



**UNIVERSITY OF OSLO**  
FACULTY OF SOCIAL SCIENCES

**TIK**

Centre for technology,  
innovation and culture  
[www.tik.uio.no](http://www.tik.uio.no)



**ESST**

The European Inter-University Association on  
Society, Science and Technology  
[www.esst.eu](http://www.esst.eu)

Connecting Europe through research collaborations?

- a case study of the Norwegian Institute of Public Health

**Ingrid Weie Ytreland**

University of Oslo  
Globalization, Innovation and Policy  
2009

Word count: 20 505



Centre for  
European Studies  
University of Oslo



*“Researchers should not be scared to join a European research project  
because it is a very good experience”*



---

## ACKNOWLEDGEMENTS

---

I would not have been able to finish this thesis had it not been for the valuable help from certain key persons. I would therefore like to thank my supervisor, Åse Gornitzka at ARENA-Centre for European Studies, for her good advice and many helpful comments. Her interest in my work has been of great encouragement when writing this thesis. I would also like to thank Aris Kaloudis from NIFU-STEP helping me with relevant literature and interesting considerations related to the European Framework Program.

I am also grateful to all my respondents at the Norwegian Institute of Public Health talking about their Framework Program experiences with great enthusiasm. Their thoughts and reflections made this thesis possible.

Finally I would like to thank Christian for his invaluable support while writing this thesis.

Thanks also to all my family and friends who have cheered me on through the whole process.

Ingrid Weie Ytreland

Oslo, October 6th 2009

---

## ABSTRACT

---

This thesis aims to explain how nations, organizations and individuals respond to opportunities for research collaborations provided by the European Framework Program. National research policy and organizational strategies as well as individual initiative might affect the decision on whether researchers should engage in Framework funded research. Based on these assumptions this thesis examines internal and external determinants for participation in the European Framework Program.

Based on a case study of the Norwegian Institute of Public Health (NIPH) I explain how changes in national research policy might lead to organizational changes using the theoretical framework of Europeanization and neo-institutional theory. The changes in national research policy is explained using theories such as Mode 2 knowledge production, the science-society contract and collaborative research originating from invisible colleges. The theoretical framework further describes central elements in collaborative research such as transfer of tacit and explicit knowledge in addition to social capital and collaborative ties. The empirical analysis consists of national, organizational and individual response to internationalization of research. I have used governmental documents and interviews with NIPH management and researchers to illustrate internationalization of research on three levels. The results from the empirical analysis indicate that participation in Framework funded projects is based on both organizational obligation and individual initiative. It also shows that the main motivational factor for participation is access to external knowledge.

**Keywords:** Framework Program – health research - research policy - science-society contract  
Europeanization - knowledge transfer - collaborative ties

---

# TABLE OF CONTENTS

---

ACKNOWLEDGEMENTS .....	v
ABSTRACT .....	vi
TABLE OF CONTENTS .....	vii
LIST OF ABBREVIATIONS .....	x
<b>CHAPTER 1: INTRODUCTION .....</b>	<b>1</b>
1.1 Internationalization of research.....	1
1.2 Research questions .....	2
1.3 Structure of the thesis .....	3
1.4 Case selection.....	3
1.4.1 Why is this interesting? .....	4
<b>1.5 Norwegian Institute of Public Health.....</b>	<b>4</b>
1.5.1 The early years .....	5
1.5.2 Current structure and strategies.....	6
<b>CHAPTER 2: SCIENCE ON THE EUROPEAN LEVEL.....</b>	<b>8</b>
2.1 EU research policy .....	8
2.2 The European Framework Program .....	9
2.3 Objectives.....	11
2.4 Summary of science on the European level .....	12
<b>CHAPTER 3: THEORETICAL FRAMEWORK .....</b>	<b>13</b>
<b>3.1 Science in the society .....</b>	<b>13</b>
3.1.1 The science-society contract .....	14
3.1.2 Contextualization of knowledge.....	15
3.1.3 Invisible colleges.....	16
<b>3.2 Science on the organizational level .....</b>	<b>18</b>
3.2.1 Organizations at the mercy of its environments? .....	18
3.2.2 Europeanization and organizational change.....	20
Two arguments for adaptation.....	21
3.2.3 Absorptive capacity .....	22
3.2.4 Research institutes' response to internationalization of research.....	23
<b>3.3 Science on the research performing level.....</b>	<b>24</b>
3.3.1 Conceptualization of knowledge .....	24

3.3.2	Preconditions for knowledge sharing .....	26
3.3.2	Social capital .....	27
3.3.3	Collaborative ties.....	28
<b>3.4</b>	<b>Summary of the theoretical framework.....</b>	<b>29</b>
3.4.1	Expected response .....	30
<b>CHAPTER 4: METHDOLOGICAL FRAMEWORK .....</b>		<b>32</b>
<b>4.1</b>	<b>Qualitative research method .....</b>	<b>32</b>
4.1.1	Case study .....	32
4.1.2	Validity and reliability .....	33
<b>4.2</b>	<b>Sources of data .....</b>	<b>34</b>
4.2.1	Documentary analysis .....	35
4.2.2	Interviews .....	36
	Coding of interviews .....	37
4.2.3	Direct observations and informal conversations .....	38
<b>4.3</b>	<b>Limitations .....</b>	<b>38</b>
<b>CHAPTER 5: EMPIRICAL ANALYSIS .....</b>		<b>40</b>
<b>5.1</b>	<b>National response .....</b>	<b>40</b>
5.1.1	Internationalization of health research .....	40
5.1.2	Health research in FPs.....	42
<b>5.2</b>	<b>Organizational response .....</b>	<b>44</b>
5.2.1	Internationalization of research .....	44
	Strategy for global public health .....	45
	Structural changes .....	46
	Participation as organizational obligation? .....	48
	Why collaborate with NIPH? .....	49
5.2.2	Motivation for participation .....	50
	Valuable professional networks .....	50
	Financial requirements .....	52
	Organizational or solely individual? .....	52
<b>5.3</b>	<b>Individual response .....</b>	<b>55</b>
5.3.1	Preconditions .....	55
	Initiation of the projects .....	55
	Motivation for participation .....	56
5.3.2	Interactional experiences .....	58
	Arenas for knowledge transfer .....	58
	Collaborative ties.....	59
	Disciplinary differences .....	61

	National and cultural differences .....	62
5.3.3	Effects and relevance .....	63
	Satisfactory preliminary results? .....	63
	Relevance of study .....	64
	Other experiences .....	65
	Future recommendations .....	66
<b>5.4</b>	<b>Summary of the empirical analysis .....</b>	<b>66</b>
<b>CHAPTER 6: CONCLUDING REMARKS.....</b>		<b>69</b>
6.1	The main findings .....	69
6.2	Suggestions for future research.....	73
6.3	Connecting Europe through research collaborations?.....	74
<b>LIST OF REFERENCES .....</b>		<b>76</b>
APPENDIX A: NIPH STRUCTURE .....		i
APPENDIX B: INTERVIEW GUIDES .....		ii
APPENDIX C: LIST OF RESPONDENTS.....		iv
APPENDIX D: PROJECT OVERVIEW .....		v

---

## LIST OF ABBREVIATIONS

---

COST	European Cooperation in Science and Technology
CREST	The Scientific and Technological Research Committee
DG	Directorate General
ECDC	European Center for Disease Control
EU	European Union
FP	Framework Program
ICT	Information and Communication Technologies
NIFU-STEP	Norwegian Institute for Studies in Innovation, Research and Education
NIPH	Norwegian Institute of Public Health
NOK	Norwegian krone (currency)
RCN	The Research Council of Norway
R&D	Research & Development
SME	Small and Medium Enterprises
STS	Science, Technology and Society
WHO	World Health Organization

---

## CHAPTER 1: INTRODUCTION

---

“...the social organization of scientific inquiry have greatly changed with collaboration and research teams becoming more and more the order of the day”

Merton & Storer (1979:546)

### 1.1 Internationalization of research

As this quote points out, research collaborations are becoming increasingly important to scientific inquiry. This particularly counts for international research collaborations which have increased substantially ever since the end of the Second World War (Trondal, Gornitzka, & Gulbrandsen, 2003:17). The growth in international research collaborations comes from a recent focus on internationalization of research encompassing a range of activities such as cross-national collaboration and adaptation to international environments. Nations, organizations and individuals see the advantages of international research collaborations as they result in co-authored publications, patents, international conferences as well as contact between institutions and states (Wendt, Slipersæter, & Aksnes, 2003:55).

The current scientific practice is characterized by co-production of science in collaborative research teams. Knowledge production also takes place in a social context where science is expected to be useful to industry, government or society at large. This illustrates the fact that scientific knowledge has become a strategic asset for economic growth to industry and nations (Wendt et al., 2003:56-60). Knowledge is not only perceived as a strategic asset for individuals, organizations and nations but also on the European level. The importance of international research teams is illustrated by several European funding opportunities for collaborative research. The European Framework Program (FP) is one of these initiatives and

was first introduced in 1984. Twenty-five years later and almost halfway into FP7 it is interesting to examine how this funding mechanism for research collaboration has contributed to increased competence, collaboration and knowledge transfer. The ongoing FP7 is the world's biggest funding program supporting scientific collaborations with €50, 5 billion. This represents a unique change in the opportunities for funding international research collaborations and also a type of change that can be expected to affect national and organizational strategies on research and development (R&D). The current aim for FPs is to strengthen European research within several different research areas and with several different types of instruments. One of these areas is health research which is the focus of this thesis. More specifically this thesis concentrates on one major actor in Norwegian health research and how this organization has adapted to the funding opportunities that have developed at the European level. Participation in international research collaborations might result from a combination of internal and external motivational factors. The purpose of this thesis is to explore how external and internal elements related to internationalization of research might result in changes in one specific organization. I have chosen to study the Norwegian Institute of Public Health (NIPH) and their participation in FP6.

## **1.2 Research questions**

The overall aim of this thesis is to contribute to an improved empirical basis for understanding the processes, external and internal elements and consequences of change in one organization. In this respect it is a study of a type of organizational change that affects international research collaboration in one particular organization. Consequently, I will be using a theoretical framework related to science in the society and organizational theory when trying to answer the following research questions:

1. How does NIPH as an organization respond to the opportunities for research collaborations provided by the FPs, and to the increasing focus on internationalization in Norwegian research policy?
2. How do NIPH researchers respond to participation in the FPs, and what factors affect the response and experiences with participating in FP research collaborations?

### **1.3 Structure of the thesis**

The first part of this thesis has so far provided a short introduction to the topic and outlined the research questions that will be addressed in this thesis. In the remainder of the introduction the case will be presented. An overview of science on the European level is given in the second chapter with the purpose of outlining the emergence of large-scale funding mechanisms in the EU. The theoretical framework used in this thesis will be outlined in Chapter three. This chapter provides a review of the literature regarding different aspects of international research collaborations on a national, organizational and individual level. The review will identify the main bodies of literature and the main debates within the field of Science, Technology and Society (STS) and organizational theory. Chapter four will provide a description of the methodological framework used to answer my research questions. The empirical analysis presented in Chapter five is divided into three levels examining the national, organizational and individual response. Finally Chapter six consists of concluding remarks on the main findings and suggestions for future research.

### **1.4 Case selection**

In addition to being a main priority in EU research policy, health research is also one of the fastest growing research areas in Norway (St.meld, 2008-2009:18). These are the main reasons why I chose to study the NIPH response to internationalization of research. I also

chose NIPH because it is one of the most active Norwegian health research organizations in FP6. In this respect it is a highly relevant case for promoting an understanding of the effects of involvement in international research collaborations. It is also potentially a case that can describe a broader range of experiences with participation in FP projects.

#### **1.4.1 Why is this interesting?**

Norwegian participation in the FPs is already evaluated three times by NIFU-STEP<sup>1</sup> with recommendations to future collaboration. Although the evaluations offer an extensive and broad picture of participation in FPs, they do not provide an in-depth understanding of why organizations participate in the FPs. In this thesis I aim at understanding the organizational and individual value of participation in FPs. A qualitative case study of NIPH will provide valuable knowledge regarding participation in FPs that exceeds mere statistics. I expect the results from the thesis to be useful for NIPH management as they will learn more about researchers' experiences with FPs and how this affects their organization. The forthcoming evaluation of FP6 and FP7 are explicitly requesting in-depth studies of specific research areas and large organizations participating in FP6 (NIFU-STEP, forthcoming). In this respect the results from this thesis complements the evaluations of participation in FPs.

### **1.5 Norwegian Institute of Public Health**

Besides the fact that NIPH is one of the most active Norwegian health research organizations in FP6, an additional interesting feature of NIPH is that it has experienced some extensive changes throughout the last twenty years with respect to structure, scope and strategies. This makes NIPH an interesting organization to study, and as this thesis will show these changes is

---

<sup>1</sup> NIFU STEP is the leading Norwegian research institute for studies in innovation, research, and education.

highly relevant for understanding the NIPH response to opportunities for international research collaborations.

### **1.5.1 The early years**

The Norwegian Institute of Public Health (NIPH) is a governmental organization placed directly under the Ministry of Health and Care Services. The NIPH acts as a national competence organization for governmental authorities, the health service, the judiciary, prosecuting authorities, politicians, the media and the public. NIPH was first established in 1929 as a successor to Medicinalstyrelsens Laboratorier, which main task was to help Norwegian health authorities control widespread diseases. Diagnostics and prevention of diseases have always been the most important areas of commitment to NIPH (Lassen, 1995:1-4). The institute experienced an extensive growth after WWII consisting of over a hundred employees in 1949. At that time preventing diseases such as syphilis and systematically vaccinate children was NIPH main tasks (NIPH, 2004b). As NIPH was gaining control of infectious diseases in the early 1960's, the institute committed to surveillance and control of new diseases related to physical, chemical and social environmental influence. In the 1970's a substantial part of the national health services was decentralized to the counties which resulted in NIPH losing an essential part of its traditional area of commitment. Subsequently, a report to the Norwegian parliament in 1982 suggested that the institute should change from mainly conducting diagnostics to become a centre of competence. NIPH center of competence includes environmental and community medicine, research and development (R&D) and educating health personnel (Lassen, 1995:37). The new mandate required extensive structural changes and the number of divisions was reduced from thirteen to five. This change was thus an important moment in the transformation of NIPH as an organization and in the process towards becoming a key organization in the national health research system.

### 1.5.2 Current structure and strategies

The current NIPH is an expertise organization somewhere in between a research organization and a public administrative organization (Lassen, 1995:3). The existing structure was established in 2002, subsequent to a unification of various organizations with significant public health activity in Norway. The reorganization was a result of renewing the central social-and health administration in Norway gathering organizations such as: the former National Institute of Public Health, The National Health Screening Service, The Medical Birth registry in Bergen, the Department of Health Statistics and methodology from a large Norwegian pharmaceutical wholesaler. More recently, the National Institute of Toxicology has also merged with NIPH (Norges Forskningsråd, 2004:39). There are currently 800 employees at NIPH and the institute's annual turnover is NOK 835 million. NIPH gets funding from The Ministry of Health and Care Services, Research Council of Norway (RCN), public departments, organizations and charities (NIFU-STEP, 2009).

The NIPH strategy for 2008-2010 aims at contributing to better health, quality of life and legal protection for the Norwegian population. This depends primarily on effective prevention of diseases and a well functioning health service. The NIPH has diverse obligations which are stated in their strategy covering both R&D activities and administration (NIPH, 2008-2010b).

The three main obligations are:

- Health surveillance: a good overview over the health of the population
- Research: The best possible knowledge about what affects the health of the population
- Prevention: Good preparedness, advice and high quality services.

NIPH seeks to offer advice and services adapted to the user's needs, world-class health surveillance and research performed on a high international level. Hence, NIPH sees itself in

an international context. NIPH also aims at being a well-known institute of public health at the same level of the best public health institutes in the world. To achieve this goal the NIPH wants to conduct research on an international level, develop modern and effective health surveillance systems and arrange quality assessments of service and advice (NIPH, 2004b). The work of NIPH aims at being professionally sound, reliable, innovative, open and respectful. According to NIPH's strategy, these values shall be present in areas that deserve special attention in the future such as inequalities, health surveillance and international health challenges (NIPH, 2008-2010b). The NIPH is divided into five divisions with underlying departments. There is also an overarching department of quality, communication and administration/support. The management consists of a Director-General, Deputy Director-General, International Director and Division directors. Please, see appendix A for the NIPH current structure.

