the next research questions are formulated.

1 What are the current policies in the Netherlands to stimulate open innovation?
2 How do companies, policy makers and policy performers evaluate the existing policies?

Relevance
This research has an important added value for the existing policies of the Dutch government regarding stimulation of open innovation. The analysis of open innovation stimulating policies allows for evaluation of the current policy measures in the Netherlands in terms of their effectiveness. This analysis therefore provides a basis for improving the existing policy measures for stimulating open innovation within the Netherlands.

Design
To understand and analyze the role of the government in stimulating open innovation three concepts are important, namely open innovation, innovation system and the role of the government. So the first three chapters of this thesis set these concepts in a theoretical perspective. These chapters discus what is meant by these concepts and which aspects are important to analyze the role of the government in stimulating open innovation.
The fourth chapter describes the methodological issues of this thesis. The three theoretical concepts are operationalised in a theoretical model. In order to analyze the objective of this thesis two research questions are formulated. In the methodological chapter, it is explained how these research questions will be analysed and why the selected methods are used.
After the methodological chapter the results of the analysis are described. The results consist of two parts. In the first part all the innovation policies in the Netherlands are mapped. In the second part, the results of the interviews with the companies, policy makers and policy performers are described.
In the last chapter of this thesis the results are discussed. Therefore the developed theoretical model is combined with the results of the mapping of innovation policies and with the results of the interviews. There are recommendations formulated for the government to stimulate open innovation.

1. Open innovation

In this master thesis the role of the Dutch government in the innovation system to stimulate open innovation will be evaluated. The entire thesis is build around three concepts: open innovation, innovation systems and the role of the government in the innovation system.

1.1. Open innovation

In the first part of the theoretical framework the concept open innovation will be explained. This chapter begins with explaining the shift from closed innovation to open innovation and the differences between it. In the second paragraph the importance and added value for the economy will be outlined. Open innovation could also be characterized in different typologies, this is the subject of the third paragraph. In the least paragraph the management of open innovation will be discussed.

Chesbrough (2003) introduced the concept of open innovation which is commercializing internal as well external ideas by deploying in-house as well outside pathways to the market. In the articles of Chesbrough the shift from a closed to an open innovation model has been discussed. The evidence for the open innovation model is taken almost exclusively from the so called high technology industries such as computers, information technology and pharmaceuticals. As stated in the article of Chesbrough and Crowther (2006) concepts of open innovation are finding application in firms outside the high technology industries.

The following is an outline of what is argued in the articles of Chesbrough (2003, 2006). In the past, a successful internal R&D department was a strategic asset and even a barrier to entry for competitors in many markets. Nowadays the leading industrial enterprises of the past have been encountering strong competition from many start-ups. These newcomers conduct no or little research by themselves, but get new ideas to the market through a different process. In the old system, which is called the closed innovation model (figure 1), successful innovation requires control. Companies generate new ideas themselves and also develop, manufacture, market, distribute and service the products themselves. For years this model was held to be the "right way". Toward the end of the 20th century, a number of factors combined to erode the underpinnings of closed innovation in the United States. Important factors were the dramatic rise in the number and mobility of research workers and the growing availability of private venture capital. In the new model organizations commercialize external as well internal ideas by deploying outside pathways to the market. This is called the open innovation model (figure 2). The boundary between an organization and the surrounding environment is more porous, enabling innovation to move easily between the two.

It is not argued that every industry has been or will migrate to an open innovation model. For example the nuclear-reactor industry, which depends mainly on internal ideas and has low labor mobility, little venture capital, few start ups and relatively little research conducted at universities (Chesbrough, 2003). Whether this industry migrates to open innovation is questionable. Some industries have been open innovators for some time. For example Hollywood, which for decades has innovated through a network of partnerships and alliances between production studios, directors, talent agencies, actors, script writers, independent producers and specialized subcontractors (Chesbrough, 2003).

Useful knowledge has become widespread and ideas must be used with enthusiasm. If a company does not do this, the company will be lost. Such factors create a new logic of open innovation that embraces external ideas and knowledge in conjunction with internal

R&D. Companies that can harness outside ideas to advance their own business while leveraging their internal ideas outside their current operations will likely prosper in this new area of open innovation.

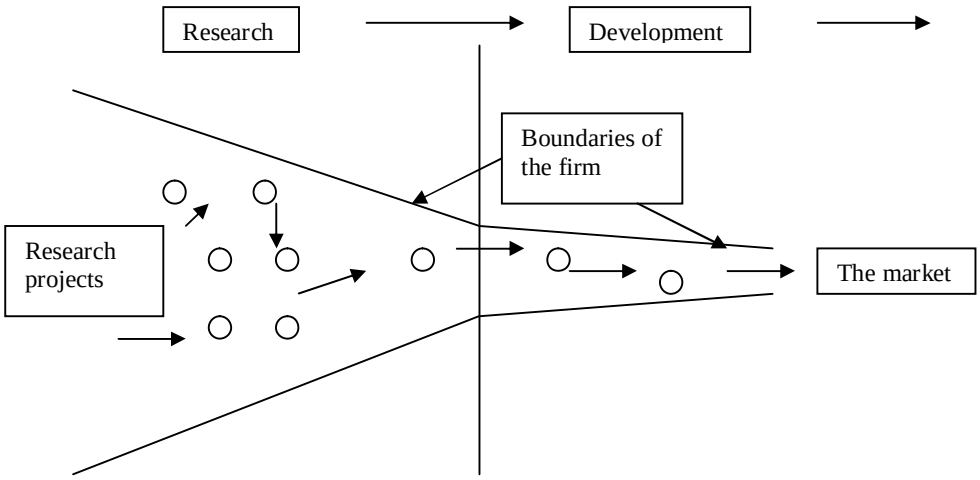

Figure 1: Closed Innovation model (Chesbrough, 2003, page 36)

The shift from closed innovation to a more open model of innovation must in the first place be realized by companies. Not all the new ideas come from inside the company and not every new idea has to be developed within the company. The next table is an illustration of that shift.

Closed innovation	***Open innovation***
The smart people in our field work for us	Not all of the smart people work for us, so we must find and tap into the knowledge and expertise of bright individuals outside our company
To profit from R&D, we must discover, develop and ship it ourselves	External R&D can create significant value; internal R&D is needed to claim some portion of that value
If we discover it ourselves, we will get it to the market first	We don't have to originate research in order to profit from it
If we are the first to commercialize an innovation, we will win	Building a better business model is better than get to the market first
If we create the most and the best ideas within the industry, we will win	If we make the best use of internal and external ideas, we will win
We should control our intellectual so that our competitors don't profit from our ideas	We should profit from others use of our intellectual property and we should buy others IP whenever it advances our own business model

Table 1: Contrasting principles of closed and open innovation (Chesbrough, 2003, page 38)

There should be a shift of thinking within companies about the company self and the environment. To involve other institutions for developing and distributing new products and services could have enormous added value. Hereby could be thought off other companies in the sector, suppliers, universities, and of course the end user.

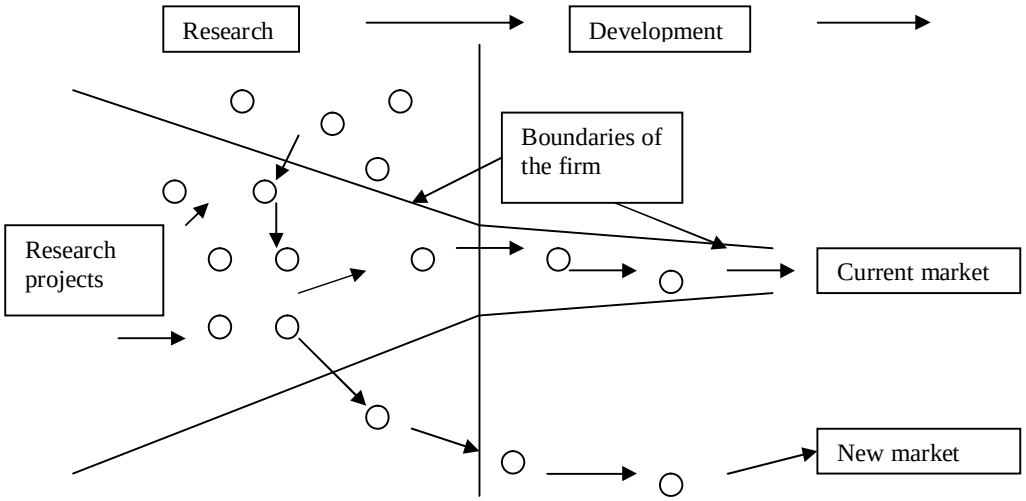

Figure 2: Open Innovation model (Chesbrough, 2003, page 37)

1.2. Added value of open innovation

According to West and Gallagher (2004) models of open innovation offer the promise that firms can achieve a greater return on innovative activities and resulting intellectual property. Other reasons are to be found in shorter innovation cycles, industrial research and development's escalating costs (Gassmann and Enkel, 2004). The recent area of open innovation started when practitioners realized that companies wished to commercialize both internal ideas as well as other firm's innovations. The phenomenon is reinforced by the increasing globalization of research, technologies and innovation, by new information and communication technologies as well as by new organizational forms and business models. Not all aspects of open innovation are completely new. The concept of open innovation argues that collaboration is very important trough for example alliances or networks. But the importance of collaboration for organizations was already argued by Porter (1980). He suggested that cooperation may enable partners to achieve a stronger position together than they could alone. Other scholars have further explained the importance of collaboration through introducing different forms of collaboration like alliances and networks.

Open innovation will lead to added value for participating firms by the following three aspects (De Rochemont et al., 2007). First, firms must have access to new knowledge by cooperating in networks. This enhances the innovative potential of an organization. Second, by combining resources in which cost and risk reduction play a critical role, new knowledge can be developed which was impossible for each member to obtain alone. Third, by cooperating with different partners along the value chain, firms are able to cover a larger part of the value chain. This can lead to increased added value for customers by offering a total solution. Thus, open innovation increase the innovative potential of firms and leads to integrated innovation across the value chain. Hence, open innovation has many potential benefits to increase the added value of Dutch firms and that could strengthen the competitive position of the Dutch industry as shown in figure 3 (Vanhaverbeke et al., 2007).

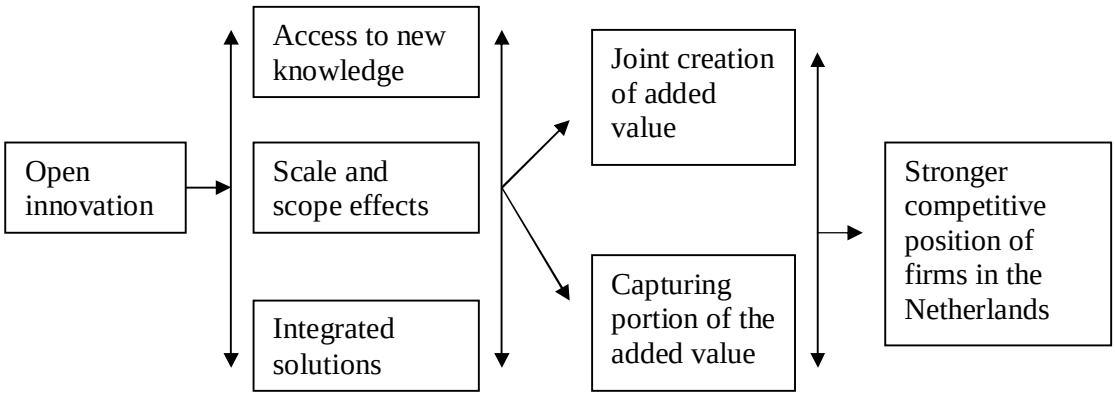

Figure 3: How open innovation can increase the competitive position of Dutch firms (Vanhaverbeke et al. 2007)

Another context in which open innovation could help are the problems of small countries. The important experience of small countries, incapable of investing public research budgets over a wide range of technological areas and possessing relatively few large corporations, therefore having to be selective about areas of innovative strength and well-organized to monitor and absorb valuable innovations form elsewhere (Cooke et al. 1997). To monitor and absorb innovations from elsewhere, collaboration between different partners is needed.

1.3. Different processes of open innovation

Open innovation has different characteristics and there are several forms of open innovation. In this section we make a distinguishing between three open innovation processes.

1.3.1. The outside-in process

This process focuses on to enrich the company's knowledge base through the integration of suppliers, customers and external knowledge (Gassmann and Enkel, 2004). In this process companies integrate internal company resources with the critical resources of other supply chain members. Firms that fail to exploit such external R&D may be at severe competitive disadvantage (Rosenberg and Steinmueller, 1988).

Examples of integrating external resources are early supplier integration, in-licensing and patent buying. By using supplier's additional resources, skills and capabilities, companies can develop and maintain a competitive advantage by reducing costs and cycle time and by offering more customized product characteristics or better product quality (Fliess and Becker, 2005). Technology licensing offers a firm the opportunity to exploit the intellectual property of another firm, normally in return for payment of a fee and royalty based on sales (Tidd et al., 2005). Licensing-in a technology has a number of advantages over internal development, in particular lower development costs, less technical and market risk, faster product development and market entry. West and Gallagher (2004) identify new and creative ways to incorporate external innovation into company product development. External knowledge could be identified in four external sources: suppliers and customers, universities, government and private laboratories, competitors and other nations (von Hippel 1988). A method to incorporate especially competitors and other nations are strategic alliances and joint ventures. Faems (2006) define strategic alliances as formal agreements between a limited numbers of otherwise independent organizations. A strategic alliance typically has a specific end goal and time table and does

not take the form of a separate company (Tidd et al., 2005). Strategic alliances do not only focus on research issues, but also on the development stage of new products and processes.

1.3.2. The inside-out process

This process focuses on earning profits by bringing ideas to market, selling IP and multiplying technology by transferring ideas to the outside environment (Gassmann and Enkel, 2004). Companies use the inside out process in order to bring ideas and innovations to the market faster than is possible through internal development. Outsourcing is a method that can be used to channel knowledge or ideas to the external environment. The benefits of outsourcing will like, including gaining access to new areas of knowledge, managing capacity problems, concentration of core competencies, speed and the sharing of costs (Haour, 1992). Tidd et al. (2005) introduce the concept of outsourcing in relation with supplier relations and subcontracting. Most of the subcontracting or outsourcing arrangements are based on the potential to save costs. Suppliers may have lower overheads and variable costs, and may benefit from economics of scale if serving other firms. Also strategic alliances and joint ventures could be used to exploit internal ideas and innovations. In the outside in process these two forms would be used to gain external knowledge, while in the inside out process these two forms would be used to exploit internal knowledge. The same strategy could be used for technology licensing. In the inside out process technology licensing is not used to exploit intellectual property of another firm, but the other firm exploit the company's internal intellectual property. Technology licensing can be a powerful strategy in remaining a market leader and in creating competitive advantage. Technology licensing and spin-off companies are two important means of commercializing technology (Roberts and Malone, 1996).

A spin-off is new company that is formed by individuals who where former employees of the parent organization, and a core technology that is transferred from the parent organization (Steffensen et al., 1999). Because technology transfer is important, a spin-off is typically founded around a core technological innovation that was initially developed at the parent organization.

The different approaches within the inside-out processes can be summarized as: leveraging a company's knowledge by opening the company's boundaries and gaining advantage by letting ideas flow to the outside (Gassmann and Enkel, 2004). Effective open innovation is identifying new and creative ways to exploit internal innovation (West and Gallagher, 2004).

1.3.3. The coupled process

This process focuses on collaboration among organizations to develop new ideas, products and knowledge. In order to do so, companies work together in strategic networks. Inter-organizational networks play an important role in the realization of open innovation (Vanhaverbeke, 2006). Increasingly, firms are working as part of broader networks to create customer value (Das and Teng, 2002 and Vanhaverbeke, 2006). Examples of these networks are research consortia and innovation networks. Research consortia consist of a number of organizations working together on a relatively well-specified project (Tidd et al., 2005), while there is no clear definition of an innovation network. There are numerous models of networks, each emphasizing different aspects depending on the research questions. A network can be thought of as consisting of a number of positions or nodes, occupied by individuals, firms, business units, universities, governments, customers or other actors, and links or interactions between these nodes. National systems of innovation are an example of an innovation network at a high level

of aggregation (Tidd et al., 2005). Consortia, defined as multi-firm collaborations, take two main forms, between competitors and between non-competing firms. The reasons for joining a research consortium include sharing the costs and risk of research, pooling scarce expertise and equipment, performing pre-competitive research and setting of standards (Tidd et al., 2005).
Co-development is also a form of the coupled process. Co-development partnerships are an increasingly effective means to improve innovation effectiveness. These partnerships embody a mutual working relationship between two or more parties aimed at creating and delivering a new product, technology or service (Chesbrough and Schwartz, 2007). The use of partners in the research and/or development of a new product or service create business model options that can significantly reduce R&D expense, expand innovation output, and open up new markets that may otherwise have been inaccessible.
To co-operate successfully, give and take of knowledge is necessary. Co-operation refers to the joint development of knowledge through relationships with different partners, such as consortia with competitors, suppliers and customers, joint ventures and alliances as well as with universities and research institutes.

The three types of open innovation processes could be used in the exploration stage of open innovation as well in the exploitation stage of open innovation. To visualize these open innovation processes the model of Chesbrough (20003) is used (figure 4).

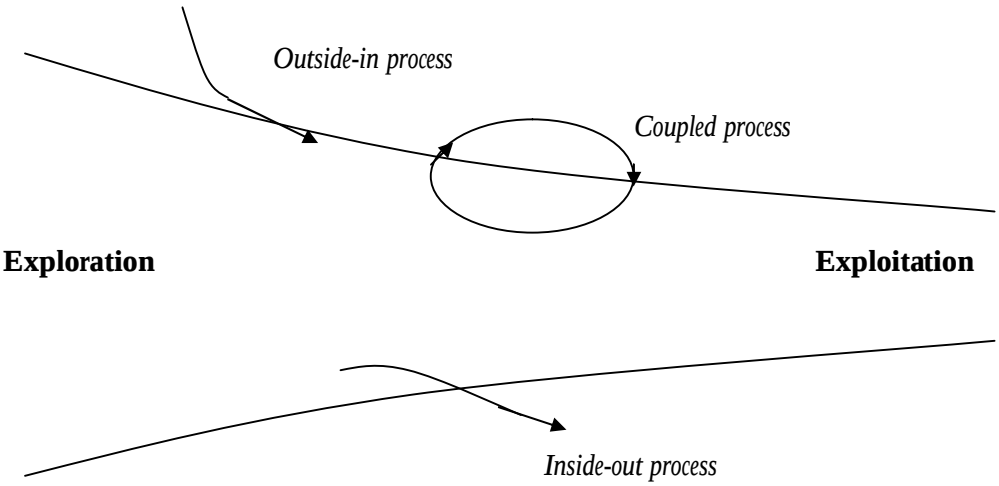

Figure 4: Three types of open innovation processes

1.4. Managing open innovation

Collaboration with a number of partners is more complex because of increased coordination and control efforts (Das and Teng, 2002). Previous research has demonstrated that companies do not feel comfortable in these "open" scenarios in which the return especially depends on the partnering actors. To influence this return the most appropriate organizational form and management style has to be chosen to be successful (Chiesa and Manzini, 1998). Therefore a process is developed to choose the most appropriate organizational form and management style. First of all, a company must define a set of requirements for the collaboration in terms of flexibility, control, time

horizon, impact on the firm, costs and formalization. Second, negotiate the form of collaboration to be adopted with the potential partners. Third compare the requirements with the characteristics of the negotiated organizational forms of co-operation. Fourth choose the most appropriate organizational mode for co-operation among those identified, if a satisfactory match between the collaboration's requirements and the organizational form characteristics is found with partners.

Gassmann and Enkel (2004) argue that to stay competitive in innovation requires more than a few changes in a company's innovation paradigm. One of these changes is transforming company's solid boundaries into a more semi-permeable membrane to enable innovation to move more easily between the external environment and company's internal innovation process. A consequence of this is that companies are more sensitive for technological and market uncertainty. In circumstances of significant technological and market uncertainty, companies need to "play poker" as well as chess (Chesbrough, 2004). Measurement errors (false positivism and false negativism) are likely to arise from judgments about the commercial potential of early stage projects (Chesbrough, 2004). The differences in managing open innovation when playing poker or chess are about resources. By chess the resources are well defined and a company must plan several moves ahead. Also the resources of the competitors are well understood. Instead of playing chess, playing poker is adapting and adjusting when new information arrives. The resources of the company and the competitors emerge over time and new information arrives regularly. The process of playing chess fits with the roadmap of future projects and with the current business model, while playing poker create options for future business and leverage or extend the business model.

Ambient intelligence has proved instrumental in the realization of open innovation and integrating of external knowledge sources (Aarts, 2005). In the world of ambient intelligence, devices work collectively. The broadness of the vision allows many different partners to contribute from within their specific angles. An example is the European Technology Platform which use the vision of ambient intelligence to define their strategic research agenda for the development of embedded systems called Artemis. This has the characteristics of a network. According to the article of Gulati et al., (2000) networks typically tend to be dynamic, this implies that the dynamics of the network have to be managed continuously. A network can give important insights to better comprehend these dynamics because networks provide a way of understanding why some firms get locked-in and why others get locked out of old and new dominant designs. Chiesa and Manzini (1998) characterize collaboration as a dynamic process which evolves over time as a consequence of partners learning processes and of the evolution of the external context. It can be argued that the organizational mode of collaboration may evolve too. Furthermore, the adequacy of the organizational form is also linked to the company's previous experience. First, previous experience determines the firms' capabilities in managing technological collaborations. Second, previous success and/or failure may affect the firms' attitude towards some forms of co-operation.

1.5 Summary

Open innovation is commercializing new internal or external ideas to the market with in-house or outside pathways. This will lead to added value for organizations, because organizations can achieve a greater return on innovative activities and resulting intellectual property. Together this will strengthen the competitive position of the Dutch knowledge economy. To realize these advantages organizations could innovate in an open manner through three different processes. The first process is from outside in the

company, integrating internal company resources with the critical resources of other supply chain members. The second process is from inside out the organization, identifying new and creative ways to bring ideas and innovations to the market. The last process is the coupled process in which the outside in and inside out process are coupled by working together with complementary partners. These processes ask for a management style which could coordinate and control the collaboration with the partners.

2. Innovation system

In the second part of the theoretical framework, the concept of innovation systems will be explained. The first paragraph of this chapter defines the concept of innovation systems and explains the different forms of innovation systems. The second paragraph discusses the added value of innovation systems for innovation. The concept of innovation systems is divided in different dimensions which will be explained in the third paragraph. The innovation system has possibilities to evaluate the success of the system, this will be explained in the fourth paragraph. The success of the innovation system is also the performance of the system for the economy, this is the topic for the last paragraph.

2.1. The concept of innovation systems

Lundvall (1985) introduces the concept of innovation systems. There is no consensus about the exact definition of an innovation system and the concept is still emerging. A core element of the concept is that it contains the interaction between the actors who are needed in order to turn an idea into a process, product or service on the market. Open innovation system stresses the point that organizations do not innovate in isolation, so innovation has to be seen as a collective process. In the innovation process firms interact with other firms as well as with non-firm organizations such as universities, research centers, government agencies, financial institutions and so on. The linkages between these different partners can be specified in terms of flows of knowledge and information, flows of investment funding, flows of authority and even more informal arrangements such as networks, clubs and partnerships (Cooke et al., 1997). However Lundvall (1985) introduced the concept of innovation systems there are other scholars which classify different innovation system approaches.

Within the academic and policy spheres, the Innovation System concept can take several forms based on criteria of classification: spatial, technological, industrial or sectoral. Malerba (2002) introduces the concept of sectoral system of innovation and production. This provides a multidimensional, integrated and dynamic view of sectors. It is proposed that a sectoral innovation system is a set of products and the set of agents carrying out market and non-market interactions for the creation, production and sale of those products. Agents are individuals and organizations at different levels of aggregation. The interaction is through processes of communication, exchange, co-operation, competition and command, and these interactions are shaped by institutions. Over the last decade several concepts representing the systemic perspective on innovation have been developed. In the beginning of the 1990s the concept technological innovation system is developed (Carlson and Stankiewitz, 1991). The literature on regional innovation systems of innovation has grown rapidly since the middle of the 1990s (Cooke, 1996; Maskell and Malmberg, 1997). The focus of this thesis is on national level, therefore the concept national innovation system will be defined and further explained.

National innovation systems could be defined by a group of characteristics and its relationships to produce, diffuse and use new knowledge, all of which are often found together only within the limits and boundaries of the state (Lundvall 1992; Cooke et al., 1997). The first notable, widespread, and significant instance of a country's adopting the concept was Finland in 1992 (Vuori and Vuorinen, 1994). The concept national innovation system can be divided in three parts, namely national, innovation and system (Cooke et al., 1997). The every day meaning of national is taken to be those persons who are citizens of a sovereign state. But of course states can compromise many nations.

Nation could also be people sharing a common language, culture and territory. The strictest and most conventional sense of innovation may be understood as: the process by which firms master and put into practice product designs and manufacturing processes that are new (Nelson and Rosenberg, 1993). In the opinion of the authors who made the national innovation system concept widely known, innovation can not be limited to the narrow interpretation of mainly production firms. The common accepted meaning of innovation in the sense of Schumpeter (1975) went beyond a simple reference to improvements in production techniques or products to also include opening up new markets for example. Technological change in a wider sense goes far beyond mere technical progress; it also implies changes in organization, behavior and the way in which different agents in a system relate to each other. A system could be defined as made up of components, relationships and attributes (Carlsson et al., 2002). Components are the operating parts of a system and the relationships are the links between the components. Attributes are the properties of the components and the relationships between them; it characterizes the system. Lundvall (1992) makes the basic point that a system consists of a number of discrete elements and relationships between them. An innovation system, therefore, comprises elements of consequence to innovation and the relationships amongst them.

2.2. Added value of innovation systems

The importance derives from the networks of relationships which are necessary for any firm to innovate (Freeman, 1995). Whilst external connections are certainly of growing importance, the influence of the national education system, industrial relations, technical and scientific institutions, government policies, cultural traditions and many other national institutions is fundamental. The possibilities of having a integrated and consistent analysis of sectors in the interrelated features, understanding their working and transformation or comparing different sectors with respect to several dimensions (such as the type and role of agents, the structure and dynamics of production, the rate and direction of innovation and the effects of these variables of the performance of firms and countries) is still very limited (Malerba et al., 2002). The triple helix model of Leydesdorf and Etzkowitz (1996), which will be discussed in the next paragraph, has prompted many to consider how these relations have changed, are changing and are likely to change.

In Europe, issues of knowledge and technology transfer have moved to the forefront of attention in economic, social and industrial policy (Etzkowitz, 2002). As the sources of future development increasingly derive from open innovation, attention must be paid to non-traditional sources that have the potential to become the basis for construction of new business and social models as well as the renovation of old ones. Innovation systems are the set of relationships in which these new or renovated models could be developed. If there are trilateral relationships between industry-academia-government innovation systems support attention for non-traditional sources (Leydesdorf and Etzkowitz, 1996; Etzkowitz, 2000).

2.3. Dimensions of the innovation system: The triple helix model

Looking from an innovation system perspective, Etzkowitz and Leydesdorff (2000) have launched the concept of the triple helix. The triple helix is a spiral model of innovation that captures multiple reciprocal relationships at different points in the process of knowledge capitalization (Etzkowitz, 2000). The triple helix denotes the university-industry-government relationship as one of relatively equal, yet interdependent, institutional spheres which overlap and take the role of the other. There has been a shift from the model of the state encompassing industry and academia to a model with

separate institutional spheres. A new institutional configuration to promote innovation change the model from one of strong boundaries between separate institutional spheres and organizations to a more flexible overlapping system, with each taking the role of the other. To understand these changes in the triple helix model, different kinds of triple helix models are discussed.

The first model of the triple helix is the Triple Helix I (see figure 6). In this configuration the nation states encompasses academia and industry and direct the relations between them. The state incorporates industry and the university. Examples of nations which have used this model could be found in the former Soviet Union and Eastern Europe countries, when state owned industries were predominant.

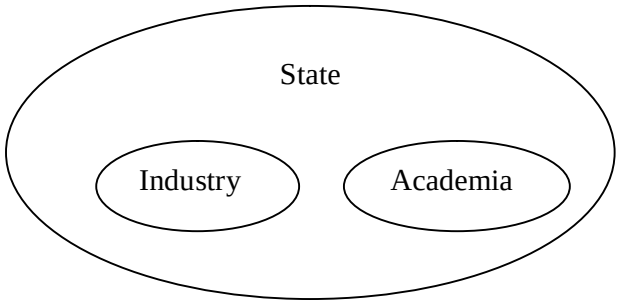

Figure 5: An etatistic model of industry-academia-government relationships

A second policy model consists of separate institutional spheres with strong borders dividing them and circumscribed relations among the spheres (see figure 7). An example is of this how the US is supposed to work at least in theory.

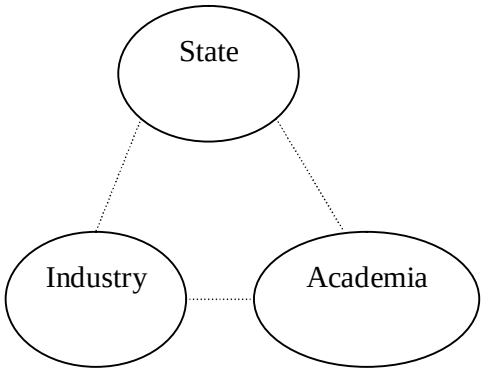

Figure 6: A "Laissez faire" model of industry-academia-government relations

Finally, triple helix III is generating a knowledge infrastructure in terms of overlapping institutional spheres, with each taking the role of the other and with hybrid organizations emerging at the interfaces (see figure 8). This model is seen as the optimal national innovation system.

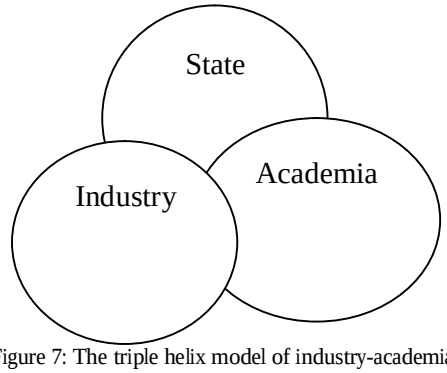

Figure 7: The triple helix model of industry-academia-government relationships

The first model of the triple helix is largely viewed as a failed developmental model with too little room for bottom up initiatives. In this model, innovation was discouraged instead of encouraged. Most countries and regions are nowadays trying to attain some form of the Triple Helix III. The common objective is to realize an innovative environment consisting of university spin-off firms, tri-lateral initiatives for knowledge based economic development, strategic alliances among firms (large and small, operating in different areas and with different levels of technology), government laboratories and academic research groups (Etzkowitz, 2002).

The first dimension of the triple helix model III is internal transformation in each of the helices. The second is the influence of one helix upon another, for example, the role of the federal government. The third dimension is the creation of a new overlay of trilateral networks and organizations from the interaction among the three helices, formed for the purpose of coming up with new ideas and formats for high-tech development. The triple helix is moving to a model where the institutional spheres overlap and collaborate and cooperate with each other, like in figure 7.

A trilateral series of relationships among industries, governments and universities is emerging in regions at different stages of development and with different inherited socio-economic systems and cultural values. Academic-industry-government cooperation requires new learning, communication, and service routines on the part of institutions that produce, diffuse, capitalize, and regulate processes of generation and application of useful knowledge.

2.4. Evaluation of different triple helix models

The last two paragraphs of this chapter describe the evaluation and performance of innovation systems. Because of the scope of this thesis these two aspects of innovation systems are not used in the conducted research. These two aspects of innovation systems are described to give a complete understanding of innovation systems.

In order to measure the success of a regional innovation system the triple helix models also have implications for evaluation (Etzkowitz, 2002). The evaluation needs to be focused not only on what is happening within an organization in meeting goals, but in interaction with other organizations. Looking at the definition of the concept of the triple helix, there are similarities with the definition of the national innovation system. Both concepts focus on the relationships among actors in the capitalization of knowledge. Therefore literature about evaluating national innovation systems is used to evaluate the triple helix models. To evaluate the triple helix III Liu and White (2001) developed a framework for analyzing national innovation systems. This framework is

based on the suggestion of Anderson and Lundvall (1992) that an innovation system has national specificities. A system level analysis should begin with an understanding of how fundamental activities of the innovation process are organized, distributed and coordinated. The fundamental activities of the framework are based on prior research on innovation systems (particularly, Rosenberg, 1972; Mansfield, 1968, 1991; Teece, 1986; Freeman, 1991; Lundvall, 1992). These activities are 1) research, 2) implementation, 3) end-use, 4) linkage and 5) education. Basic questions for a system-level analysis address system structure, dynamics and performance. Examples of such questions are summarized in the next table.

Structure	To what degree do organizational boundaries correspond to clusters of fundamental activities? Is there a distinct division of labor among organizations, or are the same activities undertaken by different types of organizations? What groups of activities are found within the same organizational boundaries, and which are not? Is coordination of the system highly centralized, multicentric or highly decentralized?
Dynamics	What brings the activities and actors together to bring an innovation from conception to use? How does the structure evolve; for example, how are organizational borders around activities altered? How do institutions and new organizations arise?
Performance	How do structure and dynamics affect the effectiveness and efficiency of the system introducing, diffusing and exploiting of new innovations? What are the relative advantages and disadvantages of different system structures?

Table 2: Evaluation of an innovation system, Lui and White (2001)

Answering these questions lead to a better understanding of the system-level context that is necessary for a meaningful discussion of particular actors, policies and institutions. To evaluate a national innovation system the performance of the national innovation system could be measured. Other aspects of the performance of national innovation systems will be discussed in the next paragraph.

2.5. Performance of innovation systems

The innovative performance of an economy depends on the common pool of institutions, resource commitments, and policies that support innovation across the economy; the particular innovation environment in the nation's industrial clusters; and the linkages between them (Furman et al., 2002). This is also called the national innovative capacity which is defined as country's potential, as both an economic and political entity, to produce a stream of commercially relevant innovations (Furman et al., 2002). The focus in the article of Furman et al. (2002) is exclusively on the understanding of patents to measure the strength of national innovative capacity. There are also other characteristics of the innovation system which influence the performance of the innovation system.

An innovation system has a number of different types of actors: firms, organizations, policy bodies, venture capitalists, etc. To evaluate the performance of the system means to evaluate each of these actors, not primarily as single entities, but connected in the entire system (Carlsson et al., 2002). All parts must be of a certain size and quality in order for the system to function well. A single indicator is not sufficient to capture

performance, several measures have to be combined to give an assessment of the performance of a system. Rickne (2001) developed indicators of performance in terms of both generation and diffusion of knowledge. These indicators are summarized in a table.

Indicators of generation of knowledge	**Indicators of the diffusion of knowledge**	**Indicators of the use of knowledge**
Number of patents	Timing/ the stage of development	Employment
Number of engineers or scientists	Regulatory acceptance	Turnover
Mobility of professionals	Number of partners/ number of distribution licenses	Growth
Technology diversity, e.g. number of technological fields		Financial assets

Table 3: Examples of performance measures for an emerging innovation system (Rickne, 2001)

Giving the dynamic nature of innovation systems, measuring their performance at particular time is not only problematic, but can also be misleading. Therefore several indicators rather than only a single one are preferable, in particular when it comes to assessing the performance of an emerging technological system (Carlsson et al., 2002). The most important aspect of performance may be the extent to which the innovation system contributes to long-term economic growth.

2.6. Summary

In this thesis the innovation system is defined as a set of agents carrying out market and non-market interactions for the creation, production and sale of new ideas within the limits and boundaries of the state. The triple helix introduced three forms how the interactions among the different agents (state, industry and academia) are organized. These three forms will be used to characterize the Dutch innovation system.

The innovation system is defined by a group of characteristics, all of which are often found together only within the limits or boundaries of the state. A fundamental role of the government is to establish, maintain and adjust institutions such as the legal system, patent system and tax system. For the purpose of the present study, an analysis of state innovation policies is the method for measuring the state's presence in the creation of an industrial and innovative setting. It ranges from taxes, direct subsidies, public education and training facilities, public R&D institutions, infrastructure facilities, financial support, regulation, standards, to public procurement.

3. The role of the government

In the last part of the theoretical framework the role of the government will be discussed. Because this thesis is written from the point of view of companies, my definition of the government is the ministry of economic affairs. This chapter begins with explaining how public policy is organized and when we need public policy. In the second part of this chapter the public policy in innovation will be discussed. This part relates public policy to open innovation and the innovation system.

3.1. Public Policy

3.1.1. What is public policy

The policy process could be explained as the process of how interested political actors interact within political institutions to produce, implement, evaluate and revise public policies (Schlager and Blomquist, 1996). There are three different approaches to policy process which will be presented here.

First, the institutional rational choice approach conceives public policies as institutional arrangements-rules permitting, requiring, or forbidding actions on the part of citizens and public officials. Policy change results from actions by rational individuals trying to improve circumstances by altering institutional arrangements (Bromley, 1989). The institutional rational choice approach addresses this apparent circularity with the concept of levels of action. Actions taken within the existing rule set are regarded as one level of action; actions taken to modify the rule set are regarded as another level of action (Ostrom, 1991). There are three levels of action, operational, collective choice and constitutional. The operational level has to do with the direct actions of individuals in relating to each other and the physical world. The collective choice level is the level at which individuals establish the rules that govern operational-level actions. The constitutional level is the levels at which individuals establish the rules and procedures for taking authoritative collective decisions. In the opinion of Ostrom (1990) the institutional rational choice approach corrects the short coming of the policy literature which has the presumption that there are only two types of institutional arrangements for resolving collective problems, markets based on individual private property rights or state-centered public bureaucracies.

Second, the politics of structural choice approach also conceives public policies as institutional arrangements (Moe, 1990). Institutional changes can be viewed as the result of rational individuals' efforts to overcome collective action problems and cooperate for mutual gains. This approach views the formation of public policies as arising from the interaction of interest groups, politicians and bureaucrats within the context of democratic politics (Moe, 1990).

Third, the advocacy coalition approach highlights multiple major actors and other variables at work in process of policy change. Policy change is viewed as a function of: first, the interaction of competing advocacy within policy subsystem; second, changes external to the subsystem; third, the effects of relatively stable system parameters (Sabatier, 1988). A policy subsystem consists of actors from public and private organizations who are actively concerned with a policy problem (Sabatier, 1988). Advocacy coalitions group the actors within a policy subsystem. Those coalitions consist of individuals who share a particular belief, a set of basic values, causal assumptions and problem perceptions. The advocacy coalition approach emphasizes the role of information and learning as motivating factors in the process of policy change. As a result, the policy process is conceived as a continuous and iterative process of policy formulation, problematic implementation and struggles over reformulation.

The Dutch government uses the structural choice approach to develop policies. In the Netherlands there are a lot of interest groups which influence the politics. Examples of these interest groups are branch organizations, milieu groups, human rights organizations and so on. The Dutch government does not formulate policy subsystem of these public and private organizations. Therefore the advocacy coalition approach does not characterize the Dutch government and is the structural choice approach the most applicable to classify the Dutch government.

3.1.2. Why public policy is needed

Most economic functions in a modern society are best fulfilled by the market mechanism and capitalist firms. Market mechanism co-ordinates the behavior and resources of private and public actors. This concerns most production of goods, like bread and automobiles, but also large proportion of service production like cleaning and IT service provision (Edquist, 1999). Sometimes there are reasons to complement or correct the market through public intervention.

Two conditions must be fulfilled for there are reasons for public intervention in a market economy (Edquist, 1999). First, the market mechanism and capitalist actors must have failed to achieve the objectives formulated. In other words, there must be a problem which is not automatically solved by market forces and capitalist actors. Second, the state and its public agencies must also have the ability to solve or mitigate the problem. If not, there should be no intervention, since the result would be a failure.

Markets may fail to operate efficiently for a variety of reasons, for example asymmetric information, economies of scale and scope, indivisibilities, barriers to entry, etc (Norgren and Hauknes, 1999). The activities that foster technological advance and innovation are primarily affected by two types of failures; imperfect appropriation of returns and uncertainty, which lead to underinvestment from society's point of view in R&D carried out by firms (OECD, 1998). It is difficult to predict the cost and duration of a project and the commercial success of its outcome. Therefore companies' profit orientation leads to short-term innovation policies and neglects the long-term benefits of complex research programmes. On the other side, most small and medium sized firms could not afford large R&D departments and are therefore not able to provide the technological basis for their innovation activities. Stimulating co-operation between firms and the public R&D infrastructure (universities, research institutes) may increase the social return on public funded R&D. More firms will be able to profit from public R&D efforts, potentially increasing in the diffusion of knowledge, particularly towards small and medium-sized enterprises (Norgren and Hauknes, 1999).

There are two main categories of policies to solve or mitigate the above mentioned problems (Edquist, 1999). On the one hand, the state may use non-market mechanisms; this is mainly a matter of using regulation instead of the mechanisms of supply and demand. One example is taxation of rich people and redistribution of income to poor people. On the other hand, various public actions improve the functioning of markets or the state may create markets. The improvement of the functioning of markets is the objective of competition law and competition policies. One example of market creation is in the area of inventions. The creation of intellectual property rights through the institution of a patent law gives a temporary monopoly to the inventor.

3.1.3. Instruments of public policy

A public policy instrument organizes specific relations between the state and those it is addressed to. It constitutes a device that is both technical and social.

Regulation

The use of regulation allows politicians to act and receive credit for action while simultaneously avoiding most of the associated costs. It provides politicians a way of redistributing income in a non-obvious way. Regulation is seen as an alternative to public ownership, one that allows governments to pursue certain non markets goals, while leaving ownership unchanged and displacing the costs of the policy on to the private sector. Regulatory instruments include three dimensions. First regulatory instruments exercise a symbolic function, as they are an attribute of legitimate power and draw their strength from their observance of the decision-making procedure that precedes them. Second regulatory instruments have an axiological function; they set out the values and interests protected by the state. Third regulatory instruments fulfill a pragmatic function in directing social behaviors and organizing supervisory systems. With regard to the functioning of these instruments, four crucial aspects are mentioned in the literature (Peters and van Nispen, 1998). First, regulatory instruments have not only an instrumental function; they also possess a normalizing and guaranteeing function. Law standardizes governmental interventions and offers social actors guarantees against government interventions. Second, the use of regulatory instruments requires monitoring and enforcement. Third, it is often noted that regulatory instruments have a coercive character. Coercion usually does not fit well into the interwoven relationship between government and social actors and tends to provoke resistance from actors at whom the policy is aimed. Fourth, regulation has a reactive character. The formation of rules is a slow process and can therefore lag behind certain developments in society.

Public ownership

Half a century ago, economists were quick to favor government ownership of firms as soon as any market inequities or imperfections, such as monopoly power of externalities, were even suspected (Schleiffer, 1998). In the last 20 years, governments in market economies throughout the world have privatized the very state firms in steel, energy, telecommunications and financial services. Private ownership should generally be preferred to public ownership when the incentives to innovate and to contain costs must be strong (Schleiffer, 1998). Many of the concerns that private firms fail to address to social goals can be addressed through government contracting and regulating, without resort to government ownership.

Taxation

The instrument used to raise the money that government spends. Taxes are generally unpopular, and the more visible they are, the less popular they appear to be. One form of taxes is regulatory taxes, for example in the areas of tobacco and alcohol (Peters and van Nispen, 1998). The primary objective in these cases is the control of consumption rather than the generation of revenue. The excise on gasoline is a case of doubt. Originally the control of consumption was certainly not the primary objective of this excise, but since the development of environmental policy the need to recognize this objective has increasingly been emphasized. The regulatory tax is often advocated by economists as the preferable alternative to regulation. Another form of taxes is tax expenditure, which are exemptions from the general applicability of the tax rule in order to obtain specific policy objectives (Peters and van Nispen, 1998). Examples are investment allowances, research allowances and allowances for medical expenses.

Subsidies

There are many situations in which a subsidy and a regulatory tax can be considered as alternative instruments to attain the same policy objective, for example a tax on polluting emissions versus a subsidy on clean production technology. An optimal subsidy can be

defined as a subsidy per unit of the substitute product that equals the sum of the marginal benefits from reduction of the negative external effect of the harmful product to the victims (Peters and van Nispen, 1998). In reality is observed that politicians often prefer subsidies to taxes, because of the attractiveness from an electoral point of view.

3.2. Public policy in innovation

3.2.1 The role of public policy in innovation

Public policy in open innovation can be defined as the public actions that influence open innovation processes (Edquist, 1999), i.e. the development and diffusion of innovations (Chaminade and Edquist, 2008). According to the article of Cooke et al. (1997) the importance of innovation policies and practices is defined as a vehicle of activating social capital to enhance systemic innovation capacity.