In summary, the NIPH has evolved from mainly conducting diagnostics to a diverse centre of competence. The NIPH center of competence performs among others environmental and community medicine, R&D and educates health personnel. These activities are currently distributed on five divisions with underlying departments. Subsequent to the fusion with additional public health organizations, NIPH has developed a strategy for the years 2008-2010 and a global health strategy. This indicates actions towards combating emerging diseases both nationally and globally. NIPH consists of autonomous divisions with diverse obligations. However, all divisions seem to have aspirations of international engagement. In this respect the NIPH has changed from a nationally oriented research organization to including extensive international commitment in its strategies.

---

## CHAPTER 2: SCIENCE ON THE EUROPEAN LEVEL

---

This chapter provides an outline of science on the European level with the purpose of describing the emergence of large-scale funding mechanisms in the EU. An outline of European research policy and the Framework Program will enhance the understanding of how and why the European research collaborations came about. The following describes the internationalization of research on the European level which in turn might affect national research policy, organizational strategy and individual action in relation to FP participation.

### 2.1 EU research policy

Funding programs have been used as an instrument for increasing competence and competitiveness ever since the end of the WWII. Europe, USA and Japan are pioneers when it comes to establishing funding instruments for collaborative research. However, Europe is a diverse region compared to USA and Japan because of its heterogeneous national science policies. This is why priorities and the formation of a common European approach to science and technology is still evolving (Lundvall & Borrás, 2005:422-423).

The first attempts to create an EU research policy in the 1950s and 1960s were not considered as successful which led to a common criticism of EU coordination of research and technology. In the 1970s the commitment to research and technology was strengthened and in 1973 the European Commission established a Directorate for research, science and education, DG XII. Later on the Commission commenced several initiatives to coordinate national policies on R&D such as the scientific and technological research committee (CREST) consisting of senior state officials from all member states. CREST still works as an important forum for European research policy. Another important initiative is the European Cooperation

in Science and Technology (COST) which covers a diverse set of scientific areas. COST was, and still is, a flexible forum for collaboration where member states and associated countries can choose to participate in the programs that they deem useful (Olsen, 1998:32).

In the end of the 1970s European industry showed signs of stagnation which led to an agreement that the EU should concentrate on R&D in order to increase the industry's competitiveness. Meeting the needs for technological development, the EU initiated a coordination of research and development with the aim of strengthening and expanding the scientific and technological collaboration in Europe. This was the beginning of the European Framework Program established to promote European integration and research collaboration of a lasting kind across Europe (ibid).

## **2.2 The European Framework Program**

The European Framework Program is formally described as follows:

The community aims to strengthen the scientific and technological foundation for the European industry and to stimulate the development of its international competitiveness. The community shall encourage SME's, research centers and universities in their contribution to research and technological development (own translation, NIFU 1997:37)

The first Framework Program for research and technology was initiated in 1984. The aim was to strengthen the competitiveness in European industry and enhance the quality of life for the European population. The FP normally lasts for four to five years and is divided into a number of thematic priorities. To maintain continuity in the research projects, the thematic priorities overlap from one FP to the next (Olsen, 1998:32).

The main thematic priorities in the first Framework Program (FP1 1984-1987) were energy, ICT and biotechnology. Research on materials and industrial technology were added to the FP2 (1987-1991). Health research, environmental research and mobility of researchers were not included until FP3 lasting from 1991-1994 (NIFU, 1997:37). The majority of the thematic priorities were developed further into FP4 (1994-1998) adding environment, medical and marine research. Four different research activities were initiated in FP4 and have been continued thereafter with some adjustments. The first activity, aimed at promoting collaboration between industry, research institutes and universities. The majority of the allocations were dedicated to this activity consisting of ten to fifteen different thematic priorities. The next activity involved collaboration between industrialized countries, developing countries and international organizations. The third activity dealt with the dissemination and optimization of research results. Finally, the fourth activity focused on training and mobility of researchers through which young researchers get access to research installations (Olsen, 1998:34).

The activities and thematic priorities from FP4 have been developed further into FP5 (1998-2002). In contrast to its predecessors, FP5 is more oriented towards society, giving more emphasis on research related to the quality of life, health, food safety and socio-economic issues (NIFU-STEP, 2003:15). FP6 (2002-2006) was thematically a continuation of the previous FPs; however some new instruments were added for large research groups such as Integrated Projects and Networks of Excellence. The ongoing FP7 (2007-2013) is different from its forerunners because of its timeframe of seven years. FP7 is divided into the same four activities as in FP4. The first activity that receives most funding is 'cooperation' which is subdivided into ten thematic priorities. The ten priorities reflect the research areas particularly important to improve Europe's ability to address its social, economic, public health,

environmental and industrial challenges for the future. The next activity is called 'ideas' and aims at reinforcing excellence and creativity in European research through investigator driven research. Investigator driven research allows scientists to identify new opportunities and directions for research, rather than being guided by priorities set by politicians. The third activity, 'capacities', aims at enhancing research and innovation capacities throughout Europe and ensure their optimal use. This activity is seen as a complement to the 'cooperation program'. The fourth activity, 'people' aims at strengthening the human potential in research and technology in Europe. This is carried out through a mobility scheme focusing on trans-national mobility of young researchers (CORDIS, 2009). The projects analyzed in this thesis are 'cooperation' projects.

### **2.3 Objectives**

The EU underlines that the FP projects should be a supplement to the research activities in the member states and associated countries. The aim is that research activities shall be carried out on the European level if the individual member state cannot manage its complexity or costs.

The FPs aims at bringing together a wide specter of knowledge and skills from different countries to diffuse the risk and costs related to developing new technologies. The funding program also aims to reflect the 'continental' dimension of problems connected to issues such as health and environment (Olsen, 1998:36).

The overall aim for EU research projects is that they shall be of an applied and strategic character. A typical FP project in the 'coordination' activity consists of several European research institutes, industry and universities divided into two types of projects; shared costs and concerted action. Shared cost is the most common type and involves splitting the expenses of the FP project. The EU covers until 100 percent of the costs for universities and

50 percent for research institutes and industry. Concerted actions cover 100 percent of the activities in the project that is related to meetings such as travel costs etc; however it does not cover any of the expenses for research (ibid). The projects analyzed in this thesis are mainly 'shared cost' projects.

## **2.4 Summary of science on the European level**

In summary, science on the European level has evolved from a few unsuccessful attempts to develop an EU initiative for research and technology to efficient large-scale funding programs such as the FPs. In the early phase of FP, the program was only funding research on ICT, biotech and energy. The ongoing FP7 have in line with its extensive growth included several other research areas such as health, environment and social sciences. The FPs normally lasts from four to five years and is divided into four different activities. 'Cooperation' is the activity that gets most funding and is divided into ten different thematic priorities including health research. The EU underlines that FP projects should be a supplement to research activities in member states and only cover 50 percent of the expenses for research institutes in 'shared cost' projects. I expect NIPH research to be highly influenced by the growing importance of FPs. I also expect the 50 percent requirement to be an important determinant to whether NIPH may participate in FPs.

---

## CHAPTER 3: THEORETICAL FRAMEWORK

---

Internationalization of research can be studied on four different levels: the European, the national, the organizational and the research performing level (Gornitzka & Langfeldt, 2008:8). In this thesis I wish to cover all of these levels when studying internationalization of Norwegian health research. The European level has already been covered in the previous chapter. The underlying assumption is that a combination of levels will generate a new and deeper understanding of how the European sphere influences the organizational and research performing level.

In the following I will describe and discuss various theoretical approaches from the literature on science in the society, science on the organizational level and research performing level. Theories on science in the society are used within the field of STS. However, I will also draw upon theories related to institutionalism and Europeanization which is not necessary included in the STS tradition. A combination of theories is necessary because it will reflect the complexity of analyzing internationalization of research on three different levels.

### **3.1 Science in the society**

Science in the society is related to the emergence of a radical and relativistic sociology of scientific knowledge (SSK) initiated the 1970's (Edge, 1995:7). Scholars within the field of SSK believe that scientific knowledge can be dissolved in various social practices. They argue that knowledge is relative and that it varies according to the different environments in which it is created (Asdal, Brenna, & Moser, 2007:16). SSK is traditionally based on empirical studies of how science is socially constructed in laboratories. The ethnography used in laboratory studies has been extended to studying significant developments in whole fields and even to

science policy (Cetina, 1995:141). Thus, SSK can be used to study national policy in relation to internationalization of scientific knowledge.

### **3.1.1 The science-society contract**

The science-society contract has emerged from the concept of science policy which can be defined as:

collective measures taken by a government in order to encourage the development of scientific and technical research and to exploit the results for general political objectives (Elzinga & Jamison, 1995:572-573).

Science policy was first introduced by J.D. Bernal, a distinguished physicist and socialist, in 1939 who was a pioneer in measuring R&D effort at a national level. Bernal strongly recommended increase in R&D because it would stimulate economic growth and welfare. In USA, the Vannevar Bush report from 1945 'Science: The Endless Frontier' defined the task for science policy as contributing to national security, health and economic growth. Today, issues in science policy are still concerning allocation of sufficient resources to science and making sure that they are used efficiently so that research can contribute to social welfare. However, science policy is not only about national security and economic objectives; it is also related to national prestige and cultural values (Lundvall & Borrás, 2005:605).

A central theme in the field of STS is the assumption that scientific knowledge is not a passive product of nature but an actively negotiated social product of human enquiry. Science is socially constructed through being supported by governmental funding, distributed between researches and maintained through political negotiation. This makes knowledge not only a socially constructed but also a political product (Cozzens & Woodhouse, 1995:534).

Knowledge as a political product obliges the national governments to make better use of

science policy to help solve the problems emerging in a rapidly changing world. One can talk of a science-society contract where science is expected to produce reliable knowledge and communicate its discovery to society. This means that the society has certain expectations for research formulated in national objectives and strategic policies (Gibbons, 2000:160). The FPs is a good example of the science-society contract in which the EU tries to shape research priorities and build research capacity to meet identified social and economic needs (Nowotny, Scott & Gibbons, 2003:180-181).

Gibbons (1999) have pointed out a new form of science-society contract where he expects science not only to be reliable but also socially robust in the sense that science would need to be legitimized again and again. The new contract requires transnational activities to legitimize scientific knowledge in different contexts and societies (Gibbons, 1999:11). This requires an understanding of the framework in which scientific knowledge is currently produced.

### **3.1.2 Contextualization of knowledge**

Scientific knowledge is not produced at some remote ideal site and then transferred to 'society' to be adapted to some practical purpose. However, it is created by scientists who form a loose intellectual collective operating in a specific historical context (Nowotny, Scott & Gibbons, 2001:121). This has also been described as the transition from Mode 1 to Mode 2 scientific production. Mode 1 scientific production is governed by the academic interest of one specific community. In contrast, Mode 2 scientific production is socially distributed, application oriented, trans-disciplinary and subject to multiple accountabilities. Thus, science has taken on a new form where it is not only created at universities but also in government laboratories, think tanks and consultancies. These different organizations interact efficiently

through ease of transportation across national borders and by using information and communication technologies. The explosion of connections and possible configurations of knowledge and skills have resulted in a socially distributed knowledge production system, in which communication increasingly takes place across organizational boundaries. Thus Mode 2 scientific production allows access to collaborations with experts from a wide range of backgrounds creating an inspiring work environment. The complexity of Mode 2 science indicates a more open society where organizational boundaries become blurry resulting in an interactive system including both science and society (Nowotny et al., 2003:180-181). Considering the fact that research collaborations are the foundation of the Mode 2 scientific production it is interesting to look further into its origin, namely the invisible colleges.

### **3.1.3 Invisible colleges**

Science and technology is characterized by transnational activities requiring worldwide diffusion of scientific personnel and activities. Although this feature is not new, it seems to have dramatically increased in terms of contacts, flows of people, information and collaboration across state borders (De Solla Price, 1986:2). The first scientific collaborations, called invisible colleges, originated in the seventeenth century as a reaction to the church controlling the scientific production (Lomas, 2002:24). An invisible college is a communication network that link groups of collaborators. Under the leadership of one or two scientists, the groups of collaborators recruit and socialize new members and maintain a sense of commitment to the area among existing members. This social selection of scientists into an invisible college has resulted in a tendency to resist new developments creating path dependencies (Crane, 1972:35-37). Merton (1974) elaborated further on the concentration of scientific resources and talent describing the emergence of 'star researchers' (Merton, 1974:459). This is called the 'Matthew effect' where scientists are socially validated by

judgments of the average quality of their past work. This principle represents a self-fulfilling prophesy, also with regards to allocation of scientific resources. The 'Matthew effect' related to allocations creates a system where the rich scientists are getting richer and the poor are getting poorer. Thus, centers that can demonstrate scientific excellence are allocated far larger resources for conducting science than centers which have yet to demonstrate scientific distinction (Merton & Storer, 1979:456). Even though social selection of researchers and allocations of scientific resources still occur, the current transfer of scientific knowledge is characterized by free transfer of thought and expertise in a global scientific community.

The global scientific community is informally organized by a web of collegial ties with local and distant peers who are significant for the scientist's work (Schott, 1993:200). The collegial circle produce new claims to knowledge, increase nations participation in research collaborations, contribute to the diffusion of knowledge creation and to the span of social ties among scientist. The world wide spread of scientific activities and personal connections among scientist constitutes a shared belief that scientific knowledge has universal validity. Universal validity is related to the new science-society contract where the validity of propositions is the same all over the world because it can be assessed by universally valid criteria. This means that anyone anywhere can learn the propositions, apply them and through their research arrive at similar propositions. Thus, modern scientific practice is oriented towards humanity as a whole (Schott, 1991:446). The fact that society is expecting science to be produced for the public good is also apparent on the organizational level where strategies are highly influenced by aims in national research policy.

## **3.2 Science on the organizational level**

Science on the organizational level aims to describe whether internationalization of science originates from external or internal motivational factors. The Norwegian research system is separated into three performing sectors: industry, research institutes and higher education (Wiig, Slipersæter & Sarpebakken, 2001:29). In this thesis I focus on research institutes. The research institutes have a wide spread international engagement with an extensive amount of collaborative projects and are important knowledge suppliers to the industry and public administration (Slipersæter & Wendt, 2006). Based on these assumptions it is interesting to examine whether NIPH engagement in international collaborative projects is influenced by environmental changes. I am going to introduce theoretical concepts related to organizational theory and Europeanization. I will also elaborate on how institutes can make use of collaborative projects to improve its absorptive capacity. Finally I will give a short overview of the findings from a report on Norwegian research institutes' response to internationalization of research.

### **3.2.1 Organizations at the mercy of its environments?**

Organizational action is directed by expectations from its environment and the organizations that do not adapt to these directions might have trouble surviving. These are the basic assumptions of the neo-institutional theory where organizations adapt to norms and beliefs in the environment. The organizational conformity is often of a ritualistic nature where organizations construct symbols of compliance to environmental change. However, the stability and reluctance to change that exist within large organizations might prevent change of structure and strategy towards internationalization of research. Thus, most changes in organizations are a result of stable routine responses to the environments (Gornitzka, 1999:9-10).

The ways in which an organization relates to its environment can take several different forms. Organizations can settle with passive adaptation or pursue active manipulation of their relations to the environment. Hence, organizations have the possibility to control their environments through responding to influence in creative and strategic ways (Gornitzka & Maassen, 2004:38). Oliver (1991) suggests five main strategies for responding to the expectations from the environment being: compliance, compromise, avoid, disobey or manipulate. The first strategy is rather passive describing organizations that follow old habits when responding to environmental expectations. The organization does not have a certain strategy and adaptation occurs through a minimum of consideration and conscious actions. The second strategy is used when organizations are confronted with inconsistencies in environmental expectations and organizational goals related to autonomy and efficiency. Under such circumstances, organizations may attempt to balance or bargain with the environmental expectations to make them fit their strategy (Oliver, 1991:151-152). The third strategy explains how organizations can avoid adapting to their environments through complying with environmental pressures but not adapting organizational structure. Finally organizations can also disobey expectations from the environment or manipulate other organizations actively to protect themselves from environmental influence and control (Gornitzka & Maassen, 2004:38). All these strategies demonstrate different ways to respond to environmental expectations. I assume that NIPH choose one of these strategies when responding to expectations on increased participation in FP projects. To summarize, the organization is at the mercy of its environments through passive adaptation to environmental influence. On the other hand, organizations might pursue active manipulation of their environments through one of the strategies mentioned. In case of adaptation to new organizational environments such as the European sphere it might be explained through the concept of Europeanization.

### **3.2.2 Europeanization and organizational change**

Europeanization of research is a process in which the dynamics of the European Framework Program, national research systems and local research organizations interfere. Unlike most studies on Europeanization that focuses on Europe in relation to national research systems, this thesis explores the relationship between Europe and NIPH. It is therefore a question of how NIPH as an organization adapts to FPs and whether this can be seen as a case of Europeanization of NIPH.

Large organizations such as NIPH are relatively stable and do not adapt quickly to changes in external conditions. Hence, Europeanization of governmental research institutes can be a rather lengthy process (Olsen, 2002:925). The size and structure of NIPH can be compared with the other governmental organizations such as universities. Research conducted on Europeanization of universities is therefore applicable when analyzing Europeanization of NIPH. The university consists of structural features that affect the capacity to collective action which makes them 'hard to move'. Universities also possess a high degree of structural differentiation where "each department is a world in itself". The distribution of decision making responsibilities, multiplicity of purpose and organizational fragmentation are important factors conditioning whether coordinated change is possible or likely (Gornitzka, 1999:11-13). These are all factors that indicate why it might be challenging to perform a rapid and smooth Europeanization of universities and governmental research institutes.

According to Meulen (2002), the inertia residing in universities and large research institutes might be solved through organizational innovations. Recent studies on Europeanization of universities found that in order to be an attractive partner in FP projects, the university need to turn itself into an entrepreneurial university. The entrepreneurial university is particularly fit

to capture new funding opportunities by having a stronger role for central management, a mix of academic units and boundary-spanning activities, a diversified funding base and an entrepreneurial culture based on innovation. Entrepreneurial universities would in most cases be more successful in the European arena than the traditional ones (Meulen, 2002:342).

Whether NIPH would change its structure or culture to fit the European arena is discussed in the empirical analysis of this thesis. It is however interesting to look further into the arguments for a possible adaptation towards the European arena through participation in FPs.

### *Two arguments for adaptation*

The following arguments for adaptation are normally used in relation to national policy and its convergence towards European policy. In this thesis the arguments will be used for describing underlying motivations for Europeanization of NIPH.

In case adaptation towards the European arena is based on rational calculation NIPH would participate in FPs in order to promote the organizations interests and collect the awards that accumulate from participation. The awards might be access to funding structures and/or organizational reputation. Organizational reputation of being an attractive and reliable partner might be favorable for future cooperative efforts in FPs. The second argument for adaptation to the European arena is dependent on rules, procedures and trends within the organization. Organizations act according to the role that they see appropriate for them to take on in an international context. Following this rule-based argument participation in FPs would be obligatory. According to both rational calculation and rule-based argument, the organizational capacities and resources devoted to internationalization of research are decisive for participation in and adjustment to European policy arenas (Gornitzka & Langfeldt, 2008:159).

An overall increased participation in FP projects indicates that even large organizations increasingly depend on external resources in their research activities. This can be related to the concept of absorptive capacity describing the organizations capacity to absorb knowledge from its environment.

### **3.2.3 Absorptive capacity**

The capacity to absorb knowledge from the environment is dependent on prior knowledge residing in the organization. A diverse and updated organizational knowledge base facilitates the ability to recognize the value of new information, assimilate it and apply it (Cohen & Levinthal, 1990:133). Based on these assumptions, knowledge has become a strategic asset to individuals, organizations and nations and absorptive capacity is therefore also important to all three levels. Organizations are highly dependent on increasing their absorptive capacity and rely on gatekeepers to manage the flow of knowledge from the environment to the organization (Cohen & Levinthal, 1990:133). Gatekeepers in FP projects are researchers familiar with the EU system communicating FP opportunities and new knowledge from projects to the organization. Research on absorptive capacity and scientific collaborations indicates that collaborations provide researchers with new perspectives on a diverse set of research areas, hence increase the organizations' absorptive capacity (Scott, 2003: 252). Participation in FP projects might therefore prevent path dependency where organizations tend to build on their existing knowledge base rather than enter unfamiliar fields (Schilling, 2008:70).

Participation in FP projects will most likely increase the NIPH absorptive capacity and consequently indicate a convergence towards a European arena. Norwegian research institutes already have a wide spread engagement in international collaborative projects. It is therefore

interesting to see whether the decision of participating in research collaborations is argued from a ‘top-down’ or ‘bottom-up’ perspective.

### **3.2.4 Research institutes’ response to internationalization of research**

Wiig et al. (2001) have studied how Norwegian research institutes respond to internationalization of research. The results show that participation in international research collaborations is argued using three different approaches. The first perspective describes a ‘bottom-up’ approach where researchers decide which organizations they want to collaborate with. The second approach describes how managers put some restrictions on collaborative organizations deciding which research areas need increased competence. Finally, research collaborations are used to strengthen established relationships to other organizations. The final perspective can be considered a ‘top down’ approach where collaborations are a consequence of organizational priorities and decisions taken on the management level. The report concludes that international collaborations are highly dependent on the individual researchers’ initiative and ability to create contact. The ‘top down’ approach is therefore hardly ever used. There is also little proof that the institutes exploit the research collaborations when creating strategies. Then again, managers tend to be self-contradictory saying that the organizations depend on research collaborations to make strategic priorities. The report concludes that institutes take environmental expectations into consideration, but only to a limited extent (Wiig et al., 2001:72-83).

Despite the neglect of environmental expectations, organizations still rely on external resources to conduct and improve their research. It is therefore important that researchers are motivated to share their knowledge in FP projects. Science on the research performing level

will therefore explore the relationship between the European arena and the individual researcher.

### **3.3 Science on the research performing level**

European research collaborations are highly dependent on efficient knowledge transfer to be able to complete their mission. The traditional perspective of knowledge transfer is seen as a relatively straightforward dissemination of information from sender to receiver by the use of some medium. This is not applicable in the current knowledge transfer process based on mutual learning where the roles of sender and receiver are not clearly defined (Thune, 2006:54). Knowledge cannot in this sense be reduced to information because the transfer process is dependent on the researchers' capacity of interpreting information. Hence, knowledge transfer is guided by human behavior and dependent on social relationships to communicate information efficiently.

#### **3.3.1 Conceptualization of knowledge**

Knowledge residing within each individual can be divided into at least two different concepts, tacit and explicit knowledge (Thune, 2006:55). The tacit dimension was first introduced by Michael Polanyi in 1983 trying to explain that humans know more than they can tell. We are for instance able to recognize a person's face amongst hundreds of others on the street, but cannot say why we recognize their face (Polanyi, 1983:5). The fact that all knowledge has some kind of tacit dimension creates implications for how humans acquire and transfer knowledge. Explicit knowledge on the other hand is highly codified through symbols such as language and manuals. Tacit knowledge lacks such extensive codification and therefore demands considerable effort to acquire (Clegg, Kornberger & Pitsis, 2006:346-349). The basic argument is that explicit knowledge is easy to transfer whilst tacit knowledge is almost

impossible to transfer. Nevertheless, scholars have argued that a sharp distinction between tacit and explicit knowledge might be misleading. This is due to the fact that codification of knowledge does not necessarily correspond with the accessibility of knowledge. Codified knowledge can in many cases be proprietary and tacit knowledge can reside in the public domain. In addition, codified knowledge might be difficult to acquire even though it resides in the public domain, an example of this is learning mathematics. The most profound statement is that tacit and codified knowledge cannot be compared because they are two different things. This is illustrated by the example of availability of handbooks in a library which makes access to knowledge easier (explicit); however access is not sufficient to master the use of the books content (tacit) (Malerba & Orsenigo, 2000:293).

Transfer of both tacit and explicit knowledge is crucial to organizations in order to constantly update their resource pool and maintain their absorptive capacity. Knowledge is quickly outdated and needs to be replaced by new research or procedures. In this sense knowledge is not only a concept but also an analytical tool for studying social relations and knowledge transfer. Knowledge is connected to social relations through the concept of 'know-who' meaning knowing who knows what and who knows what to do. This concept includes social and communicative skills on interacting with other researchers. 'Know-who' will increase the capability to establish relationships with specialized groups in order to draw upon their expertise (Lundvall, 1996:4-6). Considering the fact that knowledge transfer involves different kinds of people it depends on specific preconditions to be successful. This will be further described in the following.

### *Preconditions for knowledge sharing*

The most important preconditions for effective knowledge transfer in FP projects are intrinsic or extrinsic motivation. Intrinsic motivation illustrates the need for professional accomplishments or achieving a self-set goal. Extrinsic motivation is illustrated through incentives for accomplishing a task such as financial compensation. Research indicates that intrinsic motivation leads to most efficient knowledge transfer explained by the ‘crowding-out effect’. The effect occurs if one is initially motivated by intrinsic motivation and later on is promised incentives for doing the same job which turns it into an extrinsically motivated task. In the short run the extrinsic motivation is often successful but in the longer run the person will accomplish the task only if it is promised incentives. This illustrates how organizations must encourage intrinsic instead of extrinsic motivation for participation in research collaborations (Osterloh & Frey, 2000:539-541).

Previous research on preconditions for knowledge sharing in international research projects focus on organizational settings. Bozeman (2000) studied universities and government laboratories participation in international research collaborations which makes his studies highly applicable in the case of NIPH. He presents six different criterions of effective knowledge transfer and I will make use of four of them because the remaining falls outside the scope of this thesis. The first criterion states that organizations join research projects only if there is a directive to do so. Participation in a research project would in this case be related to external pressures and the fact that researchers were “told to” pursue knowledge transfer. The second criterion focuses on political reward for joining research projects which might appear as increased funding to the researchers that participate in international research collaborations. The first and second criterion stand for more or less the same: activity is its own reward. This can be related to rule-based argumentation for Europeanization.

The third criterion indicates that international research projects are a less important activity for organizations. In governmental laboratories collaborative research projects take place alongside a diverse set of activities such as: contributing to the advance of basic research, training scientist and ensuring that the nation can protect the public. Taking on additional missions might therefore alter basic performance and capabilities. The final criterion is related to scientific and human capital which is the total of scientific, technological and social skills applied in collaborative efforts. This describes how production of scientific knowledge might be dependent on social and political skills. According to Bozeman, the final criterion is underestimated in relation to research and technology effectiveness. Governmental laboratories should therefore include goals for developing and maintaining human resources in research areas critical to their missions (Bozeman, 2000:648-649). Social and political skills in research collaborations are further described by social capital inherent in social relationships between collaborators.

### **3.3.2 Social capital**

Social capital refers to features of social organization such as networks, norms and social trust that facilitate coordination and collaboration for mutual benefit (Putnam, 1995:67). Naphaiet and Ghoshal (in Hatch, 2006) have divided the concept of social capital into three categories; structural, relational and cognitive. The structural dimension maps an actor's ability to make connections to others within a community through knowledge transfer. This is illustrated through collaborative ties between partners. The relational dimension rests on personal relationships and facilitates development of trust, shared norms and mutual obligations (Hatch, 2006:333). Shared norms, such as 'one shall forgo self-interest and act in the interest of the collectivity' might be preferable in research collaborations because it makes the partners work for the public good. However, norms can constrain innovative actions because

partners are too preoccupied with acting for the interest for the collectivity (Coleman, 1988:105). Finally, the cognitive dimension of social capital focuses on the shared representations and systems of meaning such as common language, codes and shared narratives (Thune, 2006:69). These three levels will be used as analytical tools in the empirical analysis of this thesis.

The ability to make connections to others within a community through knowledge transfer can be explained by collaborative ties. In the following I wish to look at both strong and weak ties between researchers and how this might influence the outcome.

### **3.3.3 Collaborative ties**

Efficient research projects require an interactive learning process with linkages between individuals. These learning processes rely on strong and weak ties between researchers and are determined by “a combination of the amount of time, emotional intensity, intimacy, and reciprocal services which characterize the tie” (Granovetter, 1973:1361). Ties between friends or families where individuals share similar interests and tacit knowledge might be characterized as strong ties. Weak ties are connections with people outside the regular circle of friends and family such as a colleague or a friend of a friend (Powell & Grodal, 2005:61). New ideas are more likely to be generated from weak ties between people with different backgrounds. The argument is that one can learn more from people of a different network than of one’s own network (Dittrich, 2004:33-35). This is based on the basic assumption of the ‘strength of weak ties’. Weak ties enables access to a more varied set of activities, experiences and collaborators which makes organizations broaden their resource and knowledge base. When relationships are deepened, the greater commitment and more thorough knowledge sharing develop. The information that is exchanged in strong ties is

‘thick’, detailed and rich. Strong ties are therefore more vulnerable than weak ties because they might be harmed or severed if key persons leave the research project or the organization (Powell & Grodal, 2005:62).

### **3.4 Summary of the theoretical framework**

The first section of the theoretical framework is dedicated to the social construction of science. Scholars within the field of SSK argue that knowledge is relative and that it varies according to the different environments in which it is created. Science is therefore a social and political product guided by political decisions to fund research projects that contribute to national security, health and economic growth. This is called the science-society contract.

Mode 2 science has emerged simultaneously to the science- society contract and is based on socially distributed, application oriented, trans-disciplinary research collaborations.

International research collaborations originate from a social selection of researchers into invisible colleges. This social selection leads to an exclusive group of ‘star researchers’ with scientific resources and talent. The current transfer of scientific knowledge is characterized by free transfer of thought and expertise in a global scientific society.

The next section is dedicated to science on the organizational level. The basic assumption of neo-institutional theory is that organizational action is directed by expectations from its environment. Organizations can settle with passive adaptation or respond to environmental expectations through five different strategies. In terms of adaptation one can talk of Europeanization of research which is a process where the FPs, national research systems and local research organizations interfere. Europeanization of NIPH is expected to be a lengthy process due to the fact that its structure and culture is differentiated and ‘hard to move’.

Whether the organization or individuals decide to adapt to the European arena can be argued

from rational choice or rule-based point of view. Another argument for organizations to adapt to their environments is the opportunity to learn from external knowledge bases which increase absorptive capacity.

The third section is dedicated to science on the research performing level. Current knowledge transfer processes is based on mutual learning where the roles of sender and receiver are not clearly defined. The transfer process relies on both tacit and explicit knowledge. Tacit knowledge is hard to acquire whilst explicit knowledge is easily codified through language and manuals. Social and communicative skills are also important in a knowledge transfer process and is referred to as know-who. I also elaborate on the preconditions for knowledge sharing being: intrinsic and extrinsic motivation, external expectations, political reward and knowledge sharing as a complementary activity. I further describe the three categories of social capital: structural, relational and cognitive and how learning processes in research collaborations rely on strong and weak ties.

### **3.4.1 Expected response**

Based on the theoretical framework I expect the national response to be increased funding to international research projects that contribute to national security, health and economic growth. With regards to the organizational response, I expect NIPH to be highly dependent on the individual researchers' initiative and ability to create contact. I also expect that NIPH is an organization that is 'hard to move' towards collective actions for internationalization of research. Finally I expect NIPH actions to be guided by governmental decisions such as developing a strategy for internationalization of research. On the individual level I expect the NIPH researchers to exploit transfer of both tacit and explicit knowledge in the FP projects. I

also expect the researchers to establish strong ties with some partners and exploit the strength of weak ties in the projects.

---

## CHAPTER 4: METHDOLOGICAL FRAMEWORK

---

### 4.1 Qualitative research method

The qualitative research method is widely used in research on social sciences. The method helps the researcher explain why or how something happens rather than just describing what happens. Social research can therefore be explained as human construction, framed and presented in a social context (Punch, 2005:135). Qualitative research represents diversity by using multiple strategies and methods. It may be argued that this method gives a deeper and more accessible understanding of the process or objects studied compared to quantitative research. The aim for the researcher is to gain a holistic view of the context and to capture data on perceptions ‘from the inside’. The researcher explains the ways people understand their situation through interpretations and analysis of interviews and documents (Punch, 2005:134-142). This thesis is based on the qualitative research method. It includes a case study of NIPH researchers’ and managers’ experiences with FP research collaborations. I aim to get a holistic view of the external and internal factors that make NIPH engage in European research collaborations.