The innovation system approach emphasizes the fact that firms do not innovate in isolation but with continuous interaction with other organizations in the system. According to the article of Chaminade and Edquist (2008), the Netherlands have explicitly adopted the system of innovation approach in their innovation policies. The underlying assumptions of innovation policy making are asymmetric information and non-equilibrium. It focuses on interactions in innovation processes, networks and framework conditions. Examples of government intervention are solving problems in the system or to facilitate the creation of new systems, induce changes in the supporting structure for innovation: support the creation of institutions and organizations and support networking. The main strengths of policy making with use of the system of innovation approach are that policies are context specific, involvement of all policies related to innovation and holistic conception of the innovation process. The main weaknesses of policy making with use of the system of innovation approach are lack of indicators for the analysis of the innovation system, evaluation of innovation system policies and the system is difficult to implement. This means the acceptance of mistakes in policy making but also points to the importance of evaluation of policies and policy learning (Chaminade and Edquist, 2008). Under the innovation system approach, the formulation of policies is based on existing theory, indicators and subjective judgments. It is difficult for the policy makers to know ex-ante how the system will react to the policy. Policy makers need to experiment and allow some room for mistakes. For this reason, evaluation of policies is very important. The decision to intervene or not must be based upon whether it is likely or not that the intervention mitigates the problem. The decision must be taken in uncertainty. Afterwards it is possible to evaluate if the intervention solved or mitigated the problem. If this was not the case there has been talked about a policy mistake, this can never be avoided because of the uncertainty.

3.2.2. When do we need public policy in innovation

Understanding innovation as a complex interactive process has important implications for the design and implementation of any kind of policy to support innovation. It affects the focus of the policy, the instruments and the rationale for public policy, among other issues (Chaminade and Edquist, 2006). A main focus of the innovation system approach is therefore the complex interactions that take place among the different organizations and institutions in the systems. The innovation system approach indicates that policy makers should intervene in those areas where the system is not operating well, that is, when there are systemic problems (Chaminade and Edquist, 2008). Some examples of these systemic problems mentioned in the literature include the following (Carlsson and Jacobsson, 1997; Norgren and Haucknes, 1999; Smith, 2000; Woolthuis, Lankhuizen et al., 2005).

Infrastructure provision and investment problems

Cooke et al. (1997) defined infrastructures as the physical make up of the regional space and make possible the multiple relations that are established between the different agents in a regional economy. Two types of infrastructures can be pointed out. On the one hand, telecommunications infrastructures and infrastructures which are vital to innovation in the strictest sense of term, for creation as well as diffusion. Secondly, there are infrastructures needed to create resources allotted to innovation. Policies aiming at solving infrastructure provision problems could focus on building competence centers as well as creating new ones and investing in business incubators and a seed capital program for new companies (Chaminade and Edquist, 2008). It can also involve the creation of a large infrastructure to support innovation in a group of SME's such as investing in a modern greenery facility for flower production. In the article of Cooke et al. (1997) is stated that the financial sector is of strategic importance when a system of innovation is formed. A region's capacity to mobilize innovative resources is linked to the regional government's budgetary availability. A higher budget may enable a certain region to carry out more autonomous policy which is more adequate to the potential of the region. There may be three types of regional spending capacity. In the first place, decentralized spending, which basically involves a certain level op administrative decentralization from the central government in order to use state funds more effectively. The region has little autonomy in the system of innovation. In the second place autonomous spending. In this case the regional government has the capacity to design own spending policies. The region has greater capacity to direct in the field of innovation. In the third place, the regions that have the greatest possibilities of using financial resources effectively are those that have the authority to impose taxes. In this case, the region would be able to carry out proactive policies through public spending as well as through the fiscal system.

Transition problems

This refers to the difficulties that might arise when firms and other actors encounter technological problems or face changes in the prevailing technological paradigms that exceed the current capabilities. Firms may not be capable to foresee the emergence of new paradigms, radically new pervasive technologies or significant changes in the markets that require new technological solutions. Technology foresight exercises might help policy makers to anticipate and prevent transition problems.

Lock-in problems

Firms and other organizations might be locked into existing technologies and technology systems. Just as firms find it difficult to evolve past the existing technologies, so industries, regions and indeed whole countries can be locked-in to a particular scientific and technological paradigm (Edquist, 1999). Lock-in problems might lead to transition problems to the extent that the excessive focus on existing technologies might prevent the firms to foresee the emergence of new technological opportunities.

Hard and soft institutional problems

The innovation system approach pays special attention to the role of institutions in the system. The institutional framework plays a very significant role in the production of innovations as well as in the adoption and dissemination of innovations. The role that firms play in the social setting and the function firms carry out is an interesting aspect of a country's productive culture (Cooke et al., 1997). The government can play a significant role in the development of the formal rules whilst in most cases this role is marginal when the most tacit elements are to be influenced (culture, firm routines, social networks). Business support services for SME's might also help to overcome some soft

institutional barriers to innovation.

Network problems

Problems which include those derived from to strong or to weak linkages in the system of innovation. In practice it is very difficult to asses the adequate degree of strength of the linkages in the system. Both strong and weak linkages are reported to have advantages and disadvantages, in terms of openness and intensity of exchange (Nooteboom, 2004). An innovative regional cluster is likely to have firms with: access to other firms in the sector as customers, suppliers or partners, perhaps operating in formal or informal networks; knowledge centers such as universities, research institutes, contract research organizations and technology-transfer agencies of consequence to the sectors in question; and a governance structure of private business associations, chambers of commerce and public economic development, training and promotion agencies and government departments (Cooke et al., 1997). In this sense, policy makers might induce cooperation between the agents.

Capability and learning problems

The system might have the right infrastructure and institutional framework, but the organizations in the system might have difficulties in accessing or creating new knowledge or in transforming knowledge into innovations (Chaminade and Edquist, 2008). Innovation and learning are closely linked (Cooke et al., 1997). There can be no change without previous learning and the complexity of the concept requires distinguishing between different analytical approaches. First, there are the contents of learning by doing, learning by using, or even learning by interaction. Second, learning is linked to a certain institutional structure. Learning sometimes requires or is accompanied by an institutional change, a cultural change, a change in rules, habits, etc. It is sometimes difficult to learn due to cost or the impossibility of changing routines or lack of other different rules. Third, learning requires means, incentives and the ability for individuals or systems to acquire this knowledge. In this case the need for and role of state intervention will therefore differ drastically between national systems but fundamentally the role will involve providing the means to learn by public investment in education of novelty, preserving knowledge and keeping technological options open, and dispersing the personal and social costs of change. In a regional learning system, and even more in a regional innovation system, trust building is of essence. Breach of trust is fatal to the successful functioning of systemic interaction (Cooke et al., 1997). Policy makers might support qualified human resources or the adoption of specific managerial techniques by targeted groups or firms.

Unbalanced exploration-exploitation mechanisms

The system might be capable of generating diversity but not having the mechanisms to be able to make the adequate selections or it may have very refined selection procedures but no capability to generate diversity. Weak selection processes may allow the persistence of too much experimentation and too many inefficient firms, thus blocking the exploitation of technologies. Similarly, firms do a lot of exploration and experimentation, but without exploiting what has been discovered. On the opposite, firms may be engaged into a lot of exploitation, modifications and incremental innovations, without exploration and experimentation (Norgren and Hauknes, 1999). Policy makers might support the emergence of spin-off companies, for example.

The consequence of these systemic problems is that actors in innovation policies do not only need instruments that focus on individual organizations or on the relation between two organizations, but also instruments that focus on the system level (Smits and Kuhlmann, 2004).

3.3 Conclusion

These three chapters describe the role of the government in open innovation. In the first chapter I define the concept open innovation and explain this concept, especially the importance for open innovation in a knowledge economy. The most important conclusion of the first chapter is that open innovation is not a single process of one company anymore. Nowadays different actors play a role in innovation and therefore innovation moved from a closed process to a more open process. In the second chapter are these different actors described. Therefore I used the innovation system theory and the triple helix model which describe the industry, the university and the government as important actors in the open process of innovation. The open innovation literature mainly focus on the industry and university as important actors in open innovation, but pay not much attention to the role of the government in open innovation. This is remarkable because in chapter three is described how the government with policies and policy instruments can influence a lot of problems which are experienced with innovation. There can be concluded that also the government has a lot of influence in the success of innovation in a country. In the next chapters of this thesis will this gap in the literature be researched for the Netherlands.

4. Methodology

4.1. Focus of the thesis

In this thesis we want to get a better view on the role of the government in stimulating open innovation within companies in the Netherlands. In a knowledge economy, like the Dutch one, open innovation is important to stay competitive. The government can play an important role in stimulating open innovation among companies, knowledge institutes and the government. Where the role of the government is situated in open innovation is explained in the theoretical framework of the first chapters.

The question now arises is which government intervention instruments the Dutch Government use in order to be an important actor in open innovation. Therefore the next research questions are formulated.

4.2. Research questions

In this thesis we want to explore two main questions

1 What are the current policies in the Netherlands to stimulate open innovation?
2 How do companies, policy makers and policy performers evaluate the existing policies?

4.3. The approach and methods of the thesis

In order to give answers to these two research questions different forms of research are conducted. The first research question can be answered with analyzing documentation of innovation policies. The second research question can be answered with conducting interviews with companies, policy makers and policy performers. These two forms of research are described below.

4.3.1 Documentation

To identify the policies which stimulate open innovation in the Netherlands, I did a qualitative study of the Dutch innovation policies. A data source for Dutch innovation policies is the innovation policies trend chart on the website of proinno-europe. On this website I found eighteen innovation policies for the Netherlands. Another source of innovation policies is the website of Ministry of Economic Affairs and Senter Novem, where I found seven innovation policies. These are all generic innovation policies, applicable for companies in the Netherlands. There are twelve programmatic innovation policies specific for sectors. I found these programmatic innovation policies on the website of Ministry of Economic Affairs.

The first step is to map the different innovation policies in order to compare the policies and to analyze if the innovation policies focus on aspects of open innovation. The criteria which are used to map the innovation policies are based on the structure of the innovation policies published on proinno-europe. These innovation policy documents are divided in the different aspects of the innovation policy. With these aspects I could describe on which characteristics of open innovation the policy focuses and therefore I use these aspects as criteria to map the innovation policies.

In some cases I could not map all the criteria of an innovation policy. To fill in these missing criteria I conduct an internet research. In some cases I found the missing criteria and in some cases I did not found these missing criteria.

4.3.2. Interviews

The second step is to analyze how companies, policy makers and policy performers evaluate the existing innovation policies in the Netherlands. Interviews are an essential

source of case study evidence in which well-informed respondents can provide important insights into a situation (Yin, 1994). All interviews will be semi-structured and built on open ended questions, which will result in an in-dept and qualitative interview character.
The interviews are based on the theoretical framework described in the first three chapters. The theory is divided in four blocks which are important to understand the role of the government in open innovation. These blocks are described below and will be used to describe and analyze the results of the interviews.

The need for open innovation
In the literature are reasons discussed why open innovation is important for the economy. Authors argue that there is lot of useful knowledge outside the boundaries of companies. This knowledge is useful in order to enhance the innovative potential of companies, to reduce the costs and risk of developing new ideas and to offer better solutions for customers. Open innovation could especially help companies which not have access to all relevant knowledge or production facilities. Open innovation help such companies not to invent the wheel twice and to shorten development time.
Open innovation is not only important for individual companies, but for the whole industry. If companies could together strengthen the industry, the competitive position of this industry will be increased. In order to solve these needs companies go outside the boundaries of their company. Moving out the boundaries of the organization ask for interactive processes with different parties.

Open innovation as an interactive process
As discussed in the theoretical framework there are three processes of open innovation; the inside-out process, the outside-in process and the coupled process. These processes could take several forms like supplier integration and patent buying which are forms of the outside-in processes. While the outside-in and the inside-out process are sharing or taking of knowledge, the coupled process focus on sharing and taking of knowledge. As discussed in the literature companies could achieve a stronger position together than alone. Therefore sharing and taking of knowledge is needed. In all the open innovation processes collaboration with different parties is needed. This makes collaboration an extremely important characteristic of open innovation. Collaboration is possible at many different levels, within companies, between companies, in the value chain or in the industry. Examples of collaboration between companies or in the value chain are alliances, networks or research consortia.
When companies collaborate in networks or research consortia innovation systems are created. The innovation system literature stresses the point that innovation systems are also possible at different levels, sectoral, technical, industrial or national. The scope of this thesis is on the national innovation system level where the governments play an important role.

Government as important actor in open innovation
To understand the relationships of a national innovation system the triple helix model is introduced. This model discusses the relationships between university, industry and government. The literature discusses three forms of the triple helix, the model with overlapping institutional spheres is stated as most optimal. This model argues that the government actively participates in networks of industry, university and government. So the government is seen as an important actor in open innovation.
The government has two conditions for public intervention, market failure and the ability to solve these failures. So in the opinion of the government actively participating in the innovation system of industry, university and government relationships is only acceptable

in case of market failure. In the described process of open innovation, market failures are needs for open innovation which could not be solved by the market. These problems could arise in the interactive processes of open innovation or in collaboration with different parties. To solve these problems the government use different instruments.

Open innovation stimulated by government intervention instruments

The government has different instruments to intervene in the problems which companies have with open innovation. These instruments are regulation, public ownership, subsidies and taxation. With these instruments the government tries to influence the needs for open innovation, the interactive processes of open innovation and to stimulate the necessary characteristic of open innovation, collaboration.

4.3.3. *Interview companies*

To select companies for the interviews I have first conduct an interview with an innovation advisor of Syntens. I discuss with him the concepts open innovation and the role of the government in open innovation. I asked him for companies which I could interview and which innovate in an open manner. Because the region of the Syntens advisor is in the east of the Netherlands, all the interviewed companies are located in the east of the Netherlands.

I conduct semi-structured interviews with company's senior executives responsible for open innovation. In all interviews the interviewee is at the corporate level. The focus of the interviews with the companies is on the concept of open innovation and the problems they have with it. Does the government in the opinion of the companies support them in solving these problems? The interviews lasted an average of one and halve hours and were recorded. The transcribed material is analyzed to find problems with the open innovation policies and to find improvements for open innovation policy making.

	Company description	Number of employees	Function interviewee	
Capzo International B.V.	Specialized in micro-encapsulated Phase Change Materials (PCM) based on salt hydrates with the trade name Thermusol.	2	Director / Owner	Ootmarsum
Pontus	Specialized in upgrading, hardening, annealing, high-temperature brazing of all the many different types of steel.	20	Director / Owner	Enschede
Herikon B.V.	Specialized in processing polyurethane in order to produce all synthetic materials.	35	Director / Owner	Almelo
Tuinte Machinefabriek	The company is specialized in manufacturing components, modules and complete systems.	60	Administrator and responsible application in government policies	Hengevelde
Winkels Techniek	Guarantee fitter, head assignee and specialist in the area of electronic and tool-architecture.	175	Director / Owner	Enschede

Philips consumer lifestyle Drachten	Philips develops and manufactures shavers, Wake up light, also vacuum cleaners, Senseo coffee machines and PerfectDraft home draft systems.	1500	Manager open innovation consumer lifestyle	Drachten

Table 4: Interviewees companies

4.3.4. Interview SenterNovem

After the interviews with the companies, I conduct four interviews with SenterNovem. The focus of the interviews with employees of SenterNovem is to analyze which role they play between the government and the companies. Another question is of SenterNovem could influence this role and in which way they do this. In order to analyze this role and in which way this role can be influenced I use the following criteria for selecting the four interviewees. All interviewees must belong to the directorate Innovation. In conduct two interviews with the department programmes, one interview with the department knowledge infrastructure and one interview with the department innovation intelligence and coordination. I will also discuss the results of the interviews with the companies.

Department	Responsibility	Location
Programmes	Advisor Point One	Den Haag
Programmes	Advisor High Tech Systems	Den Haag
Knowledge Infrastructure	Advisor SBIR	Den Haag
Innovation intelligence and coordination	Advisor IOP module	Den Haag

Table 5: Interviewees SenterNovem

4.3.5. Interview Ministry of Economic Affairs

I conduct two semi-structured interviews with policy makers on the Ministry of Economic Affairs. To select these policy makers of the Ministry of Economic Affairs I use the following criteria. The interviewee must belong to the Directoraat-generaal Entrepreneurship and Innovation. Because developing open innovation policies is an integrated process of SenterNovem and the ministry of economic affairs, I conduct one interview with an employee of the Directoraat-generaal Entrepreneurship and Innovation to control the described process by SenterNovem. I conduct a second interview with a member of the InnovationPlatform. The InnovationPlatform is a part of the Ministry of Economic Affairs and is leaded by the minister president. The InnovationPlatform develop a vision about how the government should stimulate open innovation. With the interview I want to know their role in developing open innovation policies. I will also discuss the results of the interviews with the companies.

Department	Responsibility	Location
Innovation	Manager	Den Haag
InnovationPlatform	Assistant Director	Den Haag

Table 6: Interviewees Ministry of Economic Affairs

5. Results

Innovation policies can be divided in two types; generic and programmatic policies. Generic policies focus on short term results, participation is individually or a collaboration between companies and/or knowledge institutes. The results are only for the participants. A programmatic policy has the objective to realize a goal in the future. Programmatic policies are an impulse to start an initiative which will be further developed by the market. The focus in this thesis is on the generic innovation policies.
The generic policies to stimulate innovation in the Netherlands are mapped in the table on the next pages. To compare the different policies the table is divided in eleven rows which consist the most important characteristics of the policy. The first rows of the table give an overview of the policy as title, goal, problem, target group. In the second part of the table are the specific characteristics of the policies showed like sector, aspect of innovation, criteria for eligibility, budged, evaluation and collaboration. In appendix I there is a table of the generic policies which show all the characteristics of these policies.

Table 7: Generic innovation policies

Title of measure	BBMKB SMEs Credit Guarantee scheme	WBSO	Leading technological institutes
Goal	To stimulate the provision of credit for small and medium enterprises	To stimulate R&D by alleviating the wage burden for companies through tax reduction	To increase focus and mass as well as public-private interactions in research areas that strategically important for the Netherlands.
Problem	Long-term bank loans often run into difficulties due to a lack of securities and the inability of companies to meet their interest and repayment obligations in their first year of operating.	The intensity of business expenditure on R&D in the Netherlands is relatively low in international comparison. Wage costs form a bottleneck for the take-up of R&D	The Dutch research infrastructure needed strengtehening in the field of fundamental research, especially in R&D intensive sectors.
Target group	SME's only	All companies Higher educations institutions research units centres and other	All companies, Higher education institutions research units/centres, Other non-profit research organizations
Sector	Not the agriculture and medical sectors	All sectors	All sectors
Aspect of innovation	Promotion of entrepreneurship/ start up	Applied industrial research Development/ Prototype creation Industrial design	Pre-competitive research, Applied industrial research Development/ Prototype creation, Commercialization of innovation, Industrial design, Co-operation promotion and clustering, Diffusion of technologies in enterprises
Criteria for eligibility	Insufficient financial means, Insufficient securities, Rentability and future perspective, Credit not supposed to cover previous obligations with the bank, SME owner/ entrepreneur has to support the risk up to an amount of 25% of the credit sum, with a minimum of 11.000 euros	R&D should be organized by applicants themselves and carried out within their own company; R&D should be carried out as part of project or programmes; R&D should be carried out in the Netherlands or in the EU; The technological development should be new for the organization; There should be technical bottle necks; WBSO should be applied in advance	Funding was organized as open call, which had 18 responses. Each proposal was externally evaluated on its scientific quality and the economic an technological importance of the areas of study
Budget	N/A	EUR 425.000.000	EUR 29.000.000
Evaluation	2000	In 2006-2007	Interim evaluation in 2001
Results of evaluation	The process support the aims of the measure	The instrument works EUR 1,72 is spent on R&D for each euro received from the WBSO	Is a success and continuation is recommended
Collaboration	N/A	Only proposals from single organizations	Co-operation/ networking mandatory

Table 7 (continued)

Title of measure	Syntens	Venture Capital scheme	Investment Grants for Knowledge infrastructure
Goal	Provide support and advice to SME's on technology and innovation	To increase the amount of venture capital	To stimulate the creation of high-quality networks within the Dutch knowledge infrastructure that can address long-term knowledge demands in a flexible way.
Problem	SME's have difficulty with developing, acquiring and applying new knowledge	The amount of venture capital is an important bottleneck for start-ups	The knowledge infrastructure is vitally important for the Dutch knowledge economy
Target group	SME's only	Business angels, informal investors and new entrepreneurial firms	All companies, Hihger educations institutions research units/ centres
Sector	All sectors	All sectors	All sectors
Aspect of innovation	Promotion of entrepreneurship/ start-up, Awareness raising amongst firms on innovation, Co-operation promotion and clustering, Diffusion of technologies in enterprises, Innovation management tools	Promotion of entrepreneurship/ start up; Improving the legal and regulatory environment	Pr-competitive research, Applied Industrial research, Co-operation promotion and clustering
Criteria for eligibility	The measure is open to any innovative SME seeking mediation in the area of applied knowledge	Each private person who wishes to invest in new firms (except spouses or business partners of entrepreneurs in new firm) New business: entrepreneurial companies up to 8 years old. The scheme can be used by one company up to five years	Projects typically involve public-private co-operation and demand-driven knowledge production. Projects must have new aspects to add to current research,[2]
Budget	EUR 32.000.000	EUR 16.000.000	EUR 802.000.000
Evaluation	2007	2005	In 2004
Results of evaluation	No results available yet	The direct variant was effective, the indirect variant not, it will be phased out	Has proven its significance
Collaboration	N/A	N/A	Co-operation/ networking mandatory

[2] Co-operation must include at least one company and at least one knowledge institutions, must have an innovation application that delivers positive social and economic benefits. ICES/KIS 3 projects must be: new for the Netherlands, strong planning with coherent activities, focussed on the development of knowledge through fundamental and industrial research. A project must be executed within 4 years, minimum size is 5 million euro.