#### 4.1.1 Case study

According to Yin (2009), the case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context when the boundaries between the phenomenon and context are not clearly evident and where multiple sources of evidence are used. Multiple sources of evidence can be observations in natural settings, interviews and documentary analysis (Yin, 2009:11). The researcher is most likely to ask ‘how’ or ‘why’ something occurs within the context of the case study. In this thesis I aim to answer how NIPH as an organization respond to the opportunities for research collaborations provided by

FPs and the increasing focus on internationalization Norwegian research policies. I will also investigate how NIPH researchers respond to participation in FPs. These illustrate explanatory research questions where I aim to not only describe why, but also explain how NIPH respond to changes in its environment (Yin, 2009:5-12). One of the most central aspects of a case analysis is to understand the situation that the organization is a part of. This is conducted through systematically studying documents to build a descriptive model that fits the situation. A descriptive model is developed by building a compact picture of the organization, finding indexes in the text and reconstruct and expand the situation so that the researcher can identify the challenges for the organization (Easton, 1992:1).

A common critique of case studies concerns generalization. Since the case study is often based on a single study one might ask if it can be generalized to other cases. The question is rather whether the researcher wants to focus on what is unique about a particular case or on what is common with other cases (Punch, 2005:145-148). I would like to concentrate on NIPH uniqueness regarding experiences with FP projects. The intention is not to generalize but rather understand its complexity and context. If a researcher wants to generalize results from a case study the research question needs to be on a sufficient level of abstraction where the aim is to focus on common elements in a case. In this thesis I propose two definite research questions about one particular case, which is why the thesis does not focus on common elements between several cases.

#### **4.1.2 Validity and reliability**

One of the most important tests of a case study is its construct validity meaning the development of correct operational measures for the concept being studied (Yin, 2009:41). To identify correct operational measures, I asked the respondents to review their quotations and

evaluate whether this was describing the situations correctly. I have given each interview a number such as: 0207 or 0606 to ensure that I have used quotations from different respondents on the same topic. I have also used multiple sources of evidence to increase the construct validity of the thesis.

The thesis internal validity should be considered high due to a review of previous interview guides from evaluations on the topic prior to writing this thesis. I have used these as a foundation and also received help from my supervisor reviewing the interview guide. A properly designed interview guide will in this case demonstrate the causal relation between two or more variables. Consequently, I will be able to describe the NIPH response to internationalization of research and illustrate the internal validity of my case. The external validity deals with the fact that the case study can provide information outside the specific case. This should be considered lower than construct and internal validity of the case study due to lack of generalization.

To minimize errors and biases in a case study one should make sure that the study represents reliability. I have solved this challenge by constructing two interview guides, coding the interviews and thoroughly describing data collection procedures in this chapter. Through providing an extensive research protocol I expect other researchers to obtain similar results (Yin, 2009:41-45).

## **4.2 Sources of data**

In order to answer my two research questions I have collected different types of data such as documents, interviews and observations. Triangulation of data is helpful because it supports

events or facts of the case study by more than a single source of evidence (Yin, 2009:114-116).

**Table 1 Sources of data**

<b>Method</b>	<b>Data sources</b>	<b>Purpose</b>
<b>Documentary analysis</b>	National policy documents NIPH strategies Letter of allocations FP project descriptions and internet site Evaluations of Norwegian participation in FPs	Acquire knowledge about NIPH and the current state of Norwegian and global health research policy
<b>Interviews with NIPH management</b>	5 semi structured interviews with NIPH management	Acquire knowledge about NIPH and understand European research collaborations
<b>Interviews with NIPH researchers</b>	5 semi structured interviews with researchers involved in FP6	Describe and analyze experiences from FP projects
<b>Direct observations and informal conversations</b>	9 hours of field observation of one FP project meeting	Describe and analyze experiences from FP projects

#### **4.2.1 Documentary analysis**

The table provides a summary of the documents I have used to understand how the NIPH respond to internationalization of research. White papers from the Norwegian government and information from the European Commission have provided me with an overview of the strategies for internationalization of Norwegian research policy. I also use the letter of allocation<sup>2</sup> from The Ministry of Health and Care Services to get an understanding of what the government is expecting from NIPH in terms of internationalization of research and activities. Previous evaluations of Norwegian participation in FPs give me an understanding

<sup>2</sup> The letter of allocation consists of goals, a framework for revenues and disbursement and reporting requirements from the Ministry.

of the development of internationalization of health research throughout the last two decades. NIPH strategies and internet site have provided me with information regarding NIPH structure and strategies. Documentation in this case study is very important because it depicts valuable information on political and organizational priorities. In this case, documents are also used to support information from other sources such as interviews with NIPH management. This will demonstrate whether the documents are contradictory rather than corroboratory to the information retrieved from the interviews. Hence documentary analysis is exact and in terms of names, references and details provides a broad coverage of an event (Yin, 2009:103).

#### **4.2.2 Interviews**

Interviews with researchers and managers at NIPH are the main sources of data in my thesis. According to Punch (2005:168), the interview is one of the main data collection tools in qualitative research and a good way of accessing people's perceptions, meanings and construction of reality. In my study I have used a semi-structured interview guide for conducting focused interviews. According to Yin (2008:107) focused interviews are used when a person is interviewed for a short period of time, with open ended questions in a conversational manner. However, the interviewer might follow a certain set of questions derived from an interview guide.

Before interviewing the respondents I contacted them via email with a short description of my project. I received good response on my inquiries and the majority of the people I contacted wanted to meet me for an interview. I conducted ten interviews altogether, five of the interviews were carried out with the purpose to represent the NIPH management viewpoints. These people are mainly working in the administration or are division managers in NIPH. The

remaining five interviews were carried out with the purpose of gaining detailed descriptions of participation in FP and its importance to NIPH researchers<sup>3</sup>. The interview situation was rather informal where the respondent told me stories related to the topics in the interview guide<sup>4</sup>. I have used a recorder in the majority of my interviews which I have later transcribed. I also took notes with regards to the answers given and events of importance during the interview. Each interview took about 45 minutes and was conducted at NIPH in the respondents' offices and in the cafeteria. To secure anonymity I have chosen not to use any names and I consistently use the term 'she' when quoting the respondents in the empirical analysis.

### *Coding of interviews*

Coding is a process of putting tags, names and labels on pieces of the data. The pieces may be individual words, or small chunks of the data aiming to identify patterns (Punch, 2005:199-201). I have used the method of coding the interview to operationalize the data. The labels I ended up using in the empirical analysis are somewhat different from the topics in the interview guide. This is due to the use of a semi-structured interview opening up for reflections on additional issues. I have coded the interviews with the NIPH management using the following labels: internationalization of research and motivation for participation. I have also added the following sub categories: strategy, structural changes, individual or organizational participation. I have coded the interviews with the researchers at NIPH using the following labels: preconditions, interactional experiences, effects and relevance. I have also added the following sub categories: initiation of projects, motivation for participation, arenas of knowledge exchange, collaborative ties, cultural and disciplinary differences and relevance of study.

---

<sup>3</sup> Please see Appendix C for a list of respondents

<sup>4</sup> Please see Appendix B for interview guides

### **4.2.3 Direct observations and informal conversations**

Observational evidence is often useful in providing additional information and understanding about the topic being studied. As a supplement to the interviews, one all-day meeting with partners in one FP project was observed. I took field notes and talked to the partners after the meeting and in breaks to get their perception of the collaborative process. I have been observing the partners in their natural meeting setting using naturalistic observation technique where the observer neither manipulate nor stimulate the behavior of those whom she is observing. The aim of this method is to observe the behavior as the stream of actions and events naturally unfold (Punch, 2005:179).

Prior to observing the meeting I sent an email to the coordinator with information about my project and my purpose of observing the meeting. It was interesting to observe formal and informal communication among the partners and see what kind of information was shared. Through observation of communication patterns I got an impression of the degree of trust among the members which is an important precondition for collaboration. In addition to documents, interviews and direct observation I have collected data through informal conversations with the NIPH management. This was facilitated through office space at NIPH which I used for about two weeks during my studies. I have chosen not to spend the whole study period at NIPH considering it might influence my objectivity.

### **4.3 Limitations**

There are several limitations connected to conducting a case study. As touched upon earlier, one of them is the difficulties of generalizing from one case study to the broader context of other research institutes in Norway. This also becomes apparent in this thesis considering the

fact that I study the uniqueness of NIPH and its response to external and internal influence. Another limitation connected to my study is the fact that not everyone on my list of respondents had the opportunity to participate in an interview. However, the people who declined my inquiry referred me to another person that could give me the answers I needed. I see this as a minor limitation in my study as the key persons were more than happy to answer my questions. Another aspect that might have led to some bias in my research is the fact that not all divisions at NIPH are equally represented. The respondents are mainly from the division of epidemiology<sup>5</sup>, forensic toxicology and drug abuse, infectious diseases and environmental medicine. Division for mental health was left out of the study because they did not participate in any projects funded by FP6.

Finally, as with every use of qualitative research methods there are limitations connected to the subjective understanding. When observing the project meeting I was interpreting the interactions between the researchers in a specific way that might influence the data collected. I am also aware that the respondents might have interpreted my questions in different ways and answered to them accordingly. However, the good thing about interviews as opposed to questionnaires is that respondents have the chance to ask the interviewer if the questions are not clear. The interviews were conducted in Norwegian. Translating quotes from Norwegian to English might result in errors related to meaning of the statements. This was solved by sending the quotations to the respondents in English asking them to validate their translated quotations.

---

<sup>5</sup> Epidemiology is the study of the factors affecting the health and illness of populations.

---

## **CHAPTER 5: EMPIRICAL ANALYSIS**

---

This chapter presents the main empirical evidence and seeks to combine it with the reviewed literature in order to answer the research questions. In line with the theoretical framework, the empirical analysis will elaborate on national, organizational and individual response to internationalization of health research. The national response to internationalization of research is derived from documentary analysis of government white papers, evaluations and reports. The organizational and individual response is derived from interviews and organizational strategies.

### **5.1 National response**

National research policy is based on actions to encourage the development of technological and scientific research such as governmental funding mechanisms. Traditionally science is funded through national budgets however the current internationalization of research has created a need and ambition to apply for international funds. Thus, the recent development of Mode 2 scientific practice with its trans-disciplinary, application oriented and socially distributed research require changes in national research policy. These changes might be new goals in research policy focusing on increased participation in international collaborations. I have based the national response on internationalization of Norwegian health research.

#### **5.1.1 Internationalization of health research**

In 2004, The Research Council of Norway (RCN) commissioned an external evaluation of Norwegian health research. The evaluation revealed an uneven pattern of international collaboration and stated that the potential of cross border collaboration is not being exploited. Isolationism and lack of international exposure both in research collaborations and visiting

scholars abroad results in Norway lagging behind the international community in particular research areas. The panel also evaluated co-authored publications and concluded that, with some exceptions, too many local publications in Norwegian are being produced. This is related to the general lack of international exposure (Norges Forskningsråd, 2004:13).

Subsequent to this evaluation the Norwegian Government initiated several actions to increase internationalization of health research. One of these initiatives was a national health plan which explicitly states that:

future priorities in health research aim at ensuring and exploiting national excellence through research and co-operation with international competitive research environments (own translation, St.prp, 2006-2007:291-294).

The plan further states that participation in international networks is important in order to get access to new forms for treatment and technologies within health research. New technology is initiated in many countries at the same time and it is important to gain as much knowledge and experience as possible regarding these technologies (St.prp, 2006-2007:286). An additional action is a follow-up report with suggestions on how to improve the health research situation. The report states that national and international collaboration projects must be included in the organizations strategies. There is also a need for researchers to participate in networks with a critical mass ensuring continuity, trans-disciplinary and high quality research activities. To be able to participate in these research activities organizations should facilitate the possibility for international research exchange (Norges forskningsråd, 2005:9).

Subsequent to the evaluation, health research has been the fastest growing research area in Norway and can therefore be considered one of the future priorities to the Norwegian Government. This also becomes clear from a recent White paper on research aiming to improve health, leveling social differences and developing high quality health services

(Report, 2008-2009:2). The White paper further states that international collaborations is important because they provide knowledge regarding the global health conditions and how it might affect the Norwegian population. This is why participation in international research programs is one of the main goals expressed by the Government (St.meld, 2008-2009:16).

The evaluation of health research clearly demonstrates a need for change in research policy aims related to internationalization of research. The national health plan, the follow-up report, and the White paper show actions in the direction of a more structured and proactive internationalization of research. These actions demonstrate that the Norwegian Government gives international research collaborations high priority. The increased focus on internationalization of health research indicates a need to protect the Norwegian population and prevent international pandemics. In this case, increased allocations and a need for up to date health research can be considered to constitute the science-society contract. The government priorities also take Mode 2 scientific production into account when encouraging participation in networks ensuring trans-disciplinary and high-quality research.

### **5.1.2 Health research in FPs**

The Ministry of Education and Research have recently developed a strategy on Norwegian collaboration with the EU on R&D. The strategy aims at increasing Norwegian participation in FP7 and developing a policy for participation in European research projects (Strategi, 2008:5). The need for a strategy on EU collaboration demonstrates the importance of participation in FP's to researchers and policy makers. In order to understand the value of FP projects to Norwegian researches it is useful to examine the development of participation throughout the last fifteen years. I will emphasize Norwegian participation in health research projects in FPs.

When Norway joined the FP in 1994 it opened up a completely new international research arena for Norwegian researchers. The funding program was a success from the very beginning and 85 percent of the scientists expressed that participation in FP4 was successful and that they would like to participate in future FP's (Strategi, 2008:53). Norwegian participation in health research projects including biomedical-, public health- and environmental research were characterized as satisfactory or very good (NIFU, 1997:66). Norwegian participation kept booming throughout FP5 due to corresponding thematic priorities in FP5 and Norwegian research policy. 80 percent of the researchers expressed satisfaction with FP projects and stated that the European community was crucial for carrying out the project (Strategi, 2008:54). Norwegian researchers were most active within the following research areas; food, nutrition, health and biotechnology (NIFU-STEP, 2003:41-45).

Norwegian researchers had at this point discovered the advantages of participating in FP projects. In FP6 participation was excellent in environment, transport, social science, humanities, food and energy. However, involvement in health projects and nanotechnologies was somewhat lower than expected (NIFU-STEP, forthcoming). Increased participation in health research projects is expected to return in FP7 with an improved emphasis on public health-, medical and epidemiological research. This provides good opportunities for Norwegian health research organizations such as NIPH. NIPH has increased its participation from one project in FP4 to fifteen projects in FP5 (NIFU, 1997:66 & NIFU-STEP, 2003:45). The research institute attended eight projects in FP6 which might be explained by the overall reduced participation in 'health'. NIPH researchers have good competence in public health research and will have better opportunities for participating in FP7 than its predecessors (Norges Forskningsråd, 2008a:11).

In summary, the increasing Norwegian participation throughout the FPs corresponds with national policy on internationalization of research. Health related research has been somewhat unstable throughout the FPs but is expected to increase in FP7 as it is one of the main priorities for the Norwegian government and the EU. The internationalization of national science and health policy show that Norway has ambitions to be part of the global scientific community. The fact that the Norwegian Government has developed a strategy aiming to increase participation in EU research projects might indicate a convergence towards the European arena. One can therefore talk of an Europeanization of Norwegian health research which is supported by the national health plan stating

there is a need for developing strategies that makes Norway prepared for competing for international research funds, especially the funds from FP7 (St.prp 2006-2007:286)

## **5.2 Organizational response**

In the theoretical framework I have described the general attitude towards international collaborations among Norwegian research institutes. Participation in international collaborations depends on individual initiative and there is little proof that institutes are exploiting international collaborations in their strategies. It is therefore interesting to look at how NIPH respond to external influence such as internationalization of research policy and participation in FP.

### **5.2.1 Internationalization of research**

| **Main findings:** NIPH wants to improve public health through national and international research collaborations. The institute has prepared strategies and structural changes to become an attractive partner in European research collaborations.

Participation in FPs is based on both organizational obligation and individual ambition.