Table 7 (continued)

Title of measure	TWA network	TechnoPartner	Innovation vouchers
Goal	Gather and analyze information about technology/innovation and technology/innovation policy for Dutch companies, knowledge institutes, universities and the government	To promote more and better technology-based start-ups, through the creation of a better climate for technostarters inside and outside knowledge institutes	Stimulate interaction and exchange between the knowledge the knowledge suppliers and SME's
Problem	Innovation is the key to a competitive knowledge economy. Creation of international knowledge networks for Dutch companies	There is too little investment in technological starters.	For the Dutch knowledge economy it is important that SME's innovate. Knowledge reservoirs are not optimally utilized
Target group	All companies, higher educations institutions research units/ centres	Scientists/ researchers, Higher educations institutions research units/ centres, Other non-profit research organizations, Higher educations institutions	SME's only
Sector	All sectors	All sectors	N/A
Aspect of innovation	N/A	Promotion of entrepreneurship/ start up, Commercialization of innovation, Co-operation promotion and clustering	Co-operation promotion and clustering, Diffusion of technologies in enterprises
Criteria for eligibility	Information that is open to business, research institutes and government	Closed-end venture capital funds can qualify. Such funds that invest in high-risk ventures of technostarters, can apply for a loan from TechnoPartner. Knowledge Exploitation Subsidy arrangement (SKE): public-private consortiums (minimum one public knowledge institute) can apply for subsidy is they take knowledge exploitation in their region to a higher level.	SME is based in the Netherlands and is not under suspension of payment, the firm is an SME as defined by the EU, SME is not active in agriculture, fishery, aquaculture products and transportation, the firm has not receive subsidies(EUR 92,500 or more) without approval of the EC in the three years preceding the application, the firm did not receive an innovation voucher in earlier rounds of the scheme
Budget	EUR 3.800.000	EUR 31.000.000	EUR 60.000.000
Evaluation	In 2002	No	Launched as a pilot project, to learn from experience
Results of evaluation	Scored well in use and impact. Develop a better communication strategy, explicit mission and job description.	Lessons were learnt from high-tech start-up policies implemented in the past	Proved to be a success, innovation vouchers were sold out within a few days.
Collaboration	TWE's support ministries, business, knowledge institutes by providing information about scientific and technological developments in the country where they are stationed.	Co-operation/ networking optional	Co-operation/ networking optional

Table 7 (continued)

Title of measure	Casimir	Valorization grants	SBIR Pilot
Goal	Increase public-private mobility of researchers and to enhance exchanges of researchers between companies and knowledge institutes and vice versa	Support to innovative start-ups incl. gazelles	To stimulate start-ups, young fast growing firms and SME's and to challenge them to perform ground-braking research. Promote the commercialization of knowledge
Problem	Gap between knowledge production and knowledge application Research careers must be more attractive and interesting	To learn about the way in which the American (SBIR) program can be implemented efficiently and effectively within Dutch knowledge institutes	Contracting out innovative research with societal relevance
Target group	Scientists/ researchers (as individuals)	Individual researchers employed by a public research institute	SME's only
Sector	Primarily in the fields of science and technologyCompanies must be based in the Netherlands	All sectors	All sectors
Aspect of innovation	Co-operation promotion and clustering	Promotion of entrepreneurship/ start up, Commercialization of innovation	Promotion of entrepreneurship/ start-up, Awareness raising amongst firms on innovation commercialization of innovation, Diffusion of technologies in entreprises
Criteria for eligibility	Submitted by a trio of a talented graduate or researcher at a knowledge institution or company in the Netherlands, a representative of a company and knowledge institution. PhD students, Bachelor-level research staff, post-doctoral researchers, university lectures or senior lectures, professors and researchers working in the private sector[3]	Researchers that want to create a high-tech startup can apply. Proposals are reviewed. Scientific-technological quality/ expertise; commercial potential; project management; reputation of researchers	Only starters, young fast growing firms and innovative SME's can submit proposal
Budget	EUR 2.800.000	EUR 1.300.000	EUR 200.000 for the feasibility phase
Evaluation	No, launched as a pilot project, to learn from experience	No, launched as a pilot project, to learn from experience	No, launched as a pilot project, to learn from experience
Results of evaluation	Too early	The first and the second round in 2004 and 2005 were a success.	Too early
Collaboration	Co-operation/ networking mandatory	N/A	Co-operation/ networking optional

[3] It is targeted primarily at researchers in the fields of science and technology. In the view of the under representation of women and ethnic minorities in the research field, applications by them will be particularly welcome. Applicant companies and knowledge institutions must be based in the Netherlands. The knowledge institution may be a university, HBO institution, KNAW or NOW institute, TNO institute or GTI. The company may be a major company with its own R&D department, a small company or start-up, or an innovative SME. Casimir subsidies cannot be used to fund exchange or research projects that have already started. Such projects are the subject of pre-existing legal commitments and therefore ineligible under the general terms and conditions of NOW grants.

Table 7 (continued)

Title of measure	RAAK	Experimental framework regulation subsidies innovation projects	Smart Mix
Goal	Strengthen both the bridge function of vocational educational institutes and innovativeness of SME's. Generating and distributing policy relevant information and best practices.	To contribute to sustainable growth of the Dutch economy through strengthening of innovativeness Create unity in regulations and schemes	To promote focus and mass in excellent scientific research and to enhance the valorization of results from research
Problem	Innovativeness of the Dutch business sector should be increased to remain competitive	The policy mix would be renewed and streamlined and that the number of instruments would be sustainable reduced and reorganized in two main packages.	Good knowledge creation, but poor knowledge utilisation
Target group	SME's only, Higher education institutions, Other public education institutions, Business organizations	All companies, Higher educations institutions research units/ centres, Other non-profit research organizations, Higher education institutions, Other public education institutions, private institutions for education, Technology and innovation centres, Business organizations, trade unions	All companies, Higher educations institutions research units/centres, Other non-profit research organizations, Technology and innovation centres, Business organizations
Sector	All sectors	All sectors	All sectors
Aspect of innovation	Awarness raising amongst firms on innovation, Co-operation promotion and clustering, Diffusion of technologies in enterprises	Pre-competitive research, Applied industrial research, Development/ prototype creation, Commercialization of innovation, Industrial design, Co-operation promotion and clustering, Diffusion of technologies in enterprises, Improving the legal and regulatory environment	Pre-competitive research, Applied industrial research, Development/ prototype creation, commercialization of innovation, Industrial design, co-operation promotion and clustering, Diffusion of technologies in enterprises.
Criteria for eligibility	Submission of an application form; an elaborated proposal; a signed consortium agreement; and a budget. The governing body of the education institute should act as consortium leader. There should be a perspective for sustainable development	A broad definition of "innovation project" is used. Project has to be new for the Netherlands and should contribute to sustainable economic growth of the Dutch economy. The modules within the framework, will be based upon specific ministerial regulations, and can have more specific criteria for eligibility.	Consortia of knowledge producers and knowledge users can submit proposals for research programmes that are evaluated based on two main criteria: focus and mass in excellent scientific research and valorization perspective. Foreign organizations are eligible, provided that the program benefits the Netherlands.
Budget	EUR 6.000.000	N/A	EUR 100.000.000
Evaluation	Yes	No	No
Results of evaluation	Each euro innovation subsidy resulted in 5 euro additional investment of participating firms	N/A	Too early
Collaboration	Co-operation/ networking mandatory	Co-operation/ networking optional	Co-operation/ networking mandatory

Table 7 (continued)

Title of measure	IOP-TTI module	Challengers module	Innovation Performance Contracts
Goal	Optimal focus and mass in the targeted technological areas; Interaction between companies and publicly funded knowledge institutes; Valorization and anchoring; Contributing to sustainable development	Support excellent innovation projects, in which new products, processes or services are developed	An agreement between SME's and a related organization that acts for the group about an extra effort in innovation.
Problem	The restructuring and renewal of the mix of financial innovation instruments of the Ministry of Economic Affairs	Support for smaller excellent innovation projects. These challengers can be an important source of information for the future	For the Dutch knowledge economy it is important that SME's innovate.
Target group	All companies, Higher educations institutions research units/centres, Other non-profit research organisations	SME's only	SME's only, Business organizations
Sector	N/A	All sectors	All sectors
Aspect of innovation	Pre-competitive research, Applied Industrial research, Development/ prototype creation, Co-operation promotion and clustering, Diffusion of technologies in enterprises	Development/ prototype creation	Awareness raising amongst firms on innovation, Pre-competitive research, Applied industrial research, Development/ prototype creation, Co-operation promotion and clustering, Diffusion of technologies in enterprises
Criteria for eligibility	Participant in the IOP-collaboration that execute an IOP-project at own expense and for own risk A leading technology institute that executes a strategic research program at own expense and for own risk	SME's that execute an excellent innovation project at own expense and for own risk	For pre-IPC phase the applicant, typically a sector organization, can apply for a subsidy for an innovation position study; knowledge transfer in the pre-IPC phase; preparation of the "penvoerder" of the IPC-application; and knowledge transfer in the IPC-phase. For the IPC-phase the "penvoerder" applies for a subsidy for the SME's that will participate. The group has to be between15 and 35 companies. Each company has to have its own 3-year innovation plan. At least part of the activities has to be collective activities.
Budget	N/A	EUR 12.200.000	EUR 17.000.000
Evaluation	Yes	No	Launched as a pilot project, to learn from experience.
Results of evaluation	N/A	N/A	Too early
Collaboration	Co-operation/ networking mandatory	Only proposals from single organizations are accepted	Co-operation/ networking mandatory

Table 7 (continued)

Title of measure	Groeifaciliteit	Launching customer	Subsidierege-ling innovatie gerichte onderzoeks-programma's
Goal	To increase the possibilities of SME's in the Netherlands to invest and grow	To challenge buyers and policy makers at the government to think innovative.	To stimulate research on innovative subjects
Problem	To stimulate the provision of credit to SME's by financers	The government has enormous purchasing power and could through that stimulate companies to develop innovative products, services and processes	N/A
Target group	SME's	All companies	Universities or research institutes.
Sector	All sectors	All sectors	All sectors
Aspect of innovation	N/A	N/A	N/A
Criteria for eligibility	N/A	N/A	Included of a positive advice of the stuurgroep about the design of the project. Research project has to be done in the Netherlands. After every six weeks a rapport about the performing of the project. Audit certificate
Budget	EUR 170.000.000	N/A	N/A
Evaluation	N/A	N/A	N/A
Results of evaluation	N/A	N/A	N/A
Collaboration	N/A	EZ is working together with other ministries, Regiobureau Inkoop Rijksoverheid, Piano and Nederlandse vereninging voor inkoop	Co-operation/ networking optional, could be permitted by the ministry.

Table 7 (continued)

Title of measure	Besluit innovatiesubsidie samenwerkings-projecten	EUREKA	KP7	CIP
Goal	To stimulate projects which are new for the Netherlands. It is a systematically whole of activities and could consist of research/development.	Initiative of 33 countries and the EC to stimulate cooperation among Europe's entrepreneurs and institutes in the field of technology. Development of market focused products, processes and services	Development of new knowledge and technologies and the promotion of it.	Promotion and use of existing knowledge.
Problem	N/A	N/A	N/A	N/A
Target group	All companies	All companies	All companies	SME's
Sector	All sectors	All sectors	All sectors	All sectors
Aspect of innovation	N/A	N/A	N/A	N/A
Criteria for eligibility	Entrepreneur has to be located in the Netherlands. Included of a project plan and budget. It should be a technological innovations, sustainability, technological cooperation or economic perspective. After every six weeks a rapport about the performing of the project. Audit certificate	Participating companies initiate the projects by themselves. Participating governments support projects in own country.	The specific programs are: collaboration, ideas, people, capacity, Non-nuclear research activities of the GCO/JRC, nuclear research activities of the GCO and erratum	CIP is divided in three sub programs: Entrepreneurship& innovation, support of ICT policies, Intelligent Energy Europe
Budget	N/A	N/A	N/A	N/A
Evaluation	N/A	N/A	N/A	N/A
Results of evaluation	N/A	N/A	N/A	N/A
Collaboration	Co-operation/ networking optional, could be permitted by the ministry.	Cooperation mandatory	N/A	N/A

5.1. Generic innovation policies

5.1.1. Overview of innovation policies

All innovation policies are based on different problems, but there could be identified four categories of problems. These categories are financial problems, creation and diffusion of knowledge, the gap between knowledge production and knowledge application and the problems of start-ups. The table below show these categories of problems with the innovation policies which try to solve these problems.

Problem	**Innovation policies**
Financial problems	Credit Guarantee Scheme WBSO Venture Capital Scheme Groeifaciliteit
Gap between knowledge production and knowledge application	Leading Technological Institutes Syntens Innovation Vouchers Casimir Smart Mix
Creation and diffusion of knowledge	Leading Technological Institutes Investment Grants for knowledge production TWA network Innovation Vouchers Casimir SBIR Pilot Smart Mix CIP
Problems of start-ups	Venture Capital Scheme TechnoPartner

Table 8: Reasons for open innovation policies

The first category of problems is financial problems. Four innovation policies focus on this category. The Credit Guarantee Scheme stimulates the provision of credit for small and medium enterprises. With the WBSO the government try to stimulate R&D by alleviating the wage burden for companies through tax reduction. The Venture Capital Scheme wants to increase the amount of venture capital for companies. With the Groeifaciliteit the government want to stimulate the provision of credit to SME's by financers.

There are five policies which try to solve the problem of the gap between knowledge production and knowledge application, all in another way. Leading Technological Institutes want to increase the focus and mass as well public private interactions in research. Syntens support SME's with developing, acquiring and applying new knowledge. Innovation vouchers try to stimulate interaction between knowledge institutes and SME's. The Casimir project tries to enhance exchanges of researchers between companies and knowledge institutes. The Smart Mix promotes focus and mass in research and to enhance the valorisation of results from research.

The problem where the most innovation policies are based on is the creation and diffusion of knowledge. Eight policies focus on this problem and four of these eight policies also focus on the gap between knowledge production and knowledge application. These four policies are already described in the paragraph above. All the policies use different ways to solve this problem. Investment Grants for knowledge infrastructure stimulate the creation of high-quality networks within the Dutch knowledge infrastructure that can address long-term knowledge demands in a flexible way. TWA

networks gather and analyse information about technology/innovation and technology/innovation policy for Dutch companies, knowledge institutes, universities and the government. With the SBIR Pilot the government stimulate start-ups, young fast growing firms and SME's to perform ground-braking research. The CIP program promotes the use of existing knowledge.
Two innovation policies are based on the problems of start-ups. The Venture Capital Scheme wants to increase the amount of venture capital for start-ups. TechnoPartner want to promote more and better technology-based start-ups. There are also two innovation policies based on the problems with the provision of credit for innovative companies. The Credit Guarantee Scheme and the Groeifaciliteit stimulate the provision of credit to SME's.

To explain the other columns of the table, the next paragraph give an overview of these columns. Target group and sector indicate which companies could apply for the policies, some policies are only for SME's and other only for research institutes. For most of the policies the sector in which the applying company operates is not important. Only the agricultural and medical sector could not apply for the Credit Guarantee Scheme.
Aspect of innovation explains on which part of innovation the policy focus. Some policies promote entrepreneurship or the start up of a company; other policies promote co-operation and clustering. Co-operation and clustering is a main characteristic of open innovation. There are eleven of the twenty five policies which promote co-operation and clustering in innovation. Other aspects of innovation are pre-competitive research, diffusion of technologies in enterprises, awareness rising amongst firms on innovation and development/prototype creation.
Companies would apply for innovation policies have to suffice the criteria for egibility. For each innovation policy there are specific criteria on which the proposals for participation will be checked. For innovation policies which support financial problems these criteria are financial like insufficient financial means, insufficient securities, rentability and future perspective. Policies which support the problem of creation and diffusion of knowledge have other criteria like scientific quality, the economic and technical importance and projects must add new aspects to current research.
Funding explains how the policies will be financed. Most of the policies are funded by the government or through tax incentives. Another method is co-financing by the private sector.

5.1.2. Open innovation as an interactive process

Applying the data base of Dutch innovation policies, I divide these innovation policies in open innovation policies and innovation policies. The Objective in this thesis is on open innovation policies and therefore I focus on the open innovation policies. I develop a matrix in which I map the open innovation policies on the different stages and processes of open innovation: 1) the research and development stage; and 2) the inside out process, outside in process and coupled process (see figure 5). For every innovation policy I judge of this policy belong in the table and in which part of the table it belong. Only for the open innovation policies I describe the arguments why these policies belong in the table.

	Research Stage	Development Stage
Inside out process	SBIR Pilot CIP	TechnoPartner
Outside in process	Innovation Vouchers CIP TWA Network	CIP TWA Network
Coupled process	RAAK Leading Technological Institutes Smart Mix Investment grants for knowledge infrastructure Casimir IOP-TTI module Innovation Performance Contracts Besluit innovatiesubsidie samenwerkingsprojecten Eureka	Innovation Performance Contracts Besluit innovatiesubsidie samenwerkingsprojecten Eureka

Table 9: Matrix of open innovation policies

Inside-out process

We start to explain the open innovation policies in the research stage of the inside-out process. In this stage of the open innovation process two open innovation policies are situated, namely the SBIR Pilot and the CIP program.

The SBIR Pilot stimulates start-ups, young fast growing firms and SME's to perform ground-braking research, so the focus is on the research stage of open innovation. To do this ground braking research start ups and SME's are stimulated to collaborate. The policy also promotes awareness rising amongst firms for commercialisation of innovation and diffusion of technologies. Therefore this policy could be mapped in the inside-out process of open innovation.

The CIP programme promotes the propagation and use of existing knowledge which is available at knowledge institutes. Therefore companies have to collaborate with knowledge institutes. This policy could be mapped on two ways. For organizations with knowledge this policy promote the propagation of knowledge, so the inside-out process in the research stage. For organizations which use knowledge this policy promote the outside-in process in the research stage as well in the development stage.

Only one open innovation policy try to stimulate the inside-out process in the development stage of open innovation. TechnoPartner stimulates capital funds to invest in high-risk ventures of technostarters. Also public-private consortiums (minimum one public knowledge institute) can apply for subsidy if they take knowledge exploitation in their region to a higher level. The focus in these consortiums is on the exploitation of knowledge of public knowledge institutes. Therefore this policy is mapped in the development stage of the inside-out process.

Outside-in process

In the outside-in process there are three open innovation policies situated, three in the research stage and two in the development stage. The two which are situated in the development stage are also situated in the research stage. The three open innovation policies are Innovation vouchers, TWA networks and the CIP program. The CIP

program is already explained in the inside-out process.

Innovation voucher stimulates interaction and exchange between knowledge suppliers and SME's. Companies could buy knowledge from a knowledge supplier with an innovation voucher, so this is the outside-in process in the research stage of open innovation.
The ministry of Economic Affairs has stationed technical-scientific attaches (TWA) in fifteen cities in the world. These TWA's gather and analyse information about technology/innovation and technology/innovation policy for Dutch companies, knowledge institutes, universities and the government. For these organizations TWA's stimulate the outside-in process. This is possible in the research as well in the development stage of open innovation.

The coupled process
Most of the open innovation policies try to stimulate the coupled process of open innovation. In the matrix can be seen that most of these policies stimulate the research stage of open innovation. There are only three open innovation policies in the coupled process which stimulate the development stage of open innovation. These three policies also stimulate the research stage of open innovation. First the open innovation policies in the research stage of the coupled process will be explained. At the end the three open innovation policies in both stages of the coupled process will be explained.

RAAK offers financial support for collaboration projects in the areas of knowledge creation and knowledge exchange between education institutes and SME's. Subsidies can be awarded to regional innovation programmes that are aimed at the exchange of knowledge and are executed by a consortium of one or more education institutes and one or more business. Therefore this policy focuses on the research stage of open innovation and the mandatory consortiums argue a coupled process of open innovation.

The Dutch research infrastructure needed strengthening in the field of fundamental research, especially in R&D intensive sectors. Therefore Leading Technology Institutes want to increase the focus and mass as well public-private interactions in research areas that are strategically important for the Netherlands. Through strengthen fundamental research and public-private interactions in research areas this policy could be mapped in the research stage of the coupled process.

The Smart Mix promotes focus and mass in excellent scientific research and wants to enhance the valorisation of results from research. Consortia of knowledge producers and knowledge users can submit proposals for research programmes. Therefore this policy can be mapped in the research stage of the coupled process of open innovation.

Investment grants for knowledge infrastructure stimulate the creation of high-quality networks within the Dutch knowledge infrastructure that can address long-term knowledge demands in a flexible way. Projects typically involve public-private co-operation, so investment grants for knowledge infrastructure focuses on the research stage of the coupled process.

Casimir increases public-private mobility of researchers and enhances exchanges of researchers between companies and knowledge institutes and vice versa. A proposal could be submitted by a trio of a talented graduate or researcher at a knowledge institute or company in the Netherlands, a representative of a company and knowledge institution. This is a form of a network and therefore this policy could be mapped in the

research stage of the coupled process of open innovation.

The main objective of the IOP-TTI module is to establish long-term strategic R&D collaboration between companies and publicly funded knowledge institutes in those areas of strategic importance for the Dutch economy. Therefore this policy could be mapped in the research stage of the coupled process.

Innovation Performance Contracts are a collaboration of a group between fifteen and thirty-five companies. The "penvoerder" of this collaboration applies for a subsidy for the SME's that will participate. Each company has to have its own three year innovation plan. At least part of the activities has to be collective. So IPC's could be characterized as the coupled process of open innovation, but not especially in the research or the development stage of open innovation.

Besluit innovatiesubsidie samenwerkingsprojecten stimulates innovation projects which are new for the Netherlands. A proposal could be submitted by Dutch participants of a collaboration which collective carry cost and risk of an innovation project. It should be a technological innovation, sustainability, technological cooperation or have economic perspective. This policy stimulates the coupled process in the research and development stage of open innovation.

Eureka is an initiative of thirty-three European countries and the EC to stimulate cooperation among Europe's entrepreneurs and knowledge institutes in the field of technology research and the development of market focused products, processes and services. Therefore Eureka could be mapped in the coupled process and focuses on the research stage as well the development stage of open innovation.

Analysis

In the matrix can be seen that the number of open innovation policies which stimulate the research stage of open innovation is thirteen and the number in the development stage is six. There is only one open innovation policy which especially stimulates the development stage of open innovation, the other five policies stimulate also the research stage of open innovation.

This has also consequences for the budget that is available for the research and development stage of open innovation. It is not possible to compare the budgets mentioned in the table, because the budgets do not all have the same period. There can be concluded that the budget for the research stage is many times higher than the budget for the development stage of open innovation. Only the budget for Innovation Vouchers is already two times higher than the budget for TechnoPartner in the same period.

Important to know is on which organizations the open innovation policies focus, SME's, knowledge institutes or all organizations in the Netherlands. The table on the next page give an overview of the open innovation policies and their target group.

Target group	Open innovation policy
SME's	SBIR Pilot CIP Innovation Vouchers Innovation Performance Contracts RAAK
Knowledge institutes	TechnoPartner Casimir
All companies and knowledge institutes	TWA Network IOP-TTI module Investment grants for knowledge infrastructure Eureka Besluit innovatiesubsidie samenwerkingsprojecten Smart Mix Leading Technological Institutes

Table 10: Target group of open innovation policies

Open innovation policies in the research stage of the inside-out process are only for SME's and not for knowledge institutes. On the other side there are no open innovation policies in the development phase of the inside-out process for companies, the target group of the TechnoPartner is only knowledge institutions.
In the outside-in process only TWA networks are for all companies and knowledge institutes. The other two policies are only for SME's. While TWA networks only gather and analyse information about technology/innovation in other countries, there is no possibility for organizations (other than SME's) and knowledge institutes to participate in an innovation policy which stimulate the outside-in process.
The open innovation policies in the coupled process of open innovation are a mix of policies which are only for SME's, knowledge institutions or for all companies and knowledge institutions.

Collaboration is a necessarily for open innovation. The next table give an overview of the open innovation policies and how collaboration is anchored in these policies.

Open innovation policy	Collaboration
Leading Technology Institutes	Cooperation/networking mandatory
Investment Grants for Knowledge Infrastructure	Cooperation/networking mandatory
Casimir	Cooperation/networking mandatory
RAAK	Cooperation/networking mandatory
Smart Mix	Cooperation/networking mandatory
IOP-TTI module	Cooperation/networking mandatory
Innovation Performance Contracts	Cooperation/networking mandatory
EUREKA	Cooperation/networking mandatory
TechnoPartner	Cooperation/networking optional
Innovation Vouchers	Cooperation/networking optional
SBIR Pilot	Cooperation/networking optional
Experimental framework regulation subsidies innovation projects	Cooperation/networking optional
Subsidieregeling innovatie gerichte onderzoeksprogramma's.	Cooperation/networking optional
Besluit innovatiesubsidie samenwerkingsprojecten	Cooperation/networking optional

Table 11: Collaboration in open innovation policies

In eight open innovation policies collaboration is mandatory and in six open innovation policies collaboration is optional. The eight policies where collaboration is mandatory are all mapped in the coupled process of open innovation. There are several reasons why collaboration is mandatory for innovation policies. Leading Technological Institutes want to increase public-private interactions in research areas. Investment Grants for Knowledge Infrastructure want to stimulate the creation of high-quality networks within the Dutch knowledge infrastructure. The RAAK project wants to strengthen both the bridge function of vocational educational institutes and innovativeness of SME's. The other open innovation policies have also one of these reasons why collaboration is mandatory.
In six open innovation policies collaboration is optional; the reason for this is in most cases to stimulate start-ups. Other reasons are to stimulate research on innovative subjects. This can be done in R&D departments of companies or in a collaboration of companies and knowledge institutes.

This could also be related to the aspect of innovation where the policies focuses on. Nine of the fourteen open innovation policies focus on cooperation and clustering. In four of the fourteen open innovation policies are no data about aspects of innovation available. The next table give an overview on which aspect of innovation the open innovation policies focuses.

Policy	**Aspect of innovation**
Leading Technological Institutes	Pre-competitive research, Applied industrial research Development/ Prototype creation, Commercialization of innovation, Industrial design, Co-operation promotion and clustering, Diffusion of technologies in enterprises
Investment grants for knowledge infrastructure	Pr-competitive research, Applied Industrial research, Co-operation promotion and clustering
TWA Network	N/A
TechnoPartner	Promotion of entrepreneurship/ start up, Commercialization of innovation, Co-operation promotion and clustering
Innovation Vouchers	Co-operation promotion and clustering, Diffusion of technologies in enterprises
Casimir	Co-operation promotion and clustering
SBIR Pilot	Promotion of entrepreneurship/ start-up, Awareness raising amongst firms on innovation commercialization of innovation, Diffusion of technologies in entreprises
RAAK	Awareness raising amongst firms on innovation, Co-operation promotion and clustering, Diffusion of technologies in enterprises
Smart Mix	Pre-competitive research, Applied industrial research, Development/ prototype creation, commercialization of innovation, Industrial design, co-operation promotion and clustering, Diffusion of technologies in enterprises.
IOP-TTI module	Pre-competitive research, Applied Industrial research, Development/ prototype creation, Co-operation promotion and clustering, Diffusion of technologies in enterprises
Innovation Performance Contracts	Awareness raising amongst firms on innovation, Pre-competitive research, Applied industrial research, Development/ prototype creation, Co-operation promotion and clustering, Diffusion of technologies in enterprises
Besluit innovatiesubsidie samenwerkingsprojecten	N/A
Eureka	N/A
CIP	N/A

Table 12: Aspects of innovation in open innovation policies

5.2. Results companies

As discussed in chapter 3 Methodology, the interviews are semi-structured. I decided to discuss the subjects open innovation and the role of the government in open innovation with the interviewees. In the interview I asked more about these subjects according to what the interviewee knows about these subjects. Because the interviews were semi-structured the results are not analyzed with statistical methods or other methods to analyze. The results of the interviews are presented in the next paragraphs. The results are clustered by means of the theoretical framework.

5.3.1. Need for open innovation

In all the interviews with the companies is stated that open innovation is important for the Dutch economy. With open innovation and the use of experience and knowledge of other partners companies produce qualitative better products. The products are not only of better quality but also put to the market faster. If the Dutch economy does not focus on open innovation, in the future the Dutch economy will not be profitable.

"If the Netherlands do not invest in open innovation, we will become an economic unprofitable country."

Because the Dutch economy is a knowledge economy, to stay competitive as knowledge economy there must be creation of new knowledge. Citation below found this opinion.

"The Netherlands have a knowledge economy and to maintain or increase the competitive position we should together create new knowledge."

Another aspect which influence open innovation is the size of the company. Especially small companies innovate in an open manner because they are a small part of the supply chain. Such companies innovate with suppliers and customers. Citation below reflects this statement.

"If companies are not prepared to share knowledge with others, these companies do not get new knowledge from others. Companies can not invent everything by themselves."

A Disadvantage of open innovation is sharing company specific knowledge with partners, like the citation below.

"Sharing of knowledge with partners is based on trust, but trust is not always there."

There must also be a balance between exploration and exploitation of knowledge. Companies must not only develop but also produce innovations. An example of this is RAPS, a company which want to develop wheels for the slap shoe. The company develops a slap shoe with wheels so that skaters could train in the summer. Decided was to board the production to China. Because of this decision the company looses company specific knowledge and is bankrupt. Citations below are examples of this disadvantage.

"A disadvantage of open innovation is the danger that you continue develop and not produce anymore."

Remarkable is that all the companies have no big problems with open innovation. They see open innovation as opportunities in the market and important for staying competitive. Problems in the process of open innovation are solved by the market. Citations on the next page mentioned some problems with open innovation.

"Knowledge is steeled out of offers for innovative projects."

"Because I was too open and honest to partners the project was not possible anymore."

"Our problems with open innovation projects are always solved by the market."

5.3.2. Innovation as an interactive process

The focus of all the companies is on the exploitation stage of open innovation. Companies have to produce and sell products in order to make profit. Four of the six interviewed companies do only research which is necessary to produce the products. This is mainly combining knowledge from other projects. Companies do not fundamental research which could be useful in the future but not lead to short term profit. Citations below reflect these statements.

"There are some research projects, but most of the projects are application of knowledge."

"The focus in the company is on production of products. I have to, because otherwise I make no profit and the continuity of the company will be in danger."

"The implementation of customer specific solutions is the essence of the company."

Companies which do also focus on the exploration stage of open innovation are start ups. These companies do research to obtain knowledge about the characteristics of their product, market and environment. An example is a company which process polyurethane in order to produce all synthetic materials. Because polyurethane is a relative new material, not all the characteristics of this material are known. Therefore this company does a lot of research on the characteristics of polyurethane.

Five of the six interviewed companies focus on getting knowledge from outside the company, the so-called outside-in process. This is most of the time knowledge from suppliers. Companies integrate components of the suppliers in their product, because they do not know all the characteristics of these components. Citations below reflect this statement.

"The main process is to get knowledge inside the company and not sharing knowledge with others."

"We have to keep the knowledge position of the company high to let the company become a success."

On the other hand three companies participate in networks with branch organizations or learning institutes. The goal of such a network is to optimize the individual results together with other companies in the branch. An example of this process is cited.

"We collaborate in networks for relation building, not for knowledge sharing. Examples of these networks are Metaalunie and VMO."

5.3.3. The government as important actor in open innovation

The interviewed companies have not the same opinion about government intervention in open innovation. Especially small companies with one to forty employees have problems with the way in which the government intervenes in open innovation. In their opinion the government does not stimulate open innovation. It is especially the administrative annoy which trouble the small companies, because they have not the time to do this. Citations on the next page reflect this statement.

"When the government decides to stimulate open innovation there are edited a lot of rules and terms. There will be installed a commission and it takes a lot of time before something is happening."

"The whole accounting had to be changed in order to participate in a subsidy measure."

The small companies have various ideas about the way in which the government should intervene. One of these ideas is to abolish all the subsidies and stimulate open innovation in companies with tax reduction. This could be a task for the accountant, because this person also visits the company to establish the financial statement. The accountant judges the companies on criteria of open innovation and decides how much tax reduction a company deserves. The citation below found this opinion.

"Abolish all subsidies and stimulate open innovation with tax reduction".

Another idea is an innovation advisor of the government. This advisor has an own set of companies which he advices. The advisor visits the companies once in a half year to observe which innovation projects are carried out. Together with the company the innovation advisor helps to select innovation policies which could stimulate them. The innovation advisor must actively manage his clients and know what is happening in the business. The citation below reflects this statement.

"Syntens should visit the companies once in a year to observe the innovativeness of companies. The degree in which company is innovative determines the amount of subsidy."

Government intervention has not always to be giving money. There are also other methods to stimulate companies to innovate open. Two of the six interviewed companies mentioned the government as costumer. Especially with new products or services it is difficult to find the first customer. When the government is that customer the companies are sure of a first order and have not that much risk. To develop a new product or service cost a lot of money and with a first order a part of that money is earned back. A first order also stimulates other customers to invest in this new product or service.

Companies with more than forty employees have not so much problems with the way in which the government intervene. These companies have one employee which is responsible for the administration. Because this person has experience in administration, it is not so difficult for him to do the administration for open innovation policies. Another aspect is that bigger companies could collect a greater amount of subsidies. Small companies participate in one or two innovation projects while bigger companies participate in more than two innovation projects. Therefore the amount of subsidy is bigger and is it easily for an administrator to spend time on it. The citation below is an opinion of a company with more than forty employees.

"Because one person in our company is responsible for the administration, the administration time is paid back easily with the subsidy."

5.3.4. Open innovation stimulated by government intervention instruments

The opinion about open innovation policies is that they are difficult to implement, especially for small firms. These companies make only a part of a new product or produce a new service. In the application form for a subsidy is always asked for a description of a new product. These companies could not answer this question and therefore they are not applicable for a subsidy.

All the companies are not completely informed about which innovation policies there are. There are three innovation policies which all the companies know, namely: WBSO, Innovation vouchers and IPC. These innovation policies are frequently used by the companies. The companies know that there are a lot more innovation policies but find it too much and complex and do not actively seek to them. Companies do not go to the website of SenterNovem to find innovation policies which could help them. Four of the six companies are alerted on innovation policies by colleague entrepreneurs or advisors from Syntens. The citations below underpin this statement.

"Because there are so many innovation policies it is very confusing and therefore I do not pay attention to it."

"I have the idea that small subsidies are quick and easy applicable, but subsidy bureaus do not inform you about these subsidies, because they could not make profit on these subsidies."

"I never visit the website of SenterNovem to search for innovation policies."

"The Metaalunie and the VMO attended me for WBSO, IPC and Innovation Vouchers."

The opinion about subsidy as open innovation policy instrument is divided among the companies. On the one hand subsidies reduce the risk for companies. Companies are stimulated with subsidies to start more uncertain and risky R&D projects. The costs of these R&D projects are partly paid with subsidy and therefore it becomes less risky for the companies. On the other hand subsidies ask for administration and that is not what companies want. In the opinion of one of the companies' subsidies is an instrument to realize projects in the society and not for helping individual companies. The citation below reflects that companies are stimulated to start R&D projects.

"Subsidies stimulate our company to set up and develop new projects."

In the interviews with companies is observed that companies need also other government intervention instruments. There are two companies which have problems to find the right partners in their open innovation process. An example is a company which does a process with salt where little knowledge is about. The government could help this company to bring in contact with partners who could help to gather this knowledge, like universities or other knowledge institutes. The citation below found this statement.

"Companies must have a drive to innovate, policy instruments are a stimulant to hold that drive."

Three companies have also the need for a databank of knowledge. Government has contacts with a lot of companies and knowledge institutes and is able to gather knowledge about many different subjects. Collect al this knowledge in a databank and stimulate companies to use this databank. Companies could use knowledge from the databank but also submit knowledge to this databank. The citation below reflects this statement.

"To solve ad hoc problems we need for knowledge database which will be coordinated by the government."

5.4 Results Government

After conducting interviews with companies I conducted interviews with employees of the Ministry of Economic Affairs and SenterNovem. The ministry of economic affairs outsources the achievement of innovation policies to SenterNovem. In the interviews I wanted to know exactly what their role in innovation policies is. Therefore the interviews

were semi-structured and I asked the interviewees to describe the position of SenterNovem and the Ministry of Economic Affairs. I also want to know the opinion of SenterNovem and the Ministry of Economic Affairs about open innovation and the role of the government in open innovation. I confront the employees of SenterNovem and the Ministry of Economic Affairs with the results of the interviews with the companies and ask them their opinion about different aspects of open innovation. The results of these interviews are presented in the next paragraphs.

SenterNovem is a department of the Ministry of Economic Affairs. This department helps the ministry to develop and perform policies on innovation. The task of SenterNovem is to start and to apprise innovation policies and programs by companies. The Ministry of Economic Affairs develops the focus and context of the policies and SenterNovem develop together with companies' projects within this focus and context. SenterNovem play an important role in informing the ministry of economic affairs about experiences of companies with the innovation policies. So SenterNovem also help to develop innovation policies. There is no strict divergence between the Ministry of Economic Affairs and SenterNovem.
The InnovatioPlatform consist of the minister president, minister of economic affairs, minister of education, the minister of agriculture, CEO's of companies and members of knowledge institutes. The objective of the InnovationPlatform is to improve the innovation climate in the Netherlands.

5.4.1. Need for open innovation

In the opinion of the government creation of new knowledge is important for the Dutch economy. Therefore collaboration is needed, because together you know more than alone. Companies have to collaborate, especially small companies which do not have all knowledge and expertise inside. On the other side companies must not loose their competitive position and therefore it is difficult for SME's to innovate in an open manner. Citations below reflect this statement.

"It is the choice of companies to do a project yourself or to do it with others."

"Companies will always keep knowledge for themselves, so open innovation take place in the preliminary phase of an innovation project where companies have the same objectives."

"The Ministry of Economic Affairs is developing a new innovation policy instrument, the innovation omnibus. With this instrument the whole process of innovation can be accompanied depending where the needs are."

As stated in the first paragraph the main need for open innovation is the creation of new knowledge. To create this new knowledge organizations have to find the right partners to collaborate. The problem is that organizations could not always find the right partner and this partner also could be a competitor. The citation below is an example of this problem.

"Because small companies have not all the necessary knowledge and expertise, open innovation is requisite."

Another problem what especially SME's have with open innovation is the time it costs. SME's use only open innovation for short term results and not to create long term results. The need for open innovation is not of the last years. The history of open innovation policies starts in 1979.

In 1979 the Dutch government started with open innovation policy. In the years before

1979 there was an economic recession and the Dutch economy needed a stimulant. Because the Netherlands is a knowledge economy the government decided to stimulate the use of this knowledge. The first open innovation policy was Stichting Technische Wetenschappen, proposals of companies to research institutes for scientific research.
Since 2000 the government is reforming the open innovation policy. The Innovation Platform and companies influence the government to focus on the strong points of the Dutch economy. These are the so called key areas. There are several reasons why the government is reforming the open innovation policy. First, the importance of collaboration must be stimulated extensively. Second, the focus of innovation policy must not be on the whole economy, but only on the strong points of the economy. Third, there is obscurity about the high range of generic instruments. Fourth, especially the financial generic instruments have high costs and the effects are difficult to measure. The citation below is the opinion of the parliament about financial instruments.

"According to the parliament financial instruments are difficult to perform, the costs are high, the effects not measurable and the parliament loose the overview of all the different innovation policies."

5.4.2 Innovation as an interactive process

The government wants to stimulate especially the exploitation stage of open innovation, as cited below.

"The Ministry of Economic Affairs does not focus on fundamental research, but more on the development of new products and services."

The complexity of the open innovation policies influence on which process of open innovation the policy focuses. Simple open innovation policies are for individual companies or knowledge institutes to stimulate inside-out or outside-in processes. More complex open innovation policies where more than one company of knowledge institute is involved, focus on the coupled process of open innovation. The government wants to focus on all the three processes of open innovation. The simple open innovation policies are for individual companies and knowledge institutes to stimulate them to start with open innovation, as cited below.

"Companies and knowledge institutes are stimulated with simple policies to go beyond the boundaries of the organization, contacts for the future could be made."

The more complex open innovation policies are for companies and knowledge institutes which already innovate in an open manner, but need a stimulant to develop new projects. Especially organizations in the value chain have to collaborate. For example a producer of medical equipment need to know what the medical sector wants. In this kind of innovations collaboration is essential.

5.4.3. The government as important actor in open innovation

The objective of the government with open innovation policies is to improve the strengths of companies, as cited below.

"The government wants to create strength within companies."

SenterNovem and the Ministry of Economic Affairs together start up, facilitate and form the process of open innovation policies. The role of the government is to facilitate and finance open innovation policies. The citation below on the next page this statement.

"The role of the government is to facilitate and finance open innovation projects."

Nowadays the focus of government policies on open innovation is to stimulate public-private collaboration. Therefore the government develops programmatic policies. This is an initiative of the Innovation Platform which argues that the Dutch government must focus on the strong parts of the economy and not on the whole economy. The policy on open innovation could be summarized in a pyramid.

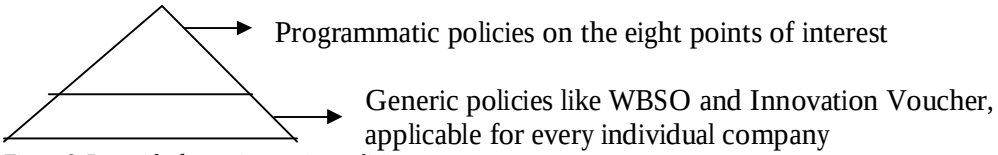

Figure 8: Pyramid of open innovation policies

The objective of the government is to support companies in these key areas with their organizing capacity. The ministry of economic affairs establishes the framework for these programmatic policies. Companies and knowledge institutes create together a tender within this framework. In this way all participants are actively involved and motivated to focus on results. Citations below show opinions about the role of the government in open innovation.

"Our people establish gaps in the economy and discuss with the Ministry of Economic Affairs how to solve these gaps."

SenterNovem try together with the ministry of economic affairs to make the generic policies better applicable. An example of a simplistic policy is Innovation Voucher. Also the legal basis of generic policies will be fitted, so it is easier for companies to make use of different innovation policies. A lot of company specific data will be the same for every innovation policy. In that way companies have to supply this data once.

Government officers developed a culture to strict maintenance regulation. In the opinion of the InnovationPlatform government officers should listen to the ideas of companies and seek for possibilities within regulations. The government should start an advice bureau to help companies with new ideas. These advices must not only focus on the technical aspects of the ideas, but also on collaboration. Open innovation is especially collaboration with different partners.

5.4.4. Open innovation stimulated by government intervention instruments

Financial instruments to stimulate open innovation are easy to perform and simple to use for the government. With financial instruments is meant subsidies, fiscal instruments and credits.

"Subsidies are a good instrument to stimulate companies to participate in innovation projects."

"Through reactions from the market know we that financial instruments stimulate companies to collaborate."

These kinds of instruments are often used by the government and it is always a mix of these instruments. The citation below found this statement.

"We will never use one kind of instrument, because pays on one horse have too much uncertainty."

In the opinion of the InnovationPlatform the generic innovation policies satisfy the demands of the market. Only these generic innovation policies focus on the

technological aspects of open innovation. But open innovation is the collaboration between different actors to create innovations, so the government should focus more on the collaboration aspect of open innovation.
Another opinion of the InnovationPlatform is that the government should operate as launching customer. If the government spend 2,5% of their purchase budget for innovative purchases, innovation will be stimulated. Companies are sure of a first order and have more certainty to develop new ideas.

SenterNovem has different methods to inform companies about new innovation policies and tenders. With the start of new innovation policies and tenders there are organized kick-of meetings. This meeting consists of sessions and workshops about the objectives and possibilities of the new innovation policy or tender.
Sending mailings to companies and knowledge institutes is also done. SenterNovem has a large network of companies and knowledge institutes. When there is a new innovation policy or tender these companies and knowledge institutes get a mailing.
Every innovation policy, program and tender is published on the website of SenterNovem. On events especially for companies, SenterNovem give sessions about new innovation policies and tenders. Citations below reflect statements about informing companies.

"The objective is not to reach every company, but only the companies which are enthusiast and will actively participate."

"The government should be able to present a clear overview of innovation policies."

"Confusing about innovation policies is not only the fault of the national government, but also of the EU, provinces and communities."

The ministry of economic affairs decides when an evaluation has to be done. There is no strict procedure for evaluation of innovation policies. The evaluation of innovation policies is the same as quality management within companies, as cited below.

"To evaluate open innovation policies we copy the quality management system."

SenterNovem judge the innovation policies on formulated objectives and criteria. The first part of an evaluation is desk research based on figures and documents. The second part of an evaluation is field research based on interviews with companies. These interviews are with companies which participated in the policy and with companies which did not participate. SenterNovem select companies for interviews on striking characteristics, for example an evaluation for the IOP regulation. In this evaluation are companies selected for interviews which frequently apply for the WBSO, which means that these companies do a lot of R&D. Therefore an IOP could also be interesting for these companies, but the question is why these companies do not participate. A new innovation policy always starts with a zero evaluation which will be compared with the other evaluations. The citation below reflects this statement.

"To evaluate government intervention, ambitions have to be formulated in advance."

A result of the evaluations is that financial instruments are effective. With subsidy or a tax reduction especially small and medium sized companies are more considerate to participate in research. For these companies the costs of research projects are often the bottleneck and with subsidy or tax reduction these costs can be reduced. Another reason

why companies participate in open innovation policies is to enlarge their network. Government can bring companies in contact with interesting partners. In this way open innovation is also stimulated. Citations below show different opinions about the evaluation of open innovation policies.

"In the past years the government was not that strict in measuring the effects of open innovation policies."

"The indicators become more and more specific to measure the right effects."

In this chapter I describe the results of the qualitative study of the Dutch (open) innovation policies and the interviews with companies and the government. In order to formulate conclusions and recommendations from these results an analysis of these results is needed. In the next chapter the results of the qualitative study of the Dutch (open) innovation policies and the interviews are combined and analyzed. This analysis leads to the formulation of conclusions and recommendations.