### *Strategy for global public health*

NIPH has recently published a strategy for global public health with an overall aim to improve public health over a three-year period. The strategy states that NIPH shall focus on:

- being at the forefront in national and international research collaboration
- contributing to improved public health in Norway and elsewhere by participating in European and multi-national fora
- Improving public health in low- and middle- income countries by international research collaboration and capacity building

The three commitments are divided into sixteen pledges that NIPH must follow to improve public health in the years to come. One of these pledges states that NIPH wants to make experts available for international teams to combat diseases and epidemics. Another states that NIPH wants to be an attractive partner in international collaborations, by building an efficient organization with a professional dialogue on global health questions and best practice in project collaboration. The comprehensive and detailed strategy on global public health illustrates a proactive international commitment. This is confirmed by a respondent saying that the aim is for NIPH researchers to become more familiar with international collaborations such as FP projects. NIPH is already participating in more than a hundred international research collaborations around the world. These collaborations are well integrated in all five divisions of the institute (NIPH, 2008-2010a). International collaborations are therefore not a new arena to NIPH researchers. However NIPH has been missing a centralized organization of international research collaborations, especially with regards to European research collaborations. This might change with the strategy stating that involvement in European fora such as FPs is important to the future development of the institute and strategies. In contrast to

previous studies on internationalization of research in Norwegian research institutes, NIPH is exploiting international collaborations in their strategies.

The existing NIPH international collaborations can be summarized in the following three ways. First, the institute has extensive collaborations with leading research communities in Europe and in the USA. Second, the institute participates in international networks directed by WHO and The European Center for Disease Control (ECDC). Finally, NIPH collaborates with low- and middle- income countries where building capacities and mutual exchange of competence are core objectives (NIPH, 2009). The NIPH has through its recent strategies demonstrated that it is an internationally oriented organization. FP projects are important to the NIPH; however there are several other international research programs that also are of importance. The focus on positioning NIPH in the international society illustrates the fact that NIPH wants to be a part of a global scientific community where local and distant peers are significant for the scientists work.

### ***Structural changes***

In 2007, NIPH engaged an international director with the purpose of strengthening the international engagement of the institute. One year later, the institute hired an EU coordinator to be the NIPH central coordinator in relation to the European Commission, the RCN and other partners. One of the main motives for engaging an EU coordinator was the many questions coming from researchers related to applications and funding from the EU. The EU coordinator aims at solving this challenge by creating a joint structure and procedure for applications and reporting from FP projects. The aim for the new structure is to make NIPH appear as a professional organization in the EU system. This is further explained by a respondent saying

The diversity among the divisions requires different approaches in terms of helping out with FP applications. My goal is to establish a structure and a joint way of thinking in NIPH with regards to FPs. This structure requires a system for reporting from projects which eventually will facilitate the retrieval of data generated in FP projects (2805).

The EU coordinator goes on saying that she defines her job as being a ‘help desk’ assisting researchers through the application process and challenges that arises throughout the project. This will be facilitated by courses in writing FP applications and through an ‘EU forum’ where researchers participating in previous FP projects act as ambassadors for future participation. The researchers express their appreciation of having an EU coordinator at NIPH by saying

I think the EU coordinator is of great importance for many people at NIPH. It is nice to have a person that can help you understand all the forms required in the EU systems...completing the forms can be challenging in terms of understanding the legal language and audit requirements (2906).

The strategy on global public health and changes in structure towards an international oriented institute indicates that NIPH is adapting to the government goals on internationalization of research. This is in relation to neo-institutional theory where change is in accordance to institutionalized expectations. The NIPH conformity is constructed through symbols such as strategy and structural changes to fulfill its international commitments. However, as further explained in the next section of this chapter, this is not solely based on a ‘top-down’ obligation. The diversity among the divisions illustrates the structural differentiation and multiplicity of purpose at NIPH. These structural characteristics might contribute to the fact that NIPH is an organization which is ‘hard to move’ towards a collective action for organized internationalization. The new structure and joint thinking within NIPH is initiated to solve the challenges that occur when a large governmental organization is expected to pull in the same

direction. The new structure at NIPH can be seen in relation to Meulen (2002) entrepreneurial university particularly fit to capture funding opportunities such as FPs.

The focus on internationalization of research will also prevent path dependency where routines prohibit the institute to be open to new ideas and information. Exposure to the global scientific community will therefore increase its absorptive capacity. One of the actions taken in the direction of enhanced absorptive capacity is the gatekeepers in the EU forum. The EU forum consists of NIPH researchers helping to manage flow of knowledge from the European environment to the NIPH. FP projects will increase NIPH absorptive capacity through providing scientists with new perspectives resulting in the ability to recognize the value of new information, assimilate it and apply it.

### ***Participation as organizational obligation?***

NIPH is a governmental organization placed directly under the Ministry of Health and Care Services. The Ministry is therefore the main source of allocations to NIPH. Based on this information it is interesting to examine whether and how the Ministry or other authorities encourages the NIPH to participate in FPs.

From the Ministry's letter of allocations to NIPH it becomes clear that it expects the institute to gain best possible knowledge on elements that affect the populations' health. It also states that NIPH shall be in the forefront with regards to research both nationally and internationally (Statsbudsjettet, 2009). This indicates an external expectation to participate in international research collaborations such as FPs. Additional organizations encouraging NIPH participation in FPs is RCN, the Norwegian Directorate of Health, Innovation Norway and The Ministry of Foreign Affairs. It is important that NIPH researchers commit to tasks given by the Ministry.

However international collaborations are not only an organizational obligation it is also perceived as a bidirectional process where the NIPH has the possibility to discuss and contribute to the Ministry's strategies (2705).

Participation in FPs is primarily an organizational obligation which confirms the rule-based argument for Europeanization where participation in FPs is based on external expectations. This is confirmed by a previous evaluation on participation in FPs where government institutes are motivated to participate first and foremost to fulfill their commission from the state (NIFU, 1997:51). However, participation in FPs is not solely a 'top-down' process which means NIPH actively contributes to internationalization of research through own international initiatives. The fact that international collaborations are not solely an organizational obligation but also a bi-directional process between NIPH and the Ministry indicates a possibility to compromise between rules and needs. It also shows that the Europeanization of NIPH is based on internal motivational factors using rational calculation. This is based on awards that accumulate from FP projects such as access to markets, funding structures and organizational reputation. International reputation is also important to other research institutes illustrated in the evaluation of FP4 (NIFU, 1997:83). These elements confirm the fact that Europeanization of NIPH is based on both rule-based argumentation and rational calculation. Assuming reputation and attractiveness is important to NIPH it is interesting to examine what researchers think make NIPH an attractive collaborative partner in FPs.

### ***Why collaborate with NIPH?***

The wide availability of health surveys, bio banks and health registers make NIPH able to solve challenges in FP projects that other research communities might not be capable of. This

is explained by one of the respondents saying “I think we are ahead of others, including Scandinavian countries, when it comes to bio banks and health surveys” (2906). This is confirmed by the assisting director who states that “bio banks and health registers are perfect opportunities for NIPH to position ourselves in the international research community. This altogether creates a unique foundation for future R&D” (Norges forskningsråd, 2008b:5). Another respondent agree with the advantages of registers by saying “the registers are unique because NIPH can monitor the Norwegian population from they are born until they die using data from the social security number, prescription register, vaccine register and death register...this facilitates longitudinal studies on genetics and environment” (2705).

The registers stem from the initial commitment of NIPH, namely diagnostics and prevention of diseases. The reorganization of NIPH into a center of competence created a diverse knowledge base resulting in increased attractiveness in national and international research collaborations. The exceptional registers and the diverse knowledge base make the institute an attractive partner in FP projects.

### **5.2.2 Motivation for participation**

| **Main findings:** Main motivations for participation are access to networks and increased competence. The 50 percent requirement influence the decision of joining projects and the NIPH participation have until recently been dependent on individual initiative.

#### ***Valuable professional networks***

FP projects are becoming increasingly important to NIPH and the institute has ambitions to increase the amount of applications and number of projects coordinated by the NIPH (2705).

Previous evaluations on participation in FPs illustrate the importance of close relations between the FP project and the institutes research activities (NIFU, 1997:80). This is also confirmed by a respondent saying

we do not start new research activities because the FP is changing...we sometimes adjust to the FP but we never change. It is important to emphasize that our first priority is to fulfill tasks from the Ministry (2705).

Nevertheless, FP projects are valuable resource pools to NIPH researchers. This can be deduced from the fact that researchers continue returning to new projects explained by one respondent "the networks seem important because we see researchers joining projects several years in a row...this creates an enhanced awareness of the future that lies within network projects" (2805). Improved competence and new knowledge among NIPH researchers are the most important motivational factors to participate in FPs. This is also apparent in previous evaluations of participation where motivational factors include ambitions to join the research front, networks, increased competence and skills (NIFU, 1997:105). Access to networks and resources are more important than financial resources from FP projects. This is confirmed by one of the respondents saying

I assume that the most important asset is networks above financial resources...I think that the researchers who participate in FP projects choose to join because they have a professional interest in the project. It might be due to personal progress, developing a certain competence or the general interest in the topic (2805).

The fact that NIPH participates in FP projects mainly to increase already existing competence indicates that projects are important but not vital to researchers. NIPH researchers have many important activities in their daily work such as basic and commissioned research. The majority of FP projects are therefore used as supplementary research. This can be related to

Bozeman (2000) preconditions for knowledge transfer were he found that government laboratories prioritize commission from state before collaborative research. Financial resources not being a motivational factor can be explained by the fact that the institute gets the majority of its allocations from the Ministry and it is not dependent on EU money.

### ***Financial requirements***

The cumbersome financial requirements to participate in FPs are one of the reasons why NIPH researchers decide not to participate in FP projects. NIPH researchers participate in 'shared cost' projects where 50 percent of the project cost must be covered by the institute. One of the respondents explained how the financial requirement might determine participation in FP projects by saying

The 50 percent requirement leads to budget discussions in the divisions. The division director ultimately decides whether the division has money to cover their part of the project. The requirements for self finance force the divisions to decide whether this is important to NIPH or not (2805).

Another respondent informed me that the financial requirement might not be an obstacle for participation from FP7 onwards. This is due to the fact that the EU covers almost 100 percent of the costs in future FPs (2706). However, the financial requirement is currently determining NIPH participation in FPs. This is also apparent in the previous evaluations of FP participation of Norwegian research institutes (NIFU, 1997:95).

### ***Organizational or solely individual?***

Participation in FP projects is important to both researchers and management, but is it embedded in the organization of NIPH? I asked the respondents whether NIPH participation was organizational or solely individual and got the following answers:

Our division gets few requests as an organization...the majority of requests is directed towards one single researcher. When researchers receive an invitation, we discuss whether we should join the project. If no one is interested or know anything about how these projects works we have no intentions of participating (2906).

The fact that FP activity is based on individual/divisional engagement illustrates a differentiated structure where ‘each department is a world in itself’. This is confirmed by another respondent saying that “for the time being participation in FPs is quite decentralized...the future goal for participation in FPs is that procedures must be centralized” (2706). Previous evaluations on participation in FPs also indicate the importance of individual engagement among research institutes (NIFU, 1997:80).

Additional factors that might explain the decentralization of participation in FP projects are ‘drawer applications’. This phenomenon is further explained by one of the respondents saying

Some of the FP applications are not registered and we occasionally discover what we call ‘drawer applications’, where researchers apply for EU funds without notifying anyone else. Suddenly there is money coming in on an NIPH account and no one knows where it is coming from. In some cases the accounting department must call researchers and ask whether they have applied for money from the EU (2706).

It is important to add that NIPH has not discovered any ‘drawer application’ in the last two years which turns this into a minor problem compared with previous years. However, the ‘drawer applications’ have illustrated that participation in FPs are individual rather than organizational. It also indicates a need for a centralized administration connected to international collaborations. Evaluating the results one can conclude that the participation in FPs is individual or divisional rather than organizational. However, there are signs of

organizational engagement in FPs such as assigning researchers to projects or making sure that someone else takes over a project that other NIPH researchers had initially been involved with. This is confirmed by four respondents saying that their involvement in FP projects did not come on their own initiative but because of the obligation to take over the participation in projects (1806, 0606, 2905 & 0207). This is a sign of organizational flexibility where NIPH is able to respond quickly to changes that might arise. Participation in this sense might be perceived as partly organizational because the NIPH strives to find replacements to finish a FP project which illustrates that these projects are important to the NIPH.

To summarize, the NIPH has made recent changes in both strategies and structure to adapt to the increasing internationalization of research. These changes have been made because of organizational obligation and individual initiative. Motivational factors for participating in FP projects are access to networks and competencies rather than financial resources. The financial requirement determines NIPH participation in FP projects because of difficulties covering the expense from NIPH's own budget. NIPH is a decentralized organization and participation in FP project has until now remained mainly individual or divisional. The recent changes might contribute to a more centralized focus on participation in FPs. Initiatives to facilitate application processes and information through 'EU forums' are steps towards building a centralized international commitment. Considering the fact that participation is currently highly dependent on individuals makes it interesting to examine the individual response to participation in FP projects.

### 5.3 Individual response

In the theoretical framework I have described determinants for successful research collaborations such as motivation for knowledge transfer, shared norms, trust and collaborative ties. In the following I will examine whether these factors are important to NIPH researchers when participating in FP projects.

#### 5.3.1 Preconditions

- | **Main findings:** NIPH researchers are invited to join projects but are reluctant to coordinate a FP project. Main motivational factors are access to knowledge and resources in addition to sharing data from Norwegian registers.

#### *Initiation of the projects*

The respondents are invited to join the FP project because of required competence. This is further explained by one of the respondents saying “our sister organization recommended us as partners because of our competence within this research field” (1806). The fact that researchers were invited to join the projects demonstrates that NIPH is an attractive partner in research projects. When asking additional questions on initiation of the project, I got the impression that there are usually some key persons involved in the process. These key persons are researchers with extensive knowledge on how to get financial resources from FP projects. This is confirmed by one respondent saying “these people know how the policymakers are thinking and how they prioritize the different thematic project areas within the FPs” (2906). The experienced EU researchers also tend to have the capacity to participate as a coordinator in a series of FP projects. This might be due to help from external resources explained by one of the respondents saying

these people were very professional and used an advisor from PWC<sup>6</sup> for writing the application...it was rather frightening because I got the impression that this is not something you would want to do on your own. Because of the professionalism in the planning stage it was easy to participate but it seemed difficult to manage the process (3006).

The phenomena of experienced FP researchers might indicate a ‘Matthew effect’ in FPs. The social selection of researchers is determined by access to external resources such as consultancies. This development might eventually lead to concentration of scientific resources and talent in applying for FP funds. The recent changes in NIPH with regards to international commitment might facilitate the administrative workload for a future NIPH coordinator. NIPH researchers might therefore be able to take on more responsibility in future FPs.

### ***Motivation for participation***

The main motivational factors for participation in FP projects are access to external knowledge and resources in addition to sharing competence and data from registers and bio banks. This is confirmed by two of the respondents saying “access to external knowledge is an important motivational factor because there is a need for improved competence in specific research fields” (0606 & 0207). The NIPH researchers are also motivated by the fact that FP projects generate new collaborators and opportunities to conduct in-depth research on specific areas (3006). These results indicate that participation in FP projects is intrinsically motivated through ambitions of improved competence and opportunities to achieve self-set goals. All the respondents seem to be motivated intrinsically which is beneficial trying to avoid the ‘crowding-out effect’ where participation in FP projects would only be based on financial incentives.

---

<sup>6</sup> PWC is an abbreviation for PricewaterhouseCoopers. PWC is a consultancy firm within assurance, tax, transactions and performance improvement.

The majority of NIPH respondents participate in projects related to surveillance, mapping and developing methods. Even though the projects are not directly related to R&D they require collaboration for staying up to date on international protocols etc. This is supported by one respondent saying “FP projects are important in terms of resources and preparedness to combat diseases” (2906). Another respondent also elaborate on this by saying

Network and competence enhancing activities is not directly related to R&D. However, it still very useful as it eventually might lead to research...it will also be easier to know whom to contact if you already have been collaborating on exchanging data (0606).

The knowledge connected to registers, surveillance and mapping might be described as explicit knowledge which is easily transferrable. Nevertheless, researchers would have to participate in projects to synchronize population data and to be able to validate their research results. Data from registers are often context specific determined by rules and routines. Thus the knowledge transfer in projects on registers and mapping also contains a tacit dimension. This is why FP projects are crucial in terms of transferring both tacit and explicit knowledge. The FP projects also facilitate access to researchers and knowing whom to contact in order to get information related to a specific research topic. This is referred to as know-who and indicates the fact that broadening the social and scientific network is an important determinant for participation in FP. The social and scientific networks can contribute to increasing the human capital of scientists consisting of scientific, technological and social skills required to achieve successful research results.