6. Discussion

In this chapter the results described in chapter five will be combined and analyzed. The first part of this chapter analyzes the results of the qualitative study of Dutch innovation policies. In the second part of this chapter the results of the qualitative study will be combined with the results of the interviews with companies and the government. Conclusions and recommendations will be formulated immediately after any analyzed subject.

6.1. Analysis of innovation policies

6.1.1. Innovation policies and open innovation policies

In paragraph 5.1.2. the open innovation policies are mapped in different processes and stages of open innovation. As can be seen in table 7 there are not only open innovation policies but also policies which focus on other forms of innovation. The next table give an overview of which policies focus especially on open innovation and which policies focus on innovation in general.

Innovation policies	**Open innovation policies**
Credit Guarantee Scheme	Leading Technological Institutes
WBSO	Investment grants for knowledge infrastructure
Syntens	TWA Network
Venture Capital Scheme	TechnoPartner
Valorization grants	Innovation Vouchers
Experimental framework regulation subsidies innovation projects	Casimir
Challengers module	SBIR Pilot
Groeifaciliteit	RAAK
Launching Customer	Smart Mix
Subsidieregeling innovatiegerichte onderzoeksprogramma's	IOP-TTI module
KP7	Innovation Performance Contracts
	Besluit innovatiesubsidie samenwerkingsprojecten
	Eureka
	CIP

Table 13: Innovation policies and open innovation policies

In totally there are twenty five innovation policies, fourteen of these twenty five focus on open innovation. In which way open innovation is stimulated with these fourteen policies is explained in paragraph 5.1.2. The other eleven innovation policies stimulate companies and knowledge institute to be innovative, but not especially in an open manner. It is important that there will be innovation policies which not especially stimulate open innovation, because not every company and knowledge institute in the Netherlands will or can innovate in an open manner. The Dutch government has the objective to stimulate especially open innovation and therefore the amount of open innovation policies has to be larger than the amount of innovation policies. In this case the amount is about half open innovation policies and half innovation policies.

There can be concluded that if the government wants to stimulate open innovation the focus must become more on open innovation policies and less on innovation policies.

6.1.2. *Analysis of open innovation policies*

In order to analyze the open innovation policies I compare the goal where is focused on and in which way this goal is tried to reach. How the goal will be reached depend on the projects which will be carried out under this open innovation policy. The projects can be influenced by setting criteria for egibility. Therefore in the next table all open innovation policies are mapped with their goal and criteria for egibility.

Table 14: Goal and criteria for egibility of open innovation policies

Policy	**Goal**	**Criteria of egibility**
Leading Technological Institutes	To increase focus and mass as well as public-private interactions in research areas that are strategically important for the Netherlands.	Funding was organized as open call, which had 18 responses. Each proposal was externally evaluated on its scientific quality and the economic an technological importance of the areas of study
Investment grants for knowledge infrastructure	To stimulate the creation of high-quality networks within the Dutch knowledge infrastructure that can address long-term knowledge demands in a flexible way.	Projects typically involve public-private co-operation and demand-driven knowledge production. Projects must have new aspects to add to current research,[4]
TWA Network	Gather and analyze information about technology/innovation and technology/innovation policy for Dutch companies, knowledge institutes, universities and the government	Information that is open to business, research institutes and government
TechnoPartner	To promote more and better technology-based start-ups, through the creation of a better climate for technostarters inside and outside knowledge institutes	Closed-end venture capital funds can qualify. Such funds that invest in high-risk ventures of technostarters, can apply for a loan from TechnoPartner. Knowledge Exploitation Subsidy arrangement (SKE): public-private consortiums (minimum one public knowledge institute) can apply for subsidy is they take knowledge exploitation
Innovation Vouchers	Stimulate interaction and exchange between the knowledge the knowledge suppliers and SME's	SME is based in the Netherlands and is not under suspension of payment, the firm is an SME as defined by the EU, SME is not active in agriculture, fishery, aquaculture products and transportation, the firm has not receive subsidies(EUR 92,500 or more) without approval of the EC in the three years preceding the application, the firm did not receive an innovation voucher in earlier rounds of the scheme
Casimir	Increase public-private mobility of researchers and to enhance exchanges of researchers between companies and knowledge institutes and vice versa	Submitted by a trio of a talented graduate or researcher at a knowledge institution or company in the Netherlands, a representative of a company and knowledge institution. PhD students, Bachelor-level research staff, post-doctoral researchers, university lectures or senior lectures, professors and researchers working in the private sector

[4] Co-operation must include at least one company and at least one knowledge institutions, must have an innovation application that delivers positive social and economic benefits. ICES/KIS 3 projects must be: new for the Netherlands, strong planning with coherent activities, focussed on the development of knowledge through fundamental and industrial research. A project must be executed within 4 years, minimum size is 5 million euro.

SBIR Pilot	To stimulate start-ups, young fast growing firms and SME's and to challenge them to perform ground-braking research. Promote the commercialization of knowledge	Only starters, young fast growing firms and innovative SME's can submit proposals.
RAAK	Strengthen both the bridge function of vocational educational institutes and innovativeness of SME's. Generating and distributing policy relevant information and best practices.	Submission of an application form; an elaborated proposal; a signed consortium agreement; and a budget. The governing body of the education institute should act as consortium leader. There should be a perspective for sustainable development
Smart Mix	To promote focus and mass in excellent scientific research and to enhance the valorization of results from research	Consortia of knowledge producers and knowledge users can submit proposals for research programmes that are evaluated based on two main criteria: focus and mass in excellent scientific research and valorization perspective. Foreign organizations are eligible, provided that the program benefits the Netherlands.
IOP-TTI module	Optimal focus and mass in the targeted technological areas; Interaction between companies and publicly funded knowledge institutes; Valorization and anchoring; Contributing to sustainable development	Participant in the IOP-collaboration that execute an IOP-project at own expense and for own risk A leading technology institute that executes a strategic research program at own expense and for own risk
Innovation Performance Contracts	An agreement between SME's and a related organization that acts for the group about an extra effort in innovation.	For pre-IPC phase the applicant, typically a sector organization, can apply for a subsidy for an innovation position study; knowledge transfer in the pre-IPC phase; preparation of the "penvoerder" of the IPC-application; and knowledge transfer in the IPC-phase. For the IPC-phase the "penvoerder" applies for a subsidy for the SME's that will participate. The group has to be between15 and 35 companies. Each company has to have its own 3-year innovation plan. At least part of the activities has to be collective activities.
Besluit innovatiesubsidie samenwerkingsprojecten	To stimulate projects which are new for the Netherlands. It is a systematically whole of activities and could consist of research/development.	Entrepreneur has to be located in the Netherlands. Included of a project plan and budget. It should be a technological innovations, sustainability, technological cooperation or economic perspective. After every six weeks a rapport about the performing of the project. Audit certificate
Eureka	Initiative of 33 countries and the EC to stimulate cooperation among Europe's entrepreneurs and institutes in the field of technology. Development of market focused products, processes and services	Participating companies initiate the projects by themselves. Participating governments support projects in own country.
CIP	Promotion and use of existing knowledge.	CIP is divided in three sub programs: Entrepreneurship& innovation, support of ICT policies, Intelligent Energy Europe

Table 14 continued

The goals of the open innovation policies could be categorized in three categories, namely the creation of public-private interactions and networks, the strengthen of start-ups and SME's and the stimulation of new open innovation projects within the

Netherlands. In the first category public-private interactions and networks belong Leading Technological Institutes, Investment Grants for Knowledge Infrastructure, Innovation Vouchers, Casimir, RAAK, Smart Mix, IOP TTI Module and CIP. In the second category to strengthen start ups and SME's belong TechnoPartner and SBIR Pilot. In the last category to stimulate new open innovation in the Netherlands projects belong TWA Network, Innovation Performance Contracts, Besluit Innovatiesubsidies Samenwerkingsprojecten and Eureka. The open innovation policies within these categories use different methods to reach the goal.

Companies which participate in open innovation policies to create public-private interactions and networks have to collaborate with a knowledge institute. This criteria is stated in all eight open innovation policies for the creation of public-private interactions and networks. In all the eight policies the focus is on doing research. There is a difference between the policies about the role of companies in doing research, in the Smart Mix for example companies actively participate in research while in Innovation Vouchers companies contract knowledge institutes to do research. There can be concluded that the goal of creating public-private interactions and networks is reached with the used criteria for egibility. On the other side all the eight open innovation policies focus on doing research and do not focus on the development and commercializing of innovations. Public-private interactions and networks could help companies to develop innovations quicker or cheaper and to commercialize innovations to more and different markets.

With open innovation policies the goal of creating public-private interactions and networks is only reached in doing research and not in the development and commercializing of open innovations.

Public-private interactions and networks are created in the research stage of open innovation, which is logic because knowledge institutes are mainly public and companies mainly private. On the other side it is also important that there will be created networks of companies in order to develop and commercialize open innovations. So new open innovation policies must also focus on the creation of such networks.

Stimulate with open innovation policies the creation of interactions and networks between companies

TechnoPartner and SBIR Pilot focus on the goal to strengthen start ups and SME's. To reach this goal the government try with TechnoPartner to stimulate funds to invest in technological starters and with SBIR Pilot to stimulate start ups and SME's to make innovative products for the government. In both open innovation policies the government try to reduce the risks of start ups and SME's. Start ups and SME's have to produce in order to make cash flow and so to have the right to exist. SBIR Pilot reduce this risk with being a customer for these companies, so start ups and SME's are sure of an order.

To strengthen start ups and SME's the government have to invest more to reduce the risks of start ups and SME's.

SBIR Pilot is a good initiative of the government. So investments of the government to reduce the risks of start ups and SME's does not mean a new open innovation policy. To enlarge SBIR Pilot with more budget and to make this open innovation policy applicable for every start up and SME, the government reduce these risks.

Enlarge SBIR Pilot with more budget and make this open innovation policy applicable to every start up and SME.

The other open innovation policies stimulate not a specific aspect of open innovation, but stimulate open innovation projects in general. Casimir for example try to stimulate open innovation by enhancing the mobility of researchers. Another example is TWA network which stimulate open innovation with free information about technologies and innovations in other countries. The four open innovation policies stimulate research as well the development and commercializing of innovations. So there can be concluded that these open innovation policies stimulate different aspects of open innovation.

6.2. Need for open innovation

Companies and the government agree about the importance of open innovation. Open innovation is necessary for the Dutch knowledge economy to stay competitive and profitable. The government and companies also agree about the importance of open innovation for SME's, because these companies do not have all the expertise and knowledge inside. Five policies in table 10 of open innovation policies are especially for SME's and seven policies are applicable for all companies. There can be concluded that the government recognize open innovation as important for SME's and that the government tries to stimulate open innovation in SME's. On the other side SME's have the most problems with open innovation policies, because of the administrative annoy and the time it costs to participate in an open innovation policy. In the opinion of SME's the government does not stimulate open innovation with these policies.

The government stimulate open innovation in SME's, but SME's do not experience this stimulation.

Eight open innovation policies are based on the problem of creation and diffusion of new knowledge. In the opinion of the government and of the companies open innovation is very important for the creation of new knowledge in order to stay competitive as knowledge economy. The government try to stimulate the creation of new knowledge with these eight innovation policies. To stay competitive as knowledge economy it is important to use this new knowledge. This is the problem in the Netherlands, because none of the interviewed companies collaborate with a knowledge institute. The companies only use open innovation when it is necessary for the production. They do not actively participate in open innovation to create new knowledge and to use created knowledge.

Companies recognize the need for open innovation, but only participate in open innovation when it is necessary for the production process.

Four of the fourteen open innovation policies focus on the aspect of commercialization of innovations. Which help to use the created knowledge in new products or services. There can be concluded that this aspect of innovation has to less attention of the government. Because companies do not actively collaborate with knowledge institutes, companies do not know which knowledge is available and do not use this knowledge. A recommendation to the government is:

Focus in open innovation policies more on the use of created knowledge which is available in knowledge institutes.

6.3. Innovation as an interactive process

In the matrix of open innovation policies is the number of open innovation policies in the research stage is two times higher than in the development stage. This is very remarkable because both the government and the companies focus on the development stage of open innovation. Companies invest in projects which return in short term profits in stead of investing in fundamental research which could be necessary for the future. The government and the companies agree about the importance of producing new products or services.

Open innovation policies stimulate especially the research stage of open innovation, while companies especially invest in the development stage of open innovation.

In order that companies could invest and produce in the future it is very important for a knowledge economy that new created knowledge will be used to produce new products and services. Therefore the production of new products and services in the exploitation stage of open innovation should be fitted to the creation of new knowledge in the exploration stage of open innovation. So companies have to participate in fundamental research.

Stimulate companies more to participate in fundamental research

The government stated the importance to stimulate all three processes of open innovation, while companies only focus on the outside-in and coupled process of open innovation. The government argues that with stimulation of the inside-out and the outside-in process companies start with open innovation. Remarkable is that there are only five open innovation policies which stimulate the inside-out or outside-in process. Of these five innovation policies, four are only for SME's. In the interviews with companies is mentioned that companies use the outside-in process to start with open innovation.

The government is especially stimulating the coupled process of open innovation, while companies use especially the outside-in process of open innovation.

This could be related to the interest of companies in creating short term profits. The outside-in process is more supporting short term profits than the coupled process which focus more on long term projects. Therefore companies are more interested in policies which stimulate the outside-in process and use these policies more. Companies only participate in networks or consortia, so the coupled process, for relation building and not especially for sharing knowledge. To interest companies in open innovation the government must stimulate the outside-in process with open innovation policies. When companies participate in these open innovation policies the government must try to stimulate these companies to participate in the coupled process of open innovation. To have not too much different open innovation policies the government has to enlarge open innovation policies which stimulate the outside-in process and reduce open innovation policies which stimulate the coupled process.

Try to interest companies in open innovation with more open innovation policies which focus on the outside-in process and reduce open innovation policies which focus on the coupled process.

6.4. Government as important actor in open innovation

Especially small companies make the statement that government intervention is accompanied with administrative annoy. Also the government recognizes this problem and tries to make the policies better applicable. Examples are more simplistic policies as Innovation Vouchers and to fit the legal basis of all the innovation policies.

There can be concluded that the government know the problem of administrative annoy and try to solve this problem.

The objective of the government with open innovation is to improve the strengths of companies. Companies associate this role of the government with giving money. This association of companies is right, because twelve of the fourteen open innovation policies use subsidy to reach the objectives. There are other methods in which the government can play an important actor in open innovation, for example the government as customer for innovative projects. Also the InnovationPlatform has ideas about how the government can play an important role in open innovation. In the opinion of the innovationPlatform the government should start an advice bureau to help companies with new ideas. The officers should listen to the ideas of companies and seek possibilities within regulations. This is also what companies argue with an innovation advisor of the government. Companies need someone which listen to them and help them to realize new ideas.

The government can play an important role in open innovation. This is not only giving money but support companies in the development of new ideas.

This asks for interaction of the government. The ministry of economic affairs realizes that the government could stimulate open innovation with their organizing capacity. Bring different organizations together and help them to start up industry based projects. To qualify the role of the government in open innovation, the above described statements indicate the role of the government in open innovation as the next figure.

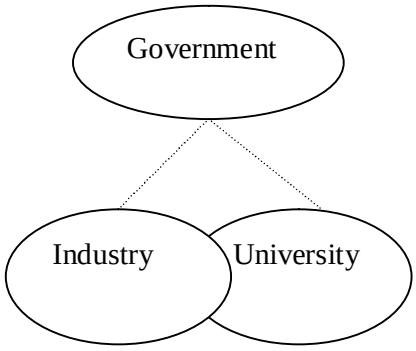

Figure 9: The Dutch innovation system

The figure is especially based on the result that twelve of the fourteen open innovation policies use subsidy as instrument. This indicates that the government not actively participates in open innovation, but tries to stimulate collaboration in the industry and knowledge institutes. Companies and the InnovationPlatform state that the government not actively participate in and support open innovation. So the government not overlaps the institutional spheres of industry and university as discussed in the Triple Helix model

III.

The spheres of industry and university are overlapping, because the open innovation policies stimulate interaction between these spheres. In eight open innovation policies collaboration is mandatory and in six open innovation policies collaboration is optional. This is collaboration between companies but also between companies and knowledge institutes. Also Innovation Vouchers which stimulate the outside-in process create interaction between companies and knowledge institutes.

There can be concluded that the government should more actively participate in innovation projects in order to fulfil the needs of companies and to become a more effective innovation system as the Triple Helix III.

The government should actively participate in innovation projects and help companies to develop new ideas and not only giving subsidy.

6.5. Open innovation stimulated by government intervention instruments

As stated in the previous paragraph the government intervenes most of the times with giving money, so use of financial instruments. Companies agree about that subsidies are in some cases a good instrument to intervene in open innovation, especially for uncertain and risky projects. But companies have also the need for other instruments. There are companies which could not find the right partners to collaborate and three companies have the need for a databank of knowledge. This is also what the government argues, but not does. The government argues that it uses a mix of instruments while most of the times (twelve of fourteen) use subsidy.

There can be identified a gap between the instruments the government want to use and the government really use.

This aspect is strong related to the role of the government in open innovation. There is concluded that the government should participate more actively in open innovation projects. Therefore the government could use different instruments. The companies mentioned different instruments in which the government actively participates in innovation projects. Enlarge the task of Syntens advisors with actively managing companies in innovation and helping them to participate in innovation policies. The government should act as customer of innovations and start an electronically knowledge databank. The establishing of an electronically knowledge databank also help to reduce the gap between knowledge production and knowledge application.

The government should use different instruments like subsidies, innovation advisors like Syntens, government as customer of innovation and an electronically knowledge databank.

Another gap which both the companies and the InnovationPlatform identify is the technological focus of innovation policies. Open innovation is more than the technological aspects of a new idea. Open innovation is the collaboration of different actors to produce new products or services. To judge if this statement of the companies and the InnovationPlatform is true there should be conducted a research to the specific criteria of each innovation policy.

The government use different methods to inform companies about open innovation

policies, from meetings to mailings. Only the effects of these inform campaigns are low. Companies are not informed about which innovation policies there are. This because of the large amount of innovation policies and the low attention companies pay to innovation policies. Companies do not check the website of SenterNovem for innovation policies and four of the six interviewed companies are alerted on innovation policies by colleague entrepreneurs or advisors from Syntens. Companies use open innovation mainly to make short-term profits and are not aware of the long-term profits of open innovation, while open innovation policies focus on these long-term effects.

There can be concluded that the different methods to inform companies about innovation policies have no effect when companies are not aware of the long-term effects of open innovation.

As described in the literature is open innovation necessary to stay competitive as knowledge economy. So the task of the government is to make companies aware of this necessarity of open innovation. If companies recognize the need for open innovation the need for stimulation from the government will increase. And if companies have the need for government intervention instruments the effects of informing are much higher.

The government should companies make more aware of the necessarily of open innovation.

The government evaluates innovation policies to measure if the instrument has the right effects. The table of innovation policies shows that nine of the eighteen innovation policies are evaluated, from the other seven innovation policies are no data about evaluations. The evaluated policies use different instruments namely; subsidies, credits and advice (Syntens and TWA networks). The government stated that an important result of the evaluations is that financial instruments are effective, especially for SME's. This is remarkable because especially SME's have troubles with subsidies because of the administrative annoy. The government mentioned that it was not that strict in measuring the effects of open innovation policies and that the indicators become more and more specific nowadays.

There can be concluded that the policy evaluations of the government need to be improved and extended in order to measure the right effects.

This chapter discusses the results of chapter five in order to formulate conclusions and recommendations. Of course are there limitations in this research which need further research. There are also developments in the Dutch government which influence the results of this thesis. The next chapter discusses these limitations and elaborates on the developments in the Dutch government.

7. Epilogue

In the last chapter of this thesis the limitations of the research will be discussed. As discussed in the results there is a difference between generic open innovation policies and programmatic open innovation policies. In the first part of this epilogue will be elaborated on the subject of programmatic open innovation policies. The second part of this epilogue discusses the limitations of the sample which is used for the interviews.

7.1. The introduction of programmatic policies

The focus of this thesis is on the generic open innovation policies of the Dutch government. However there are developments in the Netherlands in open innovation policies. The Dutch government started to introduce programmatic policies the last years. Nowadays the focus of government policies on open innovation is to stimulate public-private collaboration. Therefore the government develops programmatic policies. This is an initiative of the Innovation Platform which argues that the Dutch government must focus on the strong parts of the economy and not on the whole economy. Another argument was to stimulate stronger the importance of collaboration. Not only the Innovation Platform argues to restyle policy on open innovation also the parliament had problems with the financial instruments to stimulate open innovation. According to the parliament financial instruments are difficult to perform, costs are high and the effects not measurable. Companies and the parliament loose the overview on all the different innovation policies. The eight points of interest of the Dutch government are now: flowers and food, high tech systems and materials, water, chemistry, the creative industry, pension and social security, automotive and life science and health. The policy on open innovation could be summarized in a pyramid.

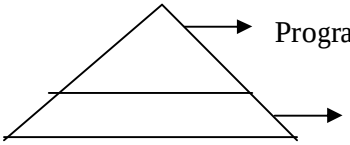

Figure 10: Pyramid of open innovation policies

The strength of programmatic policies is the private-public collaboration and to give the industry an impulse to start projects them selves. It is important that the results of the programs are for the whole industry and not only for the participating companies. At this moment there are few public-private collaborations, the government has to invest in these collaborations in the future.

Other current developments in innovation policies are studies of the InnovationPlatform. According to the InnovationPlatform, the Dutch government should use the open innovation model in open innovation policies. The government should together with other institutions formulate social challenges and objectives. Together with these institutions the government must realize the formulated objectives in order to solve the social challenges. There are four important principles for the government which stimulate successful open innovation with the open innovation model. Open innovation in government action is:

- Intensive internal and external cooperation
- Take risks carefully
- New possibilities for new knowledge
- Flexible organizing and dynamic managing

These four principles are further explained in appendix III.

There can be concluded that the government recognize the limitations of the generic policies and focus more on needs of companies in open innovation nowadays. However these developed programmatic policies do not fulfill all the recommendations described in chapter six. Programmatic policies are based on the initiatives from companies. Companies and/or knowledge institutes which are interested in an open innovation program could develop their own project. So companies must start projects them selves. Two recommendations in chapter six focus on to make companies aware of open innovation and interest in open innovation. Programmatic policies are based on the believe that companies are aware of and interested in open innovation. Before companies participate in programmatic policies, the government have to make companies aware of open innovation and interest companies in open innovation with generic policies.