Finally, one of the respondents focused on the awards coming from the FP projects such as ability to learn new things. In this case, the researcher is using rational calculation of what is profitable to her division when describing motivation for participation

Our division mainly has practical responsibilities and does not always get the opportunity to participate in these great projects as much as the divisions that have a larger level of R&D intensity. I am therefore of the impression that if we get the opportunity we should join the project and see what we get out of participating and what we can learn (3006).

The fact that researchers want to extend their knowledge base on their own initiative illustrate how researchers actively contribute to process of internationalization of research.

### 5.3.2 Interactional experiences

| **Main findings:** Former collaboration, trust and collaborative ties facilitate knowledge transfer in projects. The growing size of FP project groups might deteriorate research and collaboration in project meetings. Disciplinary and national differences might create obstacles and opportunities in projects.

#### *Arenas for knowledge transfer*

One of the main arenas for knowledge transfer is the project meetings. The NIPH researchers are busy people and the FP projects are usually something that the researchers do in addition to their daily work. For that reason, researchers consider carefully whether participation in meetings is necessary for completing their part of the project (2905). Some of the respondents have expressed dissatisfaction with the growing size of the FP project groups. This might deteriorate research and the relational dimension in projects such as trust, shared norms and mutual obligations. This is further explained by one of the respondents saying “there are simply too many people meeting each other only occasionally” (1806). This is supported by another respondent who explains how numerous partners are making the project ungovernable

you have to create your own small networks within the system to make this work...you cannot handle all the information and, as a researcher, you are not necessarily too interested in all of it either (2906).

In this case, creating networks within networks is beneficial. However, it might create closed networks that counteract norms of sharing knowledge and competence with the whole research group. The reason why small networks occur can be explained by a common scientific language, codes and shared narratives also known as the cognitive dimension of social capital. During my observations I noticed scientists who created small networks in order to work more closely on laboratory protocols. Thus, the small networks might counteract or contribute to effectiveness in the project depending on the need to discuss complexity of a task with the whole consortia. Although projects and meetings tend to grow too big they are still essential for scientists to be able to share their tacit knowledge. This especially counts for laboratory work demanding considerable effort to acquire and is confirmed by one of the researchers saying “getting together made me realize that we have interpreted the laboratory protocols differently” (1006). This also constitutes the fact that knowledge sharing, especially with regards to protocols, is a dynamic process based on a mutual learning process.

### *Collaborative ties*

Research collaborations funded through FPs consists of both formal and informal ties between partners in an organized setting. The FPs is not created exclusively for select groups but open for a wide range of researchers throughout Europe. Observing the FP project and interviewing researchers, I learned the importance of strong collaborative ties. Strong ties have developed throughout the projects creating an informal atmosphere for knowledge transfer. This is further explained by a respondent saying “one gets to discuss professional topics in a more

relaxed atmosphere” (2905). This relates to the ability to make connections to others within a community and is described as the structural dimension of social capital.

The relational dimension of social capital facilitates the development of trust, shared norms and mutual obligations. These assets are especially important when transferring tacit knowledge which is further described by a respondent saying “mutual trust is important with regards to getting to know each other; one needs to know what the other person can offer to the project” (2905 & 1006). Some respondents imply that mutual trust between researchers from Scandinavian countries is often high because they have the same level of competence and are thinking in the same terms (1806). This illustrates the cognitive aspects of collaboration such as trust, common language and codes. During my observations I learned that the majority gained personal contact throughout the project period which illustrates the importance of strong collaborative ties. This is further explained by one of the respondents saying “we have become almost like a family, in good times and bad” (1006).

Collaborative ties in the projects are most likely to be strong due to a common interest in the subject field. Thus, strong ties between partners in terms of previous collaborations determine whether NIPH researchers join FP projects. One respondent told me about her experiences related to previous interactions saying “I realized that we knew one of the partners because we have been working together within the same research field earlier” (1806). The strong ties that occur as a result of previous collaboration might counteract formation of new ties or the emergence of new ideas. Strong ties might therefore create path dependency whilst weak ties can produce innovative ideas. One respondent told me how it is important to be aware of these factors when working together in projects

if you stick to the people you already know, I think you become inflexible. In certain research fields there are rapid technological developments which

require updated knowledge about these procedures. The youngest researchers have the ability to learn new technologies faster than the traditional research community that tend to settle with old procedures. I think it is important to have people around you that seek new technologies and new ways to solve problems (2906).

Collaborative ties between partners in FP projects might also affect whether they decide to engage in future collaborations. This is further explained by one of the respondents saying “it is important to be a part of the projects due to the networks they create...it might even result in new projects after this have been completed” (1806). Based on answers from the respondents I assume that there is certain selectivity in terms of choosing partners for future collaboration (2905). This has been further explained by a respondent saying “I hope that we will carry on our collaborations with some of the partners because of their competencies within this field” (3006). Previous evaluations show that researchers who have gained personal and professional contact throughout FP projects tend to keep in touch through future collaborations (NIFU, 1997:117-119).

Researchers might choose to collaborate because of a shared discipline which facilitates knowledge transfer through shared codes and scientific language. However, disciplinary differences can create both obstacles and opportunities in FPs.

### *Disciplinary differences*

The FP projects usually consists of scientists from different disciplines working together to solve challenges related to areas like global public health. Some respondents find interdisciplinary collaborations challenging and explain this by the fact that it is difficult to communicate a professional point of view to the project management because of disciplinary differences (1806). The disciplinary differences might in this case counteract efficient

research collaborations. Contrary to Mode 2 scientific knowledge, trans-disciplinary collaboration in this specific project might not be beneficial.

Trans-disciplinary collaboration may on the other hand be profitable in terms of access to knowledge and resources from other disciplines. Examples of such profitable collaborations are research projects within epidemiology relying on competent statisticians to analyze their results. The statisticians are not always easy to find and FP projects are therefore effective channels of getting access to their knowledge (2906). This indicates the importance of trans-disciplinary collaboration in Mode 2 scientific production where experts from a wide range of backgrounds create stimulating work environments trying to solve a specific problem. In addition to disciplinary differences researchers also experience national and cultural differences that might represent obstacles or contributors to effective knowledge sharing.

### *National and cultural differences*

National and cultural differences among the researchers might have an impact on the efficiency and workload distributed in the FP project. This is confirmed by one respondent saying

there are certain differences between Northern and Southern Europe with regards to respecting deadlines...our partners from Southern Europe do not deliver the results within the deadlines; they only consider deadlines as a guiding principle (1806).

In this case, the cultural differences might deteriorate the progress of the project. Another obstacle connected to national differences is the lack of shared language, codes and narratives. This might lead to frustration which is further explained by one of the respondents saying “there have been some friction among the partners due to the different cultural backgrounds

and the way we express ourselves...it has not been easy to understand the other partners' intentions" (2905). The FP project is a meeting place for many different cultures and nationalities. In some cases this might lead to clustering of nationalities within the project, further explained by one respondent saying "it is useful to include the countries that want to join the FP projects...however, the Eastern European partners in this project tend to create small groups which make it difficult to get them to join the whole project group" (0207).

On the other hand cultural differences within FP projects are not significant compared with other international research collaborations. This is confirmed by one of the respondents saying "one of the advantages with European research collaborations is that the countries are less different compared with other countries outside Europe. European countries are not similar nor that different from each other either" (3006).

### 5.3.3 Effects and relevance

| **Main findings:** The majority of respondents have positive experiences with FP projects. FP projects are both relevant to the government and in relation to NIPH strategy of global public health. However, researchers express a need for assistance with administration of FP projects.

#### *Satisfactory preliminary results?*

At the time of study most of the FP projects were ongoing or recently finished. Some respondents say that they have already reached satisfactory goals because the projects are solely a collection of data and registration (0207). Thus, the goal of the project is to share data and knowledge, not necessarily create new knowledge.

Some respondents described obstacles in the process that might also determine the results of the project. This is confirmed by a respondent who predicts that parts of the project will remain incomplete due to overly optimistic aims resulting in difficulties to reach some of the subordinate goals (1806). Another obstacle is to have the reviewers of publications on a specific topic acknowledge the results. One of the projects has developed a research method which is dependent on reviewers recognizing the results to be able to publish them. According to one of the respondents, the skepticism related to the method is a result from badly reviewed papers on the topic. The determinants for the project to succeed are therefore scientific rather than administrative. One of the researchers explained that passing this obstacle is “like banging my head against a brick wall” (1006).

### *Relevance of study*

Considering the fact that NIPH is mainly working on commission from the state, the majority of the results are relevant for the Norwegian Government. This is also evident in the evaluation of previous participation where the majority thinks that project results are important to governmental administrative bodies (NIFU, 1997:110). Many of the projects are also relevant to the legislative authority in terms influencing law regulation (1806). The projects relevance to governmental actions is confirmed by a respondent saying “the results from the project are quite successful considering the fact that some of the countries involved have experienced a reduction in the use of medications” (2905). In addition to changes in national legislation, the projects also aim at improving public health through bio banks<sup>7</sup>. This is one of the main goals in the recently published White paper on research and therefore depicts relevance of study on the national level (St.meld, 2008-2009:44).

---

<sup>7</sup> Please see Appendix D for a project overview

In addition to being relevant to governmental actions the projects also help NIPH fulfill the tasks given to them by the Ministry. This is confirmed by one of the respondents saying “the project makes the partners and the European countries better suited for solving tasks given to them from the state” (0606). Another respondent adds the importance of how NIPH researchers might profit from working in diverse research environments saying “FP projects improve NIPH research and activities because the researchers experience how things can be done differently, absorb knowledge from other disciplines and be able to keep in touch with their peers” (2906). Another respondent elaborates on the fact that participation in FP projects contribute to maintaining NIPHS excellent reputation in the global scientific community. She says that

NIPH researchers should contribute to position Norwegian health research in the European community through data and registers. Consequently, Norwegian researchers can compare data and registers with the rest of Europe to get an overall impression of the health conditions of the entire European population (2905).

### *Other experiences*

Generally, NIPH researchers have positive experiences with participation in the FP projects emphasizing the following outcomes of collaborations: professional experience, experience with working in international research projects and professional inspiration. This is confirmed by the one of the respondents saying

researchers should not be scared to join a project if they get the chance because it is a very good experience. Still, I would be a bit careful with taking on the responsibility of coordinating a project because then you really have to know what you are doing (3006).

Another respondent told me that deliverables in FP projects creates a certain ‘lock in’ for the research activities. The EU can in these terms be understood as a control bureaucracy that

nearly paralyzes the research activities because of the requirement of submitting forms. The respondent says that research is most productive when it has open themes and goals that can be adjusted throughout the project (2906).

### ***Future recommendations***

The respondents also have some future recommendations on how researchers can benefit from participating in FP projects. Several respondents express the need for assistance with the administrative part of the FP project saying “we never want to take the initiative of such a project in the future because of the amount of administrative work... the institute should appoint someone to solve this” (1806). Another recommendation related to future participation is decreasing the amount of partners, especially if the researchers want to pursue R&D in addition to registrations. This is confirmed by one respondent saying

FP project should consist of smaller groups with active researchers within the research field. For doing research in these projects one need to exceed the mere registrations of patient data and also do research related to those data...this is impossible with the amount of partners in today’s FP projects (0207).

Finally, a respondent has recommendations for participation related to projects with blurry goals saying “you have to have a clear goal of why you want to participate in the project and you have to find it interesting and fun to work with. I think that researchers should keep away from blurry projects...I do not think you should join EU project at any cost” (0606).

## **5.4 Summary of the empirical analysis**

The overall impression as presented in this empirical chapter is that internationalization of research is well integrated at the national, organizational and individual level. An evaluation of Norwegian health research illustrates an uneven pattern of international collaborations,

visiting scholars abroad and co-authored publications. The evaluation called for governmental action to increase internationalization of health research including a national health plan. The increasing participation in FPs, have resulted in a strategy on Norwegian research collaborations with the EU. Previous evaluations indicate that participation in health research projects has been somewhat unstable throughout the FPs. Health research was booming throughout FP4 and FP5 but the number of projects decreased during FP6. The NIPH increased their participation from one project in FP4 to fifteen projects throughout FP5. NIPH participated in eight projects in FP6 explained by the low level of participation in 'health' in general. Participation in health research projects is expected to recover throughout FP7 due to a greater emphasis on health research both in the EU and Norwegian policies.

The NIPH wants to improve public health conditions through national and international research collaborations. The institute has developed a strategy on global public health and hired an international director and EU coordinator. The changes are initiated because of adaptation to governmental goals but also due to ambitions of becoming an attractive partner in European research collaborations. The main motivations for participation are access to the networks and increased competencies. The 50 percent requirement is a negative determinant for joining FP projects and the participation have until now been dependent on individual initiative. Most of the respondents say that projects are important but not fundamental.

NIPH researchers are invited to join the projects but are reluctant to coordinate a FP project. Main motivational factors are access to knowledge and resources in addition to sharing data from Norwegian registers. According to some researchers the growing size of FP project groups might deteriorate research and collaboration in project meetings. Former collaboration, trust and informal ties facilitate knowledge transfer in projects and disciplinary and national

differences might create obstacles and opportunities in FP projects. Cognitive and relational elements such as trust, shared norms and language are important when it comes to tie formations in FP projects. The majority of the respondents has positive experiences with FP projects and says that the projects are relevant to government and to NIPH strategy. To be able to increase the participation in projects or take on a coordinator role, the researchers express a need for assistance with administration of FP projects.

---

## CHAPTER 6: CONCLUDING REMARKS

---

### 6.1 The main findings

In this thesis I have, based on STS- and organizational theory, examined three different levels of internationalization of research with a main focus on the European Framework Program. I have proposed expectations to the national, organizational and individual response and I have examined the actual response on the three levels. What have been the main aims for this thesis is to examine how NIPH as an organization has adapted to the funding opportunities that have developed at the European level in the area of health research. In addition I have looked at how NIPH researchers respond to participation in the FPs and the factors that affect this response.

This thesis shows that research on the national, organizational and individual level is highly influenced by the European sphere. Science on the European level has emerged from rather unsuccessful attempts to coordinate research and technology to the world's largest funding program for research. We have seen how the FPs expanded in size and scope since it was established and that the scientific fields grew to encompass health research as a major funding opportunity at the European level. Norwegian research policy takes the increased focus on European research collaborations into account when developing future aims for research. Developing national research policy in relation to the European arena is a consequence of the science-society contract where science is expected to be useful to industry, government or society at large. Thus the international dimension of science becomes a political product that needs to be taken into consideration and prioritized when formulating aims for research policy. The empirical analysis indicates an increased focus on internationalization of national research policy, particularly with regards to health research. The RCN evaluation on

Norwegian health research concluded that the potential of cross border collaboration in health research is not exploited. Thus isolationism and lack of international exposure results in Norway lagging behind the international community. Consequently a national response consists of policy documents and strategies focusing on the importance of international collaborations, especially European research collaborations. European research collaborations provide important knowledge regarding global health conditions and how it might affect the Norwegian population. This is why the Norwegian Government has developed a strategy on how to increase and make better use of the future participation in FPs. The strategies and policy documents reflect Europeanization of national research policy which in turn affects governmental research organizations such as the NIPH. Based on these observations it is safe to say that national research policies strengthen the FP funding opportunities for Norwegian researchers. There are also clear expectations from core national actors for increased participation in FPs.

The organizational response to funding opportunities developed at the international and European level indicates a change in strategy and structure in NIPH. The strategy for global health aims to improve public health through participation in European and multinational fora. In addition, structural changes in NIPH consist of an international director and an EU coordinator to facilitate and encourage participation in FPs. The fact that NIPH participation in health research projects have increased throughout the last three FPs also indicates a convergence towards the European arena. These changes are initiated based on adaptation to governmental goals but also due to ambitions of becoming an attractive partner in European research collaborations. Thus, NIPH participation in FP projects is based on both organizational obligation and individual initiative. External elements such as policy documents and letter of allocations are highly influential. However, internal motivational

factors such as increasing the organizational knowledge base and reputation through FP projects are just as important. The participation in FPs can therefore be perceived as a bidirectional process where NIPH can discuss and contribute to strategies developed by the Ministry on internationalization of research. Based on these findings the argumentation for participation originates from both complying with 'state rules' and rational calculation of what is profitable for NIPH as an organization. The rational calculation of participation in FPs can be related to absorptive capacity where research collaborations provide researchers with new perspectives on a diverse set of research areas. This will in turn increase NIPH absorptive capacity. To summarize, NIPH responds to opportunities for research collaborations provided by the FPs and the increasing focus on internationalization in different ways. These are global strategies, change of structure and a bidirectional adaptation to the European arena based on external expectations and rational calculation of what is profitable for NIPH as an organization. In addition the international collaborations are highly dependent on the individual researchers' initiative and ability to create contact.