In chapter six is also concluded that the policy evaluations of the government need to be improved and extended in order to measure the right effects. Programmatic policies are based on the believe that if companies and knowledge institutes develop the projects them selves, the results of these projects satisfy companies. So the government does not actively measure the effects of programmatic policies. The danger of this believe is that programmatic policies not satisfy the objectives of the government and the needs of the whole Dutch economy.

7.2. Limitations of the interview sample

In the methodology is described which six companies are interviewed for this research. The decision to use these companies has consequences for the generalization of the results. Which consequences those are and which further research is needed will be discussed in this paragraph.

The companies which are used for the interviews are all located in the east of the Netherlands and are especially SME's. I assume in this thesis that these companies have the same opinion about government intervention than companies in other parts of the Netherlands. There could be a difference between companies in the east of the Netherlands and companies in other parts of the Netherlands. In order to give statements about this, further research on this topic is needed. This research does not focus on the (open) innovation policies themselves, but on how companies evaluate these policies. The sample of companies in this research has to have more variety in small and large companies and more variety the location of companies. The next matrix could be used to make a sample for this research with the different variations.

	North of the Netherlands	South of the Netherlands	East of the Netherlands	West of the Netherlands
Small company (SME's)	5	5	5	5
Large company	5	5	5	5

Table 15: Sample for further research

To use this sample, statements could be mate about how small and large companies in the different parts of the Netherlands evaluate (open) innovation policies. A remark to this sample is that the ratio of small and large companies is not the same in every part of the Netherlands. Even the amount of companies is not the same in every part of the Netherlands. Therefore the developed sample is an indication of a sample which can be used.

Another aspect which is related to the chosen sample and which is not explicit measured in this research is the effectiveness of the Dutch innovation system. The sample of six interviewed companies is too low and in the interviews is not focused on aspects of innovation systems. In chapter two in which innovation system theory is discussed, two paragraphs focus on the evaluation of innovation systems. These theories are not used in this thesis to evaluate the Dutch innovation system. To measure the effectiveness of the Dutch innovation system further research is needed on the variables mentioned in the last two paragraphs of chapter two. In this further research the focus must be on indicators of the performance of an innovation system. In the theory of chapter two are indicators mentioned which focus on the generation, diffusion and use of knowledge. In that way further research characterize the whole process of an innovation, from the generation of knowledge (start of an innovation) to the use of generated knowledge (commercializing of an innovation). In a well organized innovation system all three parts are even well developed.

Finally, the current generic open innovation policies offer space for improvements. A start has been made to capture these limitations with the introduction of programmatic open innovation policies. Also this research offer space for improvements. In order to do further research on the evaluation of open innovation policies, more variety in the sample is needed.

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Appendix I Generic policies

Code	NL 3	NL 5	NL 19
Title of measure	BBMKB SMEs Credit Guarantee scheme	WBSO	Leading technological institutes
Start	1994	< 1995	1997
End	open	No end date	2007
Replaced by measure			NL 54
Goal	To stimulate the provision of credit for small and medium enterprises	To stimulate R&D by alleviating the wage burden for companies through tax reduction	To increase focus and mass as well as public-private interactions in research areas that strategically important for the Netherlands.
Problem	Long-term bank loans often run into difficulties due to a lack of securities and the inability of companies to meet their interest and repayment obligations in their first year of operating.	The intensity of business expenditure on R&D in the Netherlands is relatively low in international comparison. Wage costs form a bottleneck for the take-up of R&D	The Dutch research infrastructure needed strengtehening in the field of fundamental research, especially in R&D intensive sectors.
Related to measure	NL 10	No	No
Motive			
Target group	SME's only	All companies Higher educations institutions research units centres and other	All companies, Higher education institutions research units/centres, Other non-profit research organizations
Sector	Not the agriculture and medical sectors	All sectors	All sectors
Aspect of innovation	Promotion of entrepreneurship/ start up	Applied industrial research Development/ Prototype creation Industrial design	Pre-competitive research, Applied industrial research Development/ Prototype creation, Commercialization of innovation, Industrial design, Co-operation promotion and clustering, Diffusion of technologies in enterprises
Criteria for eligibility	Insufficient financial means, Insufficient securities, Rentability and future perspective, Credit not supposed to cover previous obligations with the bank, SME owner/ entrepreneur has to support the risk up to an amount of 25% of the credit sum, with a minimum of 11.000 euros	R&D should be organized by applicants themselves and carried out within their own company; R&D should be carried out as part of project or programmes; R&D should be carried out in the Netherlands or in the EU; The technological development should be new for the organization; There should be technical bottle necks; WBSO should be applied in advance	Funding was organized as open call, which had 18 responses. Each proposal was externally evaluated on its scientific quality and the economic an technological importance of the areas of study
Funding	Guarantees and other co-financing by the private sector	Tax incentives and other co-financing	25% Industry 25% knowledge institutes 50% government
Eligible costs	The loan guarantee does not specify what the loan should be used for	Labour costs of R&D personnel	Labour costs, infrastructure, equipment, training and external expertise
Budget	N/A	EUR 425.000.000	EUR 29.000.000

Evaluation	2000	In 2006-2007	Interim evaluation in 2001
Results of evaluation	The process support the aims of the measure	The instrument works EUR 1,72 is spent on R&D for each euro received from the WBSO	Is a success and continuation is recommended
Collaboration		Only proposals from single organizations	Co-operation/ networking mandatory

Code	NL 22	NL 23	NL 29
Title of measure	Syntens	Venture Capital scheme	Investment Grants for Knowledge infrastructure
Start	1998	1996	2003
End	No end date	No end date	2007
Goal	Provide support and advice to SME's on technology and innovation	To increase the amount of venture capital	To stimulate the creation of high-quality networks within the Dutch knowledge infrastructure that can address long-term knowledge demands in a flexible way.
Problem	SME's have difficulty with developing, acquiring and applying new knowledge	The amount of venture capital is an important bottleneck for start-ups	The knowledge infrastructure is vitally important for the Dutch knowledge economy
Related to measure	No	No	No
Target group	SME's only	Business angels, informal investors and new entrepreneurial firms	All companies, Hihger educations institutions research units/ centres
Sector	All sectors	All sectors	All sectors
Aspect of innovation	Promotion of entrepreneurship/ start-up, Awareness raising amongst firms on innovation, Co-operation promotion and clustering, Diffusion of technologies in enterprises, Innovation management tools	Promotion of entrepreneurship/ start up; Improving the legal and regulatory environment	Pr-competitive research, Applied Industrial research, Co-operation promotion and clustering
Criteria for eligibility	The measure is open to any innovative SME seeking mediation in the area of applied knowledge	Each private person who wishes to invest in new firms (except spouses or business partners of entrepreneurs in new firm) New business: entrepreneurial companies up to 8 years old. The scheme can be used by one company up to five years	Projects typically involve public-private co-operation and demand-driven knowledge production. Projects must have new aspects to add to current research,[5]
Funding	EUR 32.000.000 base funding EUR 19.000.000 target funding	Tax incentives and other co-financing	Grants and co-financed by the private sector
Eligible costs	External expertise	Tax exemption and tax reduction	Labour costs, equipment
Budget	EUR 32.000.000	EUR 16.000.000	EUR 802.000.000
Evaluation	2007	2005	In 2004
Results of evaluation	No results available yet	The direct variant was effective, the indirect variant not, it will be phased out	Has proven its significance
Collaboration			Co-operation/ networking mandatory

[5] Co-operation must include at least one company and at least one knowledge institutions, must have an innovation application that delivers positive social and economic benefits. ICES/KIS 3 projects must be: new for the Netherlands, strong planning with coherent activities, focussed on the development of knowledge through fundamental and industrial research. A project must be executed within 4 years, minimum size is 5 million euro.

Code	NL 30	NL 43	NL 47
Title of measure	TWA network	TechnoPartner	Innovation vouchers
Start	< 1995	2004	2004
End	No end date	No end date	No end date
Goal	Gather and analyze information about technology/innovation and technology/innovation policy for Dutch companies, knowledge institutes, universities and the government	To promote more and better technology-based start-ups, through the creation of a better climate for technostarters inside and outside knowledge institutes	Stimulate interaction and exchange between the knowledge the knowledge suppliers and SME's
Problem	Innovation is the key to a competitive knowledge economy. Creation of international knowledge networks for Dutch companies	There is too little investment in technological starters.	For the Dutch knowledge economy it is important that SME's innovate. Knowledge reservoirs are not optimally utilized
Related to measure	No	NL 24 and NL 32	No
Motive	Inspired by an existing measure of another country		
Target group	All companies, higher educations institutions research units/ centres	Scientists/ researchers, Higher educations institutions research units/ centres, Other non-profit research organizations, Higher educations institutions	SME's only
Sector	All sectors	All sectors	
Aspect of innovation	N/A	Promotion of entrepreneurship/ start up, Commercialization of innovation, Co-operation promotion and clustering	Co-operation promotion and clustering, Diffusion of technologies in enterprises
Criteria for eligibility	Information that is open to business, research institutes and government	Closed-end venture capital funds can qualify. Such funds that invest in high-risk ventures of technostarters, can apply for a loan from TechnoPartner. Knowledge Exploitation Subsidy arrangement (SKE): public-private consortiums (minimum one public knowledge institute) can apply for subsidy is they take knowledge exploitation in their region to a higher level.	SME is based in the Netherlands and is not under suspension of payment, the firm is an SME as defined by the EU, SME is not active in agriculture, fishery, aquaculture products and transportation, the firm has not receive subsidies(EUR 92,500 or more) without approval of the EC in the three years preceding the application, the firm did not receive an innovation voucher in earlier rounds of the scheme
Funding	N/A, other co-financing	Venture capital, other 1. information platform 2. exploitation initiatives at the regional level will be supported through subsidies	Grants and other co-financing
Eligible costs	N/A	Knowledge exploitation	External expertise, small vouchers of EUR 2500 and big vouchers of EUR 7500
Budget	EUR 3.800.000	EUR 31.000.000	EUR 60.000.000
Evaluation	In 2002	No	Launched as a pilot project, to learn from experience

Results of evaluation	Scored well in use and impact. Develop a better communication strategy, explicit mission and job description.	Lessons were learnt from high-tech start-up policies implemented in the past	Proved to be a success, innovation vouchers were sold out within a few days.
Collaboration	TWE's support ministries, business, knowledge institutes by providing information about scientific and technological developments in the country where they are stationed.	Co-operation/ networking optional	Co-operation/ networking optional

Code	NL 48	NL 49	NL 50
Title of measure	Casimir	Valorization grants	SBIR Pilot
Start	2004	2004	2004
End	No end date	2008	No end date
Replaced by measure			
Goal	Increase public-private mobility of researchers and to enhance exchanges of researchers between companies and knowledge institutes and vice versa	Support to innovative start-ups incl. gazelles	To stimulate start-ups, young fast growing firms and SME's and to challenge them to perform ground-braking research. Promote the commercialization of knowledge
Problem	Gap between knowledge production and knowledge application Research careers must be more attractive and interesting	To learn about the way in which the American (SBIR) program can be implemented efficiently and effectively within Dutch knowledge institutes	Contracting out innovative research with societal relevance
Related to measure	No	No	No
Motive	Recommended by the Innovation Platform and based on the European Marie Curie initiative	Inspired by an existing measure of another (EU) country	Inspired by an existing measure of another country
Target group	Scientists/ researchers (as individuals)	Individual researchers employed by a public research institute	SME's only
Sector	Primarily in the fields of science and technologyCompanies must be based in the Netherlands	All sectors	All sectors
Aspect of innovation	Co-operation promotion and clustering	Promotion of entrepreneurship/ start up, Commercialization of innovation	Promotion of entrepreneurship/ start-up, Awareness raising amongst firms on innovation commercialization of innovation, Diffusion of technologies in entreprises
Criteria for eligibility	Submitted by a trio of a talented graduate or researcher at a knowledge institution or company in the Netherlands, a representative of a company and knowledge institution. PhD students, Bachelor-level research staff, post-doctoral researchers, university lectures or senior lectures,	Researchers that want to create a high-tech startup can apply. Proposals are reviewed. Scientific-technological quality/ expertise; commercial potential; project management; reputation of researchers	Only starters, young fast growing firms and innovative SME's can submit proposal

[6] It is targeted primarily at researchers in the fields of science and technology. In the view of the under representation of women and ethnic minorities in the research field, applications by them will be particularly welcome. Applicant companies and knowledge institutions must be based in the Netherlands. The knowledge institution may be a university, HBO institution, KNAW or NOW institute, TNO institute or GTI. The company may be a major company with its own R&D department, a small company or start-up, or an innovative SME. Casimir subsidies cannot be used to fund exchange or research projects that have already started. Such projects are the subject of pre-existing legal commitments and therefore ineligible under the general terms and conditions of NOW grants.

	professors and researchers working in the private sector[6]		
Funding	Grants and co-financed by the private sector	Grants and co-financed by the private sector	Grants and other co-financing
Eligible costs	Labour costs	Labour costs, equipment, travel expenses and other costs which have been approved by STW	Labour costs and equipment. The feasibility and development phase are 100% funded
Budget	EUR 2.800.000	EUR 1.300.000	EUR 200.000 for the feasibility phase
Evaluation	No, launched as a pilot project, to learn from experience	No, launched as a pilot project, to learn from experience	No, launched as a pilot project, to learn from experience
Results of evaluation	Too early	The first and the second round in 2004 and 2005 were a success.	Too early
Collaboration	Co-operation/ networking mandatory		Co-operation/ networking optional

Code	NL 51	NL 52	NL 53
Title of measure	RAAK	Experimental framework regulation subsidies innovation projects	Smart Mix
Start	2004	2006	2006
End	2008	No end date	No end date
Replaced by measure			
Goal	Strengthen both the bridge function of vocational educational institutes and innovativeness of SME's. Generating and distributing policy relevant information and best practices.	To contribute to sustainable growth of the Dutch economy through strengthening of innovativeness Create unity in regulations and schemes	To promote focus and mass in excellent scientific research and to enhance the valorization of results from research
Problem	Innovativeness of the Dutch business sector should be increased to remain competitive	The policy mix would be renewed and streamlined and that the number of instruments would be sustainable reduced and reorganized in two main packages.	Good knowledge creation, but poor knowledge utilisation
Related to measure	No	No	No
Motive	Inspired by national policy debate	Inspired by a restructuring and renewal of the existing set of innovation support schemes.	Inspired by national policy debate
Target group	SME's only, Higher education institutions, Other public education institutions, Business organizations	All companies, Higher educations institutions research units/ centres, Other non-profit research organizations, Higher education institutions, Other public education institutions, private institutions for education, Technology and innovation centres, Business organizations, trade unions	All companies, Higher educations institutions research units/centres, Other non-profit research organizations, Technology and innovation centres, Business organizations
Sector	All sectors	All sectors	All sectors
Aspect of innovation	Awarness raising amongst firms on innovation, Co-operation promotion and clustering, Diffusion of technologies in enterprises	Pre-competitive research, Applied industrial research, Development/ prototype creation, Commercialization of innovation, Industrial design, Co-operation promotion and clustering, Diffusion of technologies in enterprises, Improving the legal and regulatory environment	Pre-competitive research, Applied industrial research, Development/ prototype creation, commercialization of innovation, Industrial design, co-operation promotion and clustering, Diffusion of technologies in enterprises.
Criteria for eligibility	Submission of an application form; an elaborated proposal; a signed consortium agreement; and a budget. The governing body of the education institute should act as consortium leader. There should be a perspective for sustainable development	A broad definition of "innovation project" is used. Project has to be new for the Netherlands and should contribute to sustainable economic growth of the Dutch economy. The modules within the framework, will be based upon specific ministerial regulations, and can have more specific criteria for eligibility.	Consortia of knowledge producers and knowledge users can submit proposals for research programmes that are evaluated based on two main criteria: focus and mass in excellent scientific research and valorization perspective. Foreign organizations are eligible, provided that the program benefits the Netherlands.

Funding	Grants and other co-financing	Grants, subsidized loans and other co-financing.	Grants and co-financed by the private sector
Eligible costs	Labour costs and external expertise	Labour costs, equipment and external expertise	Labour costs, equipment, costs for using equipment and facilities of third parties for hiring of test persons
Budget	EUR 6.000.000	N/A	EUR 100.000.000
Evaluation	Yes	No	No
Results of evaluation	Each euro innovation subsidy resulted in 5 euro additional investment of participating firms		Too early
Collaboration	Co-operation/ networking mandatory	Co-operation/ networking optional	Co-operation/ networking mandatory

Code	NL 54	NL 55	NL 56
Title of measure	IOP-TTI module	Challengers module	Innovation Performance Contracts
Start	2006	2006	2007
End	No end date	No end date	No end date
Replaced by measure			
Goal	Optimal focus and mass in the targeted technological areas; Interaction between companies and publicly funded knowledge institutes; Valorization and anchoring; Contributing to sustainable development	Support excellent innovation projects, in which new products, processes or services are developed	An agreement between SME's and a related organization that acts for the group about an extra effort in innovation.
Problem	The restructuring and renewal of the mix of financial innovation instruments of the Ministry of Economic Affairs	Support for smaller excellent innovation projects. These challengers can be an important source of information for the future	For the Dutch knowledge economy it is important that SME's innovate.
Related to measure	NL 19 and NL 18	NL 2 and NL 34, this are replaced discontinued measures.	NL 35 and NL 36, this are replaced discontinued measures.
Motive			Inspired by national policy debate
Target group	All companies, Higher educations institutions research units/centres, Other non-profit research organisations	SME's only	SME's only, Business organizations
Sector		All sectors	All sectors
Aspect of innovation	Pre-competitive research, Applied Industrial research, Development/ prototype creation, Co-operation promotion and clustering, Diffusion of technologies in enterprises	Development/ prototype creation	Awareness raising amongst firms on innovation, Pre-competitive research, Applied industrial research, Development/ prototype creation, Co-operation promotion and clustering, Diffusion of technologies in enterprises
Criteria for eligibility	Participant in the IOP-collaboration that execute an IOP-project at own expense and for own risk A leading technology institute that executes a strategic research program at own expense and for own risk	SME's that execute an excellent innovation project at own expense and for own risk	For pre-IPC phase the applicant, typically a sector organization, can apply for a subsidy for an innovation position study; knowledge transfer in the pre-IPC phase; preparation of the "penvoerder" of the IPC-application; and knowledge transfer in the IPC-phase. For the IPC-phase the "penvoerder" applies for a subsidy for the SME's that will participate. The group has to be between15 and 35 companies. Each company has to have its own 3-year innovation plan. At least part of the activities has to be collective activities.
Funding	Grants and co-financed by the private sector	Subsidized loans and co-financed by the private sector	Grants and co-financed by the private sector

Eligible costs	Labour costs, equipment and training	A credit without interest for 35% of the development costs with max 1.000.000	50% of the labour costs with a max of 175.000 in the first phase 50% of the labour costs with a max of 50.000 in 3 years for SME's
Budget	N/A	EUR 12.200.000	EUR 17.000.000
Evaluation	Yes	No	Launched as a pilot project, to learn from experience.
Results of evaluation	N/A		Too early
Collaboration	Co-operation/ networking mandatory	Only proposals from single organizations are accepted	Co-operation/ networking mandatory

Code	1	2	3
Title of measure	Groeifaciliteit	Launching customer	Subsidierege-ling innovatie gerichte onderzoeks-programma's
Start	2006	2007	1997
End	No end date	No end date	No end date
Replaced by measure			
Goal	To increase the possibilities of SME's in the Netherlands to invest and grow	To challenge buyers and policy makers at the government to think innovative.	To stimulate research on innovative subjects
Problem	To stimulate the provision of credit to SME's by financers	The government has enormous purchasing power and could through that stimulate companies to develop innovative products, services and processes	
Target group	SME's	All companies	Universities or research institutes.
Sector	All sectors	All sectors	All sectors
Aspect of innovation			
Criteria for eligibility			Included of a positive advice of the stuurgroep about the design of the project. Research project has to be done in the Netherlands. After every six weeks a rapport about the performing of the project. Audit certificate
Funding	Grants		Grants
Eligible costs			Labor costs, materials, machinery and equipment
Budget	EUR 170.000.000		
Evaluation			
Results of evaluation			
Collaboration		EZ is working together with other ministries, Regiobureau Inkoop Rijksoverheid, Piano and Nederlandse vereninging voor inkoop	Co-operation/ networking optional, could be permitted by the ministry.