The empirical analysis shows that even though NIPH is highly engaged in FP projects, the researchers only participate in projects that are closely connected to their daily activities. Hence, NIPH adapts through changes in administration and increased participation but not with regards to priorities within NIPH research areas. The fact that NIPH considers FP projects as supplementary to their daily work makes it difficult to speak of Europeanization of NIPH. Additional elements of interest are the organization of NIPH illustrating a differentiated structure where 'each department is a world in itself'. The participation in FPs is therefore individual or divisional rather than determined at the organizational level. However, results from the empirical analysis show signs of organizational engagement in the sense that NIPH strives to find replacements to finish FP projects. This indicates a partial

Europeanization through change in strategy, structure and some organizational engagement. However, participation in FP projects is still based on individual initiatives and it is therefore a long way to go before this is centralized in NIPH. Establishing a centralized FP participation might be perceived as a radical break with the existing practices of the NIPH researchers. Being a large and decentralized organization the NIPH has adapted to the European research arena in a decentralized manner. This is not unusual as governmental research organizations are generally perceived as 'hard to move'. Thus, organizational features of NIPH might affect whether a centralized organization of international participation is considered appropriate.

The high level of individual engagement in NIPH and other Norwegian research institutes spurred my interest for studying the individual experiences with participation in FP research collaborations. The individual response in the empirical analysis shows that the researchers are invited to join FPs projects due to required competence. Researchers are motivated to participate but are reluctant to start a project due to lack of administrative help. This indicates that there is a need for a centralized administration in NIPH with regards to international research projects. However, the decentralized structure indicates a 'bottom-up' approach where researchers decide which organization they want to collaborate with. NIPH researchers are motivated to participate in FPs to enhance professional accomplishments and access to external knowledge. This is something that should be further emphasized in future participation as financial incentives for participation in FPs would result in the 'crowding out' effect. Internal motivational factors for successful FP projects are transfer of both tacit and explicit knowledge. NIPH researchers attend both R&D projects and projects related to surveillance and registers. R&D projects usually aims at developing new research methods or technologies where researchers need to transfer both tacit and explicit knowledge. Projects related to surveillance and registers require transfer of explicit knowledge such as rules and

procedures related to the registers. However, rules and procedures might have a tacit dimension related to the national context in which the procedure has been developed. Thus there is a need for transfer of both tacit and explicit knowledge in both project types. The access and transfer of tacit and explicit knowledge in FP projects contribute to enhancing NIPH absorptive capacity which might lead to increased participation in FP projects.

Additional factors that affect experiences with participation in FPs are related to collaborative ties and trust among the researchers. The researchers see advantages with both strong and weak ties in FP projects. Strong ties are established because of previous collaborations or because researchers have become familiar with each other throughout the project. The strong ties among collaborators might create 'networks within networks' which can contribute or prohibit effectiveness in a project. The 'strength of weak ties' is confirmed by one respondent when describing how researchers can use FP projects to get updated knowledge related to new methods or technologies. Disciplinary and national differences are related to common language, codes and shared narratives. Thus, the trans-disciplinary and trans-national nature of FP projects can be perceived as both a facilitator and an obstacle. Despite a few difficulties, the NIPH researchers are satisfied with FP projects and say that the results are relevant to the Government and the overall NIPH strategy. This confirms a partial convergence towards the European research arena.

## **6.2 Suggestions for future research**

Considering the fact that I am studying only one organization in this thesis makes it difficult to generalize to other organizations. By comparing cases in different research areas one would discover other external and internal factors that encourage or prohibit internationalization of research. Future research might therefore examine additional thematic priorities that are

closely connected to priorities in research policy such as ICT or environmental studies. It might also be of interest to examine other Norwegian research institutes response to opportunities for research collaborations provided by the FPs. Additional suggestions for future research is conducting a longitudinal study focusing on organizational participation throughout several FPs. A longitudinal study would be able to explain changes in NIPH and its response to opportunities within the FP. Organizational change in governmental research organizations tend to be a lengthy process which confirms the need for a longitudinal study. In the case of NIPH, one might be able to reveal additional elements by adding respondents such as government officials or the entire NIPH management. Using statistics from evaluations of participation in FP projects have been useful when analyzing one specific case. It might therefore be rewarding to conduct other studies based upon statistics from previous evaluations of participation in FPs.

### **6.3 Connecting Europe through research collaborations?**

The Framework Program makes international research collaboration possible. Participation in FP projects is important not only to face global challenges but also to increase the organizational and national reputation and future collaboration among European researchers. Thus, organizations and individuals are highly adaptive to the changes that occur in the European sphere. This thesis has shown that European research collaborations are crucial for individuals, organizations and nations. Even though it is not sufficiently embedded in the organization it still is an important knowledge supplier to NIPH and national research policy. In this respect it might be interesting to ask whether the NIPH participate in FPs because of the financial resources, national expectations or because of possibilities in international research collaborations. In the case of NIPH a combination of national expectations and possibilities for international research collaborations are the most important determinants. The

aim of a centralized administration related to international collaboration can be considered as a direct consequence of national expectations. However, participation in FPs is still highly dependent on individual initiatives and can therefore be used as the main explanation to why NIPH participate in FPs. Based on the empirical analysis the financial resources resulting from FPs might not be of significance because the main source of allocations to the NIPH is the Ministry of Health and Care Services. This might change if the national research funds are reduced and FP financial resources appear as a necessity to NIPH research communities. The organizational convergence towards the European arena can be explained by national expectations to increased internationalization of NIPH research. The fact that the convergence is partial is related to the differentiated structure of NIPH where participation in FPs is based on individual initiative rather than organizational obligation. The NIPH management and administration might therefore find it challenging to balance information and incentives and leaving initiative to join FP projects to the divisions and individuals.

Returning to the introductory quote by Merton and Storer, one sees that this study supports, maybe even underlines, the fact that research collaborations are important to scientific inquiry. This counts for individual researchers, organizations and nations and supports the assumption that the Framework Program connects Europe through research collaborations.

---

## LIST OF REFERENCES

---

- Asdal, K., Brenna, B & Moser, I. (2007) *Technoscience: The politics of interventions*. Oslo: Unipub.
- Bozeman, B. (2000) Technology transfer and public policy: A review of research and theory. *Research policy*, 29, 627-655.
- Cetina, K. K. (1995) Laboratory studies: The cultural approach to the study of science. In Jasanoff S., Markle, G.E., Petersen J.C & Pinch, T. (Eds.). *Handbook of science and technology studies* (pp.140-167). Thousand Oaks: SAGE publications.
- Clegg, S, Kornberger, M & Pitsis, T. (2005) *Managing and organizations: An introduction to theory and practice*. London: SAGE publications
- Cohen, W.M. & Levinthal, D.A. (1990) Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 1, 128-152.
- Coleman, J.S. (1988) Social capital in the creation of human capital. *The American Journal of Sociology*, 94, 95-120.
- Cozzens, S.E. & Woodhouse, E.K. (1995) Science, Government, and the politics of knowledge. In Jasanoff S., Markle, G.E., Petersen J.C & Pinch, T. (Eds.). *Handbook of science and technology studies* (pp.533-554). Thousand Oaks: SAGE Publications.
- Crane, D. (1972) *Invisible colleges: Diffusion of knowledge in scientific communities*. Chicago: The University of Chicago Press.
- De Solla Price, D.J. (1986) *Little science, big science...and beyond*. New York: Columbia University Press
- Dittrich, K. (2004) *Innovation networks: exploration and exploitation in the ICT industry*. Doctoral dissertation. Technische Universiteit Delft, Delft.

- Easton, G. (1992) *Learning from case studies*. 2<sup>nd</sup> ed. Hertfordshire: Prentice Hall.
- Edge, D. (1995) Reinventing the wheel. In Jasanoff S., Markle, G.E., Petersen J.C & Pinch, T. (Eds.). *Handbook of science and technology studies* (pp.3-25). Thousand Oaks: SAGE Publications.
- Elzinga, A. & Jamison, A. (1995) Changing policy agendas in science and technology. In Jasanoff S., Markle, G.E., Petersen J.C & Pinch, T. (Eds.). *Handbook of science and technology studies* (pp.572-598). Thousand Oaks: SAGE publications.
- Gibbons, M. (1999) Science's new social contract with society. *Nature*, 402, 81-84.
- Gibbons, M. (2000) Context-sensitive science: Mode 2 society and the emergence of context sensitive science. *Science and Public Policy*, 27, 159-163.
- Gornitzka, Å. (1999) Governmental policies and organizational change in higher education. *Higher Education*, 38, 5-31.
- Gornitzka, Å. & Maassen, P. (2004) Europeiske universiteter mellom marked og myndighet. In I. M. Larsen & B. Stensaker (Eds.). *Tradisjon og tilpasning – Organisering og styring av universitetene* (pp. 35-58). Oslo: Cappelen Akademisk Forlag.
- Gornitzka, Å. & Langfeldt, L. (2008) The internationalisation of national knowledge policies. In Å. Gornitzka & L. Langfeldt (Eds.). *Borderless knowledge: Understanding the "new" internationalisation of research and higher education* (pp.141-171). Dordrecht: Springer.
- Granovetter, M.S. (1973) The strength of weak ties. *The American Journal of Sociology*, 78, 1360-1380.
- Hatch, M.J. (2006) *Organization theory – modern, symbolic, and postmodern perspectives*. 2<sup>nd</sup> ed. Oxford: Oxford University Press.
- Lassen, H.M. (1995) *Reorganisering: instrumentell, kulturell eller mytetreget handling: en*

- studie av en reorganiseringsprosess ved Statens Institutt for Folkehelse* (Master's thesis). University of Oslo, Oslo.
- Lomas, R. (2002) *The invisible college: The royal society, freemasonry and the birth of modern science*. London: Headline Book Publishing.
- Lundvall, B.Å. (1996) The social dimension of the learning economy. *DRUID working paper*, 1/1996. Aalborg: DRUID.
- Lundvall, B. Å. & Borrás, S. (2005) Science, technology and innovation policy. In Fagerberg, J., Mowery, D.C., & Nelson, R.R. (Eds.). *The Oxford Handbook of Innovations* (pp.599-631) New York: Oxford University Press.
- Malerba, F. & Orsenigo, L. (2000) Knowledge, innovative activities and industrial evolution. *Industrial and Corporate change*, 9, 289-314.
- Merton, R. (1974) *The sociology of science: theoretical and empirical investigations*. Chicago: University of Chicago Press.
- Merton, R. & Storer, N. (1979) *The sociology of science: theoretical and empirical investigations*. Chicago: University of Chicago Press.
- Meulen, B . v. d. (2002) Europeanization or research and the role of universities: An organizational-cultural perspective. *Innovation*, 15, 341-355.
- Nowotny, H. Scott, P. & Gibbons, M. (2001) *Re-thinking science – knowledge and the public in an age of uncertainty*. Cambridge: Blackwell Publishers.
- Nowotny, H., Scott, P & Gibbons, M. (2003) Introduction – Mode 2 revisited: The new production of knowledge. *Minerva*, 41, 179-194.
- Oliver, C. (1991) Strategic responses to institutional processes. *Academy of Management Review*, 16, 145-179.

- Olsen, H. (1998) "Europeisering" av Universitetet: fullt og helt - eller stykkevis og delt? *ARENA report*, 2/1998. Oslo: ARENA.
- Olsen, J.P. (2002) The many faces of Europeanization. *Journal of Common Market Studies*, 5, 921-952.
- Osterloh, M. & Frey, B. (2000) Motivation, knowledge transfer, and organizational forms. *Organization Science*, 11, 538-550.
- Polanyi, M. (1983) *The tacit dimension*. Gloucester: Peter Smith Publisher Inc.
- Powell, W.W. & Grodal, S. (2005) Networks of innovators. In Fagerberg, J., Mowery, D.C. & Nelson, R.R. (Eds.). *The Oxford Handbook of Innovations* (pp.56-86). New York: Oxford University Press.
- Punch, K.F. (2005) *Introduction to social research - quantitative and qualitative approaches*. 2<sup>nd</sup> ed. London: SAGE publications.
- Putnam, R.D (1995) America's declining social capital. *Journal of Democracy*, 6, 65-78.
- Schilling, M. A. (2008) *Strategic management of technological innovation*. 2<sup>nd</sup> ed. New York: McGraw Hill.
- Schott, T. (1991) The world scientific community: Globality and globalization. *Minerva*, 29, 440-462.
- Schott, T. (1993) Globalization of institutions and participation. *Science, Technology and Human values*, 18, 196-208.
- Scott, J.T. (2003) Absorptive capacity and the efficiency of research partnerships. *Technology Analysis & Strategic Management*, 2, 247-253.
- Slipersæter, S. & Wendt, K. (2006) Ikke så særnorsk likevel. *Forskningspolitikk* 3/2006. Oslo: NIFU-STEP.

- Thune, T. (2006) *Formation of research collaborations between universities and firms: Towards an integrated framework of tie formation motives, processes and experiences*. Doctoral dissertation. Oslo: Norwegian School of Management.
- Trondal, J., Gornitzka, Å. & Gulbrandsen, M. (2003) Conceptual lenses. In Gornitzka, Å., Gulbrandsen M. & Trondal, J.(Eds.). *Internationalization of Research and Higher Education: emerging patterns of transformation* (pp.16-35). NIFU Report 2/2003. Oslo: NIFU.
- Wendt, K., Slipersæter, S. & Aksnes D.W. (2003) Internationalization of research. In Gornitzka Å., Gulbrandsen M. & Trondal, J. (Eds.). *Internationalization of Research and Higher Education: emerging patterns of transformation* (pp.55-85). NIFU Report 2/2003. Oslo: NIFU.
- Wiig, O., Slipersæter, S. & Sarpebakken, B. (2001) Instituttsektoren i norsk forskning. *NIFU Report*, 4/2001. Oslo: NIFU.
- Yin, R.K. (2009) *Case study research: design and methods*. 4<sup>th</sup> ed. Thousand Oaks: SAGE Publications.

## OFFICIAL DOCUMENTS AND REPORTS

- CORDIS (2009) *European Commission – Seventh Framework Program*. [On-line]. Available. Retrieved September 5th, 2009 from: <http://cordis.europa.eu/fp7>
- NIFU (1997) *En himmel full av stjerner – EUs rammeprogram for forskning og utvikling: En evaluering av norsk deltakelse i utvalgte særprogrammer*. Oslo: NIFU & Norges Forskningsråd.
- NIFU-STEP (2003) *Evaluation of Norway's participation in the EU's 5th Framework Programme*, Oslo: NIFU, STEP & Technopolis
- NIFU-STEP (2009) *Catalogue of non-university research institutions*. [On-line]. Available.

Retrieved August 3<sup>rd</sup>, 2009 from: [http://english.nifustep.no/norsk/institutter/nasjonalt\\_folkehelseinstitutt](http://english.nifustep.no/norsk/institutter/nasjonalt_folkehelseinstitutt)  
NIFU-STEP (fourthcoming) *Evaluering av norsk deltakelse i EUs 6. Rammeprogram og første del av 7. Rammeprogram*. Oslo: NIFU-STEP & Technopolis.

Norges forskningsråd (2004) *Evaluation of clinical, epidemiological, public health, health-related and psychological research in Norway: Public health and health service research*. [On-line]. Available. Retrieved June 20<sup>th</sup>, 2009 from:  
<http://www.forskningsradet.no/en/Evaluations/1138882276154>

Norges forskningsråd (2005) *Oppfølging - evaluering av klinisk, epidemiologisk, samfunnsmedisinsk, helsefaglig og psykologisk forskning*. [On-line]. Available.  
Retrieved June 3<sup>rd</sup>, 2009 from:  
<http://forskningsradet.no/no/Artikkel/Oppfolging+av+evaluering+av+medisinsk+og+helserelatert+forskning/1187921136746>

Norges forskningsråd (2008a) *EU-kontorets årsrapport for 2007*. [On-line]. Available.  
Retrieved June 30<sup>th</sup>, 2009 from:  
<http://www.forskningsradet.no/servlet/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobheadername1=Content-Disposition%3A&blobheadervalue1=+attachment%3B+filename%3DEU-kontoret%C3%A5rsrapport07web.pdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1220786907754&ssbinary=true>

Norges forskningsråd (2008b) *Verdiskapning: forsknings- og innovasjonsnyheter*, 1/2008.  
NFR: Oslo.

Report nr.30 (2008-2009) Summary in English: *Report nr 30 to the Storting* (2008-2009)

Statsbudsjettet (2009) *Tildeling av bevilgning – Nasjonalt folkehelseinstitutt*, Oslo: Helse- og Omsorgsdepartementet

Stortingsmelding nr.30 (2008-2009) *Klima for forskning*, Oslo: Kunnskapsdepartementet.

Stortingsproposisjon nr. 1 (2006-2007) *Nasjonal Helseplan (2007-2010)*, Oslo: Helse- og Omsorgsdepartementet., [On-line]. Available. Retrieved September 15<sup>th</sup>, 2009 from:  
<http://www.regjeringen.no/nb/dep/hod/tema/sykehus/sykehus-i-norge.html?id=115230>

Strategi (2008) *Strategi for Norges samarbeid med EU om forskning og utvikling*, Oslo: Kunnskapsdepartementet. [Online]. Available. Retrieved July 5<sup>th</sup>, 2009 from: <http://www.regjeringen.no/upload/KD/Vedlegg/Forskning/EU-strategien.pdf>

## **NIPH DOCUMENTS**

NIPH (2004) *Folkehelseinstituttet 75 år*. [On-line]. Available. Retrieved July 27<sup>th</sup>, 2009 from: [http://www.fhi.no/eway/default.aspx?pid=233&trg=MainLeft\\_5669&MainLeft\\_5669=5544:49992:0:5667:1:::0:0](http://www.fhi.no/eway/default.aspx?pid=233&trg=MainLeft_5669&MainLeft_5669=5544:49992:0:5667:1:::0:0)

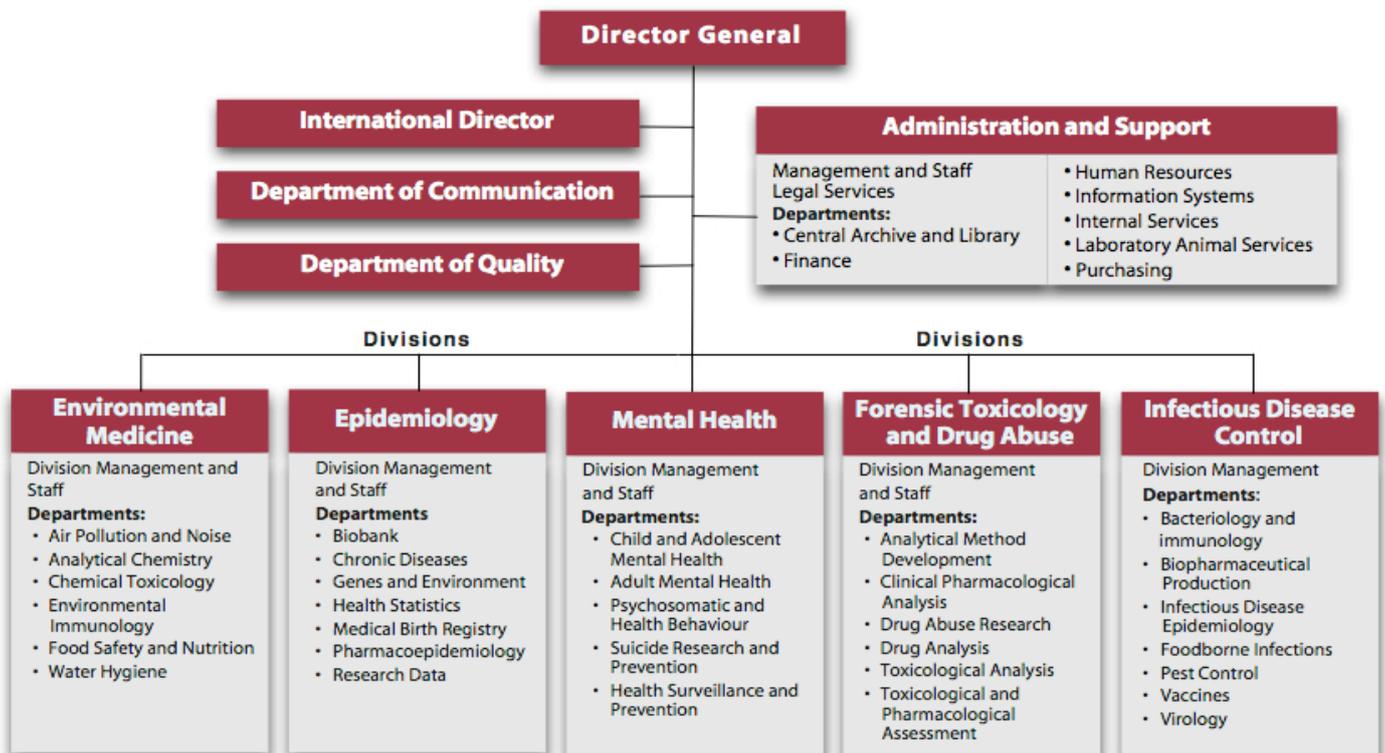
NIPH (2008-2010a) *Strategy for global public health (2008-2010)*. [On-line]. Available. Retrieved August 3<sup>rd</sup>, 2009 from: [http://www.fhi.no/eway/default.aspx?pid=238&trg=MainArea\\_5811&MainArea\\_5811=5903:0:15,4467:1:0:0:::0:0](http://www.fhi.no/eway/default.aspx?pid=238&trg=MainArea_5811&MainArea_5811=5903:0:15,4467:1:0:0:::0:0)

NIPH (2008-2010b) *Strategy 2008-2010*. Norwegian Institute of Public Health. [On-line]. Available. Retrieved September 3<sup>rd</sup>, 2009 from: <http://www.fhi.no/dav/ec8228cb4e.pdf>

NIPH (2009) *Terms related to Norwegian Institute of Public Health*. [On-line]. Available. Retrieved July 4<sup>th</sup>, 2009 from: <http://www.fhi.no/eway/?pid=23>

# APPENDIX A: NIPH STRUCTURE

## Norwegian Institute of Public Health



---

## APPENDIX B: INTERVIEW GUIDES

---

### Interview guide – NIPH researchers

The interview guide was modified to fit different groups of respondents. All interviews focused on the same topics, but questions were not always posed in the same way. The topics covered in the interviews are listed in the following table.

<p><b>Preconditions, formation and application process</b></p>	<ul style="list-style-type: none"> <li>▪ How did you become a part of this project?</li> <li>▪ What was your motivation for participation in this specific project?</li> <li>▪ Who took the initiative of applying for funding in the FP6?</li> <li>▪ Do you have certain experiences from the establishment of the project that others can learn from?</li> </ul>
<p><b>Collaboration, communication and interaction experience</b></p> <ul style="list-style-type: none"> <li>▪ <b>Process</b></li> <li>▪ <b>Results and effects of collaboration</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ How do you experience collaboration in the project?</li> <li>▪ How is the organization of the consortium?</li> <li>▪ Do you have any experiences from the research collaborations that others might learn from? Specific challenges related to FP projects?</li> <li>▪ Are there some partners that were collaborating more than others?</li> <li>▪ What roles did previous relationships play?</li> <li>▪ Have you reached the expected preliminary results?</li> <li>▪ Who are the results from the project relevant for? (partners, public administrative bodies etc.)</li> <li>▪ Compared to other research projects, how important are the results from this project?</li> <li>▪ Are you motivated to participate in other international research projects after this project?</li> </ul>
<p><b>Evaluating the project and opinions about interaction in the future</b></p>	<ul style="list-style-type: none"> <li>▪ What did you get out of the project personally?</li> <li>▪ Would you describe the research collaboration as successful? why, or why not?</li> <li>▪ What is the biggest challenge in the collaborations?</li> <li>▪ What is the importance of this being a European project and not a national project?</li> <li>▪ In the future, will you or other partners continue collaboration within this or other topics?</li> <li>▪ How is the project result useful for NIPH?</li> <li>▪ What will be your advice considering how researchers can profit from FP projects in the future?</li> <li>▪ Do you have any additional comments relevant to future participation in FP projects?</li> </ul>

## Interview guide – NIPH management and administration

The interview guide was modified to fit different groups of respondents. All interviews focused on the same topics, but questions were not always posed in the same way. The topics covered in the interviews are listed in the following table.

<b>Respondent info</b>	<ul style="list-style-type: none"> <li>▪ What is your current position in NIPH?</li> <li>▪ What is the background for the initiation of your position?</li> </ul>
<b>NIPH Strategy</b>	<ul style="list-style-type: none"> <li>▪ How important are the FP projects for NIPH?</li> <li>▪ How do you see the FP projects being incorporated in NIPH strategies?</li> <li>▪ Do NIPH use FP projects to explore collaborations with new actors?</li> <li>▪ Are FP research closely connected to the research areas in NIPH?</li> <li>▪ Is participation in the FP's individual or organizational?</li> <li>▪ Do you see participation in the FPs as an organizational obligation?</li> </ul>
<b>International research collaborations</b>	<ul style="list-style-type: none"> <li>▪ What makes NIPH an attractive partner in FPs?</li> <li>▪ How do FP projects differ from other international research collaborations?</li> <li>▪ Do NIPH wish to enlarge its international engagement?</li> </ul>
<b>Financial resources</b>	<ul style="list-style-type: none"> <li>▪ How does the 50 percent requirement affect the decision for attending FP projects?</li> <li>▪ In which areas do you expect the biggest profits? (financial, collaborative or competence)</li> </ul>
<b>Effects and results from FP projects</b>	<ul style="list-style-type: none"> <li>▪ Have participation in FPs changed the academic profile of NIPH?</li> <li>▪ How is the response from researchers after participating in FP projects?</li> <li>▪ As a result of participating in FPs, do NIPH get increased attention from the Ministry etc?</li> </ul>

---

## APPENDIX C: LIST OF RESPONDENTS

---

Respondent nr	Division	Department	Position
1	Director general	Director general	International director
2	Director general	Director general	Senior advisor
3	Epidemiology	Health statistics	Advisor
4	Epidemiology	Pharmacoepidemiology	Senior advisor
5	Epidemiology	Division management and staff	Division director
6	Forensic Toxicology and Drug Abuse	Drug abuse research	Senior advisor
7	Infectious disease control	Division Management	Division director
8	Infectious disease control	Bacteriology and Immunology	Chief physician
9	Infectious disease control	Bacteriology and Immunology	Researcher
10	Environmental medicine	Chemical toxicology	Department director

---

## **APPENDIX D: PROJECT OVERVIEW**

---

- **Health Alliance for Prudent Prescribing, Yield and Use of antimicrobial Drugs in the Treatment of respiratory tract infections (HAPPY AUDIT)**

The aim of HAPPY AUDIT is to strengthen the surveillance of respiratory tract infections in primary health care in Europe through development of intervention programs targeting general practitioners (GPs), parents of young children and healthy adults. The team will study the incidence of respiratory tract infections among patients in general practice and carry out research based on audit registration to explore the existing use of diagnostic tools in patients with respiratory tract infections.

Based on results from audit registrations in primary health care, the team will develop locally adapted intervention programs, including guidelines, courses for GPs, workshops and patient information leaflets for improving the quality of antibiotic prescription.

The overall aim of the intervention program is to reduce the occurrence of bacterial resistance by reducing prescribing of unnecessary antibiotics for respiratory tract infections and by improving the use of appropriate antibiotics in suspected bacterial infections. HAPPY AUDIT consists of seventeen partners from nine different countries and the researchers have received €1, 49 million in project funding. The project is expected to last from 2007 until 2010.

- **European Cohort coordinating network on HIV drug resistance (EUROPEHIVRESISTANCE)**

This project is an establishment to follow up of HIV drug resistance within a network of national virological, epidemiological and clinical centers across Europe. The aim is to create a large pan-European cohort for studying the appearance, spread, virological determinants and clinical consequences of HIV resistance under joint standards linked to a common shared self-sustainable database.

Human immunodeficiency viruses (HIV) resistant to one or more HIV drugs are spreading throughout the world. If further spread of resistant HIV will not be controlled, a future situation may occur, in which no effective HIV drugs will be available for newly infected

patients. The size of this problem in Europe is currently unknown, but it is estimated that approximately one fifth of all new HIV-infections are due to drug resistant viruses. No systematic information is collected and no strategy is available to prevent further spread of resistant viruses. The data will be analyzed using models and will be used to identify risk groups and predict future trends. It is anticipated that as a result, practical and economically feasible strategies for prevention of further spread of drug resistant viruses in Europe can be developed. EUROPEHIVRESISTANCE envision implementation of these strategies in Europe through a multidisciplinary collaboration between regulatory authorities, patients, physicians and pharmaceutical industry.

EUROPEHIVRESISTANCE consists of thirty-five project partners from thirty-two different countries and the researchers have received €1, 5 million in project funding. The project is expected to last from 2006 until 2010.

- **Driving under the influence of drugs, alcohol and medicine (DRUID)**

DRUID is going to find answers to questions concerning the use of drugs or medicines that affect people's ability to drive safely. DRUID will bring together the most experienced organizations and researchers throughout Europe, involving more than twenty European countries. The aim is to gain new insights to the real degree of impairment caused by psychoactive drugs and their actual impact on road safety. All in this entire project will fill the gaps of knowledge and provide a solid base to generate harmonized, EU-wide regulations for driving under the influence of alcohol, drugs and medicine.

DRUID consists of thirty-six partners from twenty different countries and the researchers have received €18, 93 million in project funding. The project is expected to last from 2006 until 2010.

- **Comet Assay and Cell Array for fast and efficient genotoxicity testing (COMICS)**

Comet assay is a single and sensitive technique for the detection of DNA damage and repair in individual cells. It has gained popularity as a standard technique for evaluation of DNA damage/repair, biomonitoring and genotoxicity testing. COMICS will develop a method of detecting DNA damage in individual cells so that one can limit the amount of animal experimentation that needs to be carried out – this is in connection to the new EU policy on

Registration, Evaluation and Authorization of Chemicals (REACH). The methods developed through COMICS will be subjected to rigorous testing in order to meet international validation standards and to be accepted by industrial users and regulatory authorities.

COMICS consist of fifteen partners from seven countries and the researchers have received €3, 19 million in project funding. The project is expected to last from 2007 until 2009.

- **Biological agents: Strengthening the Adequate response to deliberate releases by the establishment of a Framework European-wide (BIOSAFE)**

BIOSAFE aims to enhance the capability of public health- and civil protection authorities to respond adequately to the deliberate releases of biological agents by terrorists. In pursuit of this aim, BIOSAFE will bring together, interpret and analyze existing expertise on virulence factors of those pathogens and toxins that may be used in acts of bio-terrorism, by means of the establishment of a European-wide network and a database information system. This database will be complemented by information on the disinfectants for these biologicals and on drugs, antiserum and vaccines to stop terrorist induced infection outbreaks. The objectives are:

- Strengthening the co-ordination of research in the field of virulence factors.
- Identification of specific virulence factors that might be used in (engineered) biological warfare organisms in order to detect these engineered organisms and break their virulence pathway.
- Identification of new ways and methods to control outbreaks of disease caused by biological agents and to stop further spread of the disease, including identification of research requirement for the development of new cures and rapid detection methods.

BIOSAFE consists of ten partners from ten different countries. The project is expected to last from 2007 to 2009.

- **Early nutrition programming- long term Efficacy and Safety Trials and integrated epidemiological, genetic, animal, consumer and economic research (EARNEST)**

EARNEST is a multi-disciplinary team of leading international scientists from major research centers across Europe working on critical aspects of nutritional programming, co-ordinated by professional management, with strong horizontal, vertical and sectoral integration. EARNEST

uses a broad and multi-disciplinary approach to find out what kind of long-term consequences early nutrition may have on later illness. The study aims to:

- Discover the connection between early nutrition and later cardiovascular disease risk, diabetes, immunodefense, allergies, bone mineral health, cognitive capacity and cancer
- Identify critical periods for the development of illness later in life
- Examine the role of genes
- Understand the roles played by particular kinds of food, and the contribution of the mother's nutritional habits
- Develop new strategies for treatment and prevention
- Examine the connection between people's knowledge of nutrition and how this knowledge influences their behavior
- Examine the economic consequences of introducing programs in early nutrition

EARNEST consists of forty-one partners from fifteen countries and the researchers have received €13, 43 million in project funding. The project is expected to last from 2005 until 2010.