Code	4	5	6	7
Title of measure	Besluit innovatiesubsidie samenwerkings-projecten	EUREKA	KP7	CIP
Start	2003	1985	2005	2005
End	No end date	No end date	No end date	No end date
Goal	To stimulate projects which are new for the Netherlands. It is a systematically whole of activities and could consist of research/development.	Initiative of 33 countries and the EC to stimulate cooperation among Europe's entrepreneurs and institutes in the field of technology. Development of market focused products, processes and services	Development of new knowledge and technologies and the promotion of it.	Promotion and use of existing knowledge.
Motive			Decision of the European Parliament	
Target group	All companies	All companies	All companies	SME's
Sector	All sectors	All sectors	All sectors	All sectors
Criteria for eligibility	Entrepreneur has to be located in the Netherlands. Included of a project plan and budget. It should be a technological innovations, sustainability, technological cooperation or economic perspective. After every six weeks a rapport about the performing of the project. Audit certificate	Participating companies initiate the projects by themselves. Participating governments support projects in own country.	The specific programs are: collaboration, ideas, people, capacity, Non-nuclear research activities of the GCO/JRC, nuclear research activities of the GCO and erratum	CIP is divided in three sub programs: Entrepreneurship& innovation, support of ICT policies, Intelligent Energy Europe
Eligible costs	Labor costs, machines and equipment, materials			
Collaboration	Co-operation/ networking optional, could be permitted by the ministry.	Cooperation mandatory		

Appendix II Programmatic policies

Innovation Program	Innovative strength	Economic significance	Vision	Ambitions	Content	Budget
High-tech systems and Materials						
Nanoelectronics and embedded systems	The Netherlands holds a unique position in that high-level knowledge and experience is to be found throughout the value chain, from the manufacture of chips comlex high-tech equipment to production and marketing of specific applications.	The nanoelectronics and embedded systems cluster has a very high economic value. Annual turnover in the Netherlands exceeds twenty billion euro's. Companies active in this cluster account for approximately 40% of all private R&D investments in the Netherlands.	Dutch companies and knowledge institutes wish to realize an ambitious innovation programme in the economically important nanoelectronics and embedded systems sector, as an extension of the previous Joint Technology Initiatives.	To form an innovation cluster for nanotechnology and embedded systems. To become a world leader in these fields. Achieve 30% growth, reaching 26 billion euros per year in 2011. Realize eight high-quality start-ups each year	The central concept of the program is that Dutch organizations in pursuit of excellence should have the opportunity to prove themselves within the best possible climate. The program encourages the exchange of personnel between the private sector and the research field.	36,1 million euros between 2006 and 2009
Automotive	Trends in the sector are greater number of electronic functions, migration to hydrogen and new combinations of propulsion systems and lightweight materials.		To become one of Europe's leading innovation regions within certain focal areas of automotive technology within five years		At the beginning of 2006, the Dutch automotive industry started an initiative to promote innovation within the sector, known as PPS Automotive	
Flowers and Food						
Food & Nutrition Delta	R&D activities are high compared to other countries. The innovative strength is largely concentrated within a few larger companies. The Netherlands have a favorable geographic location.	It provides employment for 130.000 people, generates turnover of over 47,5 billion euros per annum, with added value of 12 billion euros. Sector generates 20% of Dutch export trade.	Rendering the Netherlands the leading region in Europe with regard to innovation in Food & Nutrition	To support a sustainable and competitive food industry. To create a stronger and more innovative SME sector. To create good opportunities for the spinning out and spinning in of technological innovations. To promote the quality of life.	The program is based on an integrated approach which addresses the entire innovation chain and therefore covers the entire route from knowledge and expertise to the supermarket till.	
Green Genetics	The Netherlands is one of the world's leaders in plant strain refinement and the production of plant cultures. It is also one of the top three countries in botanical and horticultural research		Focus on the development of new plant culture material whereby optimum growth, development and production can be realized under new cultivation and environmental conditions	Higher quality. More efficient use of labour. Reduced use of pesticides Reduced energy consumption. More economic use of nutrients.	The Top Institute is a lean organization which wills asses research proposals and contract out research projects to leading research groups at Dutch universities and knowledge institutes.	20 million euros

Horticulture	Horticulture is rapidly developing to become a knowledge-intensive, high-tech economic activity	The overall result will be value creation and an even stronger international market position	By matching all the required competences, it becomes possible to create a climate in which top performance can be achieved.	Greenports as the hubs of international networks. Health and wellbeing The intelligent glasshouse as part of an intelligent chain. The energy web and glasshouse as a source of energy projects. Learning to innovate.	A cooperative alliance of private sector organizations and knowledge institutes has produced the Innovation and knowledge agenda for the Horticultural Cluster 2020.	
Water						
Water Technology	The Netherlands has considerable knowledge and experience in the field of water purification technology. This knowledge and experience is not being fully utilized on the international market.	The sector accounts for an annual turnover of approximately 9 billion euros, of which 2,1 billion is generated on the international market. This is a small fraction of the total world market value, 200 to 300 billion euros	Focus on those activities which make a contribution to sustainable development, particularly with regard to public health and the environment.	The Dutch water sector wishes to double its exports from 2 billion to 4 billion euros within the next five years.	The development of TTI Water Technology's knowledge position. The development portfolio. Launching customers. The formation of export consortia for the most promising products.	80 million euros for 2006 to 2010
Maritime Cluster	The Dutch maritime sector has an extremely promising future in terms of innovation, economic growth and employment potential.	There are some 340 companies active in the off-shore segment, with a combined turnover of approximately 3 billion euros. The growing demand for energy means that there is enormous growth potential in this segment. The maritime manufacturing industry consists of 800 companies, 30.000 employees and annual turnover of 5 billion euros. The hydraulic engineering segment has an annual turnover of 2 billion euros	To further strengthen its leading international position by addressing a number of developments within the offshore industry and the high-potential areas of the maritime manufacturing industry.	To achieve 40% share of the world market for LNG transport and storage. To achieve 30% market share for deep-sea exploration. Maritime manufacturing industry from 5 billion to 7 billion euros. An improved technology education system. The creation of a leading international Institute for Sustainable Hydraulic Engineering.	The spearheads of the program are: The LNG Supply Chain, Deep-sea exploration, Complex specials, Process innovation, Knowledge base and Legislation. To program devotes attention to SME companies, under the program they will benefit from cooperative projects, vouchers, feasibility studies and special loan arrangements.	
Delta Technology			Further ambitions as a joint target, education with a clear link to water innovation and good international orientation.		Public-private partnership undertakings to address five key areas: Space for the river, the coast, EU framework directive on water, living in an urbanized Delta and water an information.	
The Creative Industry	By international standards, the Netherlands have	The added value of the industry was approximately	To strengthen the economic potential of culture and		The program includes five action lines: establishing	15 million euros

	creative talent in abundance.	8,4 billion euros in 2004. The contribution to exports is 0,4%. Over 230.000 people are employed in some area of the creative industry.	creativity by encouraging the commercial sector to make better use of its creative ability, to strengthen the international competitive position.		links, enhancing the financial conditions for creative enterprises, improved arrangements with regard to intellectual property rights, greater internationalization and professionalization of cultural management.	
The Chemicals Industry		The Dutch chemicals sector is large and is important to the national economy.	To take full advantage of the opportunities which exist or which will emerge in future.		A study into the opportunities for cooperation between chemicals companies and knowledge institutes is currently being conducted.	
Life Science & Health	Health is seen as the largest growth market for the next twenty years. Major innovative breakthroughs are now in sight: personalized medicine, preventive diagnostics, regenerative medicine.	The Netherlands has over 4 hundred innovative life science companies. The combined turnover of Dutch pharmaceutical companies was 5,8 billion euros in 2003. The industry have 15.000 employees	Realize a societal and economic return on the investments made, successfully bring concepts to market and patients.		Several initiatives in the field of life sciences & health have already been undertaken, such as public-private partnerships: Top Institute Pharma, the Centre for Transnational Molecular Medicine and the Biomedical Materials initiative.	130 million euros in 2006 for the Top Institute Pharma and 150 million euros the CTMM initiative
The Energy Transition	A sustainable energy supply and demand balance		To become a leading force in the transition to global economy with significantly reduced greenhouse gas emissions, less reliance on fossil fuels and ready availability of sustainable energy	Efficiently combine urbanization, traffic infrastructure and flows. High organizational efficiency in the separation, recycling and combination of waste flows. A high-quality gas infrastructure. Top-end scientific and technological knowledge with regard to energy. Competitive commercial parties in the energy sector. Scientific and technological knowledge at the interstices of agricultural production, biomass and chemicals. Mercantile spirit.	Six specific themes are established: New gas/Clean fossil fuels, Sustainable electricity, green raw materials, chain efficiency, the built environment and sustainable mobility. Because the program is based on several themes, cooperation between ministries is essential.	
Pensions and Social Insurance		Population ageing			The Network for Pensions Ageing and retirement (Netspar) has already been	

					founded at the University of Tilburg and create centres of expertise addressing various social issues.	
The Hague: Residence of Peace and Justice		An important driving force of the Dutch service economy		The development and application of technology to counter the threat of terrorism. Enhanced commercial activity further to international academic courses.	The opening of the Hague Institute for the Internationalization of the Law (HIIL), which bring together a number of research institutes with an international orientation	

Appendix III The Dutch innovative government, InnovationPlatform

The government could be an important factor in stimulating the power of innovation in the industry, knowledge institutes and other institutions. The government can also use innovation to approach social challenges. But how can the government increase their innovative capacity? According to the InnovationPlatform, the Dutch government should use the open innovation model. The government should together with other institutions formulate social challenges and objectives. Together with these institutions the government must contract the social challenges and realize the objectives. There are four important principles for the government which stimulate successful innovation with the open innovation model. Open innovation in government action is:

- Intensive internal and external cooperation
- Take risks carefully
- New possibilities for new knowledge
- Flexible organizing and dynamic managing

Intensive internal and external cooperation

The shift from closed to more open model of innovation means in the first place that the government has to cooperate intensively, as well within the different departments as also with the industry, knowledge institutions and social institutions. Especially in formulating social objectives and organizing of the financing and the execution of policies, invitations to tenders, investments and projects. To stimulate internal and external cooperation, the InnovationPlatform makes the following recommendations.

PPS for social objectives

Use public private cooperation (in Dutch PPS) for financing social objectives like healthcare and safety. It concerns financial resources which have been coupled to the social priorities of the coalition agreement. The PPS for social objectives will be in charge of a program minister and other collaborated partners. With mandate of the whole council of ministers and in association with important actors outside the government, the program minister has power over the departmental borders. The program minister will be supported by a staff and is also responsible for finances and personnel.

Platform Geregeld

Collaboration on social field with the government is being free in setting up regulation. To stimulate collaboration between the government and social actors, InnovationPlatform has the idea to establish Platform Geregeld. Innovators from social sectors could together with the representatives of the departments join the Platform about projects which is agreement about, but not could realized within the common regulation. Platform Geregeld state how this could be possible.

Quick procedures for experiment rooms

There should be quick procedures to establish experiment rooms for all forms of network services. With clause of responsibility or evaluation about the process and results of experiments, there should be temporary exemption of regulations.

Certification in stead off inspection

To carry out inspection the government works together as many as possible with the industry. This is done by making connection with control systems of the industry. Certification could be used in stead off inspection. Certification is a system of quality

guarantee with use of self regulation, which is used in the private sector for years. Entrepreneurs join the certification organization voluntary and register to achieve the regulations. Expected is that regulations which are established by users will be better achieved than regulations which are established by government officers.

Take risks carefully

Innovation is taking risks. Through participating in risky projects, the government is stimulating innovation. A government which stimulate innovation, ask for another manner of collaboration and because of that a change in the financing and budget system. This could be realized by the government through risky participating on many levels. To give the House of Commons insight in the risks and control mechanisms beforehand, the House of Common has more space to take risks. To take risks carefully, the InnovationPlatform makes the following recommendations.

The government as venture capitalist for social projects

The government should more often invest in new ideas for social problems as a venture capitalist. With the involved partners will be appointed about the objectives, financing and results of projects for social problems. An investment bank seeks intensively to new ideas. The investment bank could be founded by government contributions and with contributions of pension funds and venture capitalists.

Space in budget and budget system for risky innovations

The budget of several departments could be included with a fixed percentage and a fixed justification method for risky innovations. This asks for an adaptation of the VBTB systematic, by taking for example an "innovation box" in the VBTB systematic.

New possibilities for new knowledge

The success of the government in the open innovation model will be stipulated for a large part in finding the right knowledge and contracting of knowledge alliances. The government should use a working method in which the government is been able to pick up the right knowledge at the right time. To get access to new knowledge, the InnovationPlatform makes the following recommendations.

Establish communities

With internet tools and user groups, every reader can also become a writer and add information to an internet encyclopedia or correct information from others. This is a way to collect information in a more open and innovative manner.

Make knowledge problems electronically

Knowledge problem and research should be made public through an electronic auction or the internet. This increases the possibilities of unknown and unexpected parties to come with innovative knowledge, answers and solutions.

Organize an idea competition

A competition between creative solutions is an effective method for realizing innovative solutions. The government could organize a competition for a social problem, like a nursing home for the future.

Use new knowledge networks

New knowledge will be created in new knowledge networks. The government should use these networks for image and opinion shaping of social themes. An example of a knowledge network is "De Nationale Denktank". This network consists of twenty master

students, graduates and promovendi which are selected every year. Within two months this network has to find creative, innovative and practical solutions for a social problem.

Flexible organizing and dynamic managing
An innovative government has to be organized to react quickly and effective on social developments and chances, through together with relevant actors taking initiatives in developing and carrying out solutions. Therefore is a flexible government needed, which is dynamic managed. To stimulate flexible organizing and dynamic managing, the InnovationPlatfrom makes the following recommendations.

Reinforce the concern management of the government
The collaboration between departments can be reinforced by cooperation between the Secretary-General and a collegial governing board. The management team of the Secretary-General will be political managed by the cabinet.

Make the establishing of temporary, flexible project teams more easily
The project teams consist of civil servants of more than one department and employees from outside the (realm) government. These project teams recognize and solve problems quick. The InnovationPlatform has developed a project proposal for a result oriented program and project treatment. Through an interdepartmental project pool are project employees rapidly available for projects outside the organization. Employees build on knowledge and experience in working in flexible project teams.

Employ civil servants in attendance of the state
Civil servants should be employed in attendance of the state in stead off in attendance of one department. It become more easily for civil servants to participate in project teams in different departments. These method and continuous attention for special culture development projects stimulate concern thinking.

Select and develop the right civil servants
Managers and civil servants need specific competencies to work flexible and organize dynamic. The selection and development of civil servants should be focused on working from the outside in. In this way civil servants recognize their boundaries of knowledge and skills and try to bring actual knowledge and innovations inside the organization. Open innovation can also be stimulated through organizing an exchange among civil servants, consultants, scientists and experts.

Appendix IV Interview protocol bedrijven

Inleiding

Het onderwerp van deze onderzoeksopdracht heft betrekking op het concept van open innovatie, een onderwerp waar op dit moment veel aandacht aan wordt besteed. Binnen de open innovatie literatuur worden de relaties beschreven tussen bedrijven, overheid en onderzoeksinstellingen om tot innovaties te komen. Veel van deze onderzoeken richten zich op relaties tussen verschillende bedrijven of tussen bedrijven en onderzoeksinstellingen. In de wetenschappelijke literatuur is nog weinig aandacht voor de relatie tussen bedrijven en de overheid, terwijl de overheid doormiddel van beleidsmaatregelen open innovatie kan stimuleren. Vooral in een kenniseconomie zoals Nederland is open innovatie belangrijk om concurrentiekracht te behouden. De overheid wil daarom en mede vanuit het Lissabon akkoord open innovatie stimuleren. Dit onderzoek wil de overheidsmaatregelen in kaart brengen en evalueren die de overheid uitvoert om open innovatie te stimuleren. Met dit interview wil ik deze beleidsmaatregelen gaan evalueren onder verschillende bedrijven.
Het interview begint met uw mening naar open innovatie en de rol van open innovatie binnen uw onderneming. Wat ik vervolgens graag wil weten is of de beleidsmaatregelen van de overheid u stimuleren om open te innoveren en of u op de hoogte bent van de verschillende overheidsmaatregelen. De resultaten van dit onderzoek worden gebruikt om een Europese analyse te maken van overheidsbeleid ter stimulatie van open innovatie in de verschillende landen.

Open innovatie

Wat is uw mening over open innovatie?

- Is open innovatie belangrijk voor de Nederlandse economie en waarom?
- Wat zijn volgens u de voor en nadelen van open innovatie?

Samenwerking is een essentieel onderdeel van open innovatie. Kunt u aangeven welke problemen bedrijven ondervinden met samenwerking? Kunt u mij voorbeelden geven van situaties waarin de overheid samenwerking wil stimuleren binnen het innovatieproces? Waarom juist in deze gevallen?

Open innovatie binnen een bedrijf kan vooral gericht zijn op het exploratie stadium (onderzoeken) of het exploitatie stadium (ontwikkelen) van innoveren.

- Welk stadium van het innovatieproces wil de overheid stimuleren bij bedrijven? Waarom juist dit stadium?
- Wat zijn hier de voor en nadelen van?
- Welke problemen ondervinden bedrijven in het exploratie stadium of exploitatie stadium van het innovatieproces?
- Hoe moeten deze problemen volgens u worden opgelost? Moet de overheid ingrijpen of niet? Welke instrumenten zou de overheid moeten gebruiken?
- Kunt u mij voorbeelden geven van dergelijke maatregelen?

Binnen deze twee stadia van het innovatieproces zijn er verschillende vormen van open innovatie; van buiten de grenzen van het bedrijf naar binnen, van binnen naar buiten de grenzen van het bedrijf of een samengestelde vorm.

- Is het innovatieproces in uw bedrijf er vooral op gericht om innovaties van buiten het bedrijf naar binnen te halen of innovaties van binnen het bedrijf naar buiten te exporteren?
- Wat zijn hier de voor en nadelen van?
- Ondervindt u problemen met bovengenoemde vormen van open innovatie? Tegen welke problemen loopt u aan? Moet de overheid ingrijpen om deze problemen op te lossen? Welke instrumenten zou de overheid moeten gebruiken?
- Kunt u mij voorbeelden geven van dergelijke projecten?

- Open innovatie is het geven en nemen van elkaars kennis, is dit een struikelblok voor bedrijven en dan vooral het geven van kennis?

Rol van de overheid

De overheid grijpt alleen in bij marktfalen. Er zijn twee condities waaronder de overheid moet ingrijpen.
- de markt faalt in het halen van zijn doelstellingen
- de overheid moet de mogelijkheden hebben om het probleem aan te pakken

Wat is uw mening over het ingrijpen van de overheid om open innovatie te stimuleren?
- Wat zijn de voor en nadelen van het ingrijpen van de overheid om open innovatie te stimuleren?

Welke problemen ervaart u met open innovatie?
- Kunt u mij hier voorbeelden van geven?
- Zijn deze problemen door de markt op te lossen?

Wat is uw mening over de huidige beleidsmaatregelen ter stimulatie van open innovatie?
- Kunt u mij voorbeelden geven van maatregelen die naar uw mening open innovatie stimuleren?
- Kunt u mij voorbeelden geven van maatregelen die naar uw mening open innovatie juist niet stimuleren?
- Op welke gebieden zijn volgens kan de overheid nog meer initiatieven tonen om open innovatie te stimuleren?

Mag ik u vragen of u op de hoogte bent van de volgende maatregelen?
- SBIR Pilot: het stimuleren van startende bedrijven, snel groeiende bedrijven en het MKB om baanbrekend onderzoek uit te voeren en dit te commercialiseren. Deze worden ondersteund in een tegemoetkoming in de kosten voor arbeid en materieel.
- TechnoPartner: omdat er te weinig investeringen zijn in technologische starters, wil de overheid een beter starters klimaat voor deze bedrijven creëren. Investeringsfondsen of publiek/private consortia die kennis exploitatie tot een hoger niveau brengen in een regio kunnen een subsidie aanvragen.
- WBSO: de intensiteit van bedrijfsuitgaven aan R&D in Nederland zijn laag ten opzichte van andere landen. De loonkosten vormen de bottleneck en dit wordt verholpen door belastingvoordeel.

- Smart Mix: Er is goede creatie van kennis in Nederland maar er is maar een matig gebruik van deze kennis. Samenwerkingen tussen kennis makers en kennis gebruikers kunnen een voorstel indienen voor tegemoetkoming in de kosten.
- TWA network: om nog innovatiever te zijn kunnen bedrijven internationale kennis netwerken aangaan.
- Besluit innovatiesubsidie samenwerkingsprojecten: Het stimuleren van samenwerkingsprojecten welke nieuw zijn voor Nederland in technologische innovaties. Er wordt tegemoetgekomen in de kosten voor arbeid en materiaal.

In het voorgaande heb ik u op welk stadium van innovatie (exploratie of exploitatie) uw bedrijf zich richt en welke vorm van open innovatie (buiten naar binnen of binnen naar buiten) daarbij wordt gebruikt.

- Wordt u door de overheid gestimuleerd om op deze wijze met open innovatie bezig te zijn? Bent u tevreden over de rol van de overheid?
- Kunt u mij voorbeelden geven van overheidsmaatregelen die u hiervoor gebruikt?
- Wat zou de overheid nog meer kunnen doen om deze vorm van open innovatie te stimuleren?

Hoe blijft u op de hoogte van de overheidsmaatregelen om open innovatie te stimuleren?

- Hebt u nog verbeterpunten om overheidsmaatregelen om open innovatie te stimuleren beter onder de aandacht van bedrijven te brengen?

Zijn de overheidsmaatregelen om open innovatie te stimuleren makkelijk toepasbaar?

- Kunt u mij voorbeelden geven van overheidsmaatregelen om open innovatie te stimuleren die makkelijk toepasbaar zijn binnen uw bedrijf?
- Kunt u mij voorbeelden geven van overheidsmaatregelen om open innovatie te stimuleren die niet toepasbaar zijn binnen uw bedrijf? Waar ligt dit aan?

Hebt u nog aanbevelingen voor de overheid om open innovatie meer te stimuleren?

Appendix V Interview protocol overheid

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- Welk innovatieproces wil de overheid stimuleren, om innovaties van buiten het bedrijf naar binnen te halen of innovaties van binnen het bedrijf naar buiten te exporteren?
- Wat zijn hier de voor en nadelen van?
- Welke problemen ondervinden bedrijven met deze vorm van open innovatie? Moet de overheid ingrijpen om deze problemen op te lossen? Welke instrumenten kan de overheid hierbij gebruiken?
- Kunt u mij voorbeelden geven van dergelijke maatregelen?

- Open innovatie is het geven en nemen van elkaars kennis, is dit een struikelblok voor bedrijven en dan vooral het geven van kennis?

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- de overheid moet de mogelijkheden hebben om het probleem aan te pakken

Wat is uw mening over het ingrijpen van de overheid om open innovatie te stimuleren?

- Wat zijn de voor en nadelen van het ingrijpen van de overheid om open innovatie te stimuleren?

Op welke problemen die bedrijven met open innovatie ervaren ligt de focus van de overheid? Waarom juist op deze problemen? Welke overheidsinstrumenten worden gebruikt om dit probleem op te lossen?

Wat is uw mening over de huidige beleidsmaatregelen ter stimulatie van open innovatie?

- Kunt u mij voorbeelden geven van maatregelen die naar uw mening open innovatie stimuleren?
- Kunt u mij voorbeelden geven van maatregelen die naar uw mening open innovatie juist niet stimuleren?
- Op welke gebieden kan de overheid nog meer initiatieven tonen om open innovatie te stimuleren?

Hoe worden bedrijven op de hoogte gehouden van de overheidsmaatregelen om open innovatie te stimuleren?

- Hebt u nog verbeterpunten om overheidsmaatregelen om open innovatie te stimuleren beter onder de aandacht van bedrijven te brengen?

Zijn de overheidsmaatregelen om open innovatie te stimuleren makkelijk toepasbaar voor bedrijven? Vooral vanuit kleine bedrijven komt de opmerking dat de maatregelen veel administratieve last met zich mee brengen en daardoor juist niet stimulerend zijn. Bent u op de hoogte van dit probleem? Zijn hier oplossingen voor?

Veel gebruikte instrumenten van de overheid zijn subsidies of een belastingvoordeel. Waarom worden deze twee instrumenten het meest gebruikt? Welke andere instrumenten

zou de overheid nog kunnen gebruiken? Wat zijn de redenen om deze instrumenten niet te gebruiken?

Worden de beleidsmaatregelen geëvalueerd? Op welke aspecten worden de beleidsmaatregelen dan beoordeeld? Welke consequenties worden hieraan verbonden?

Wat vindt u van de opmerking: Succesvolle maatregelen worden opgeheven en niet succesvolle maatregelen lopen te land door?

Hebt u nog aanbevelingen voor de overheid om open innovatie meer te stimuleren?