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„BETWEEN COOPERATION AND COMPETITION-

THE EU AND THE USA IN THE RESEARCH AREA“

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To my family – especially to

my mum Christine and my dad Franz

Für meine Familie, im Speziellen

für meine Mutter Christine und meinen Vater Franz

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PREFACE

It was during the research seminar “Elite University“ that the idea for this thesis was born. I learnt about the concept of the “Knowledge Society“ and the European Union’s policy. At first, my focus was on higher education and the mobility of students and researchers. However, over time this research project took interesting turns and the emphasis changed. Thus, my internship at the Office of Science and Technology at the Austrian Embassy in Washington D.C./USA led to a new focus on EU-USA cooperation. Returning to Austria, I enrolled in the IFF (Institute for Interfaculty Research) study program “Science Communications and Higher Education Research” (Wissenschaftskommunikation und Hochschulforschung), in which I learnt more about theoretical approaches and the effects of globalization on science. As a result, I entirely dropped the issue of mobility and mobility programs and instead focused on the European Union’s science and research policy – with a special focus on the role of the USA in this policy field.

It was always my intention to understand why the cooperation between EU and USA exists despite of competition and constantly growing competitiveness. At the beginning, it was rather difficult to find material on international science and technology cooperation. Therefore, I decided to take interviews at the Austrian Ministry of Science and the Austrian Ministry for Transport, Innovation, and Technology. The thus gained insights gave me a broad overview and led me on the way. Between 2009 and 2011 policy and evaluation studies were published, which were vital for my thesis. It seemed that I was on the right track as international science and technology cooperation had gained prominence on the political agenda. My work finally proceeded.

Although the maturing process of this thesis took its time, I would not want to miss any of the stages, as all of them were important parts of my life. During this process, I learnt a lot such as research skills, knowledge and last but not least gained insights about myself. In that spirit this thesis is:

“More than the sum of its parts – it’s a period of my life“

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The completion of this thesis was possible due to the input, support and faith of many people.

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Furthermore, I want to thank my interview partners from the Ministries for their vital input: Renate Fischer, Claudia Kaler, Raoul Kneucker, Rupert Pichler, Reinhard Schurawitzki, Christian Seiser. I also thank Philipp Marxgut, Attaché for Science and Technology at the OST in Washington D.C., who allowed me to accompany him to the European Commission Delegation. This visit gave me an insight in the day–to–day work of science diplomats.

I also want to thank my study colleagues, with who I spend uncountable hours in diverse libraries in Vienna: Angela Brandl, Sabine Pölz, Mag. Yvonne Sattler. Together we would be able to write a library guide of the city. Moreover, I want to thank my friends Mag. Bettina Novacek, Mag. Björn Budde, Mag. Roland Schneider and Stefan Huber for their support in technical, scientific and emotional matters. Special thanks also to my high school teacher Mag. Maria Habersack, who inspired me to study political science. For their assistance in proofreading, I want to thank Mag. Margret Hausegger, Mag. Helga Pöcheim, Tara Goverdhan and Mora Bayer.

However, the most sincere gratitude I owe to my family for their endless support: Lisi, Lydia and Hannes and most of all to my mum and my dad, Christine and Franz, who made it possible for me to study and live in different countries.
I cannot thank you enough for all the experiences and opportunities.

LIST OF ABBREVIATIONS

AAAS	American Association for the Advancement of Science
AT&T	American Telephone&Telegraph
BRIC	Brasil, Russia, India, and China
BRITE	Basic Research in Industrial Technologies for Europe
CAP	Common Agriculture Policy
CERN	European Organization for Nuclear Research
CERT	Committee on Energy, Research and Technology of European Parliament
CFSP	Common Foreign and Security Policy
CORDIS	Community Research and Development Information Service
COST	European cooperation in the field of scientific and technical research
CREST	Comité de la Recherche Scientifique et Technique
DG	Directorate-General of European Commission
EC	European Community
ECSC	European Coal and Steel Community
ECU	European Currency Unit (before the Euro)
EEAS	European External Action Service
EEC	European Economic Community
EG	Expert Group
EIT	European Institute of Technology
ENP	European Neighourhood Policy
EP	European Parliament
ERA	European Research Area
ERA-Net	Scheme under the Framework Programme for coordination and cooperation of national and regional Programmes
ERC	European Research Council
ESF	European Science Foundation
ESPRIT	European Strategic Programme in Information Technologies
EU	European Union
EURATOM	European Atomic Energy Community
EUREKA	European Research Co-coordinating Agency
FP	Framework Programme
GATS	General Agreement on Trade and Services
GDP	Gross Domestic Product
GLOSPERA	Global Systems and Policy Design for the European Research Area (study)
GNP	Gross National Product
HRST	Human Resources in Science and Technology
ICT	Information and Communications Technology
INCO	International Cooperation
IP	Intellectual Property
IPR	Intellectual Property Rights

IRSES	International Research Staff Exchange Scheme
JAP	Joint Action Plan
JCG	Joint Consultative Group
JHA	Justice and Home Affairs
JRC	Joint Research Centre
MEP	Member of the European Parliament
MIT	Massachusetts Institute of Technology
MS	Member State
NSB	National Science Board (USA)
NTA	New Transatlantic Agenda
OECD	Organization for Economic Cooperation and Development
OJ	Official Journal
OMC	Open Method of Coordination
QMV	Qualified Majority Voting
OST	Office of Science and Technology, Austrian Embassy, WA. D.C.
R&D	Research and Development
RACE	Research in Advanced Communications for Europe
RAP	Research Action Programme (former name for FP)
RTD	Research and Technological Development
RTI	Research, Technology and Innovation
S&T	Science and Technology
SCIENCE	Stimulation des Coopérations Internationales et des Echanges Nécessaires aux Chercheurs en Europe
SDI	Strategic Defense Initiative
SEA	Single European Act
SFIC	Strategic Forum for on International Cooperation (EU)
SLG	Senior Level Group
SME	Small or medium-sized enterprise
STA	Science and Technology Agreement
STI	Science, Technology and Innovation
STEP	US National Academy of Sciences' Board on Science, Technology, and Economic Policy
STP	Science and technology policy
TABD	Transatlantic Business Dialogue
TALD	Transatlantic Legislators' Dialogue
TD	Transatlantic Declaration
TEC	Transatlantic Economic Council
TEEC	Treaty establishing the European Economic Community "Treaty of Rome" (renamed TFEU by the Treaty of Lisbon)
TEP	Transatlantic Economic Partnership
TEU	Treaty on European Union "Treaty of Maastricht"
TFEU	Treaty on Functioning of the European Union (formerly TEU)
TMR	Training and Mobility of Researchers
USA	United States of America
USSR	Union of Soviet Socialist Republics.now Russia
VLSI	Very-Large-Scale Integration
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

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"The EC and the Government of the United States of America DESIRING to establish a formal basis for cooperation in scientific and technological research which will extend and strengthen the conduct of cooperative activities in areas of common interest and encourage the application of the results of such cooperation to their economic and social benefit."[1]

NOTE: *Shortly before this thesis was finalized, the "EU-US global partners - global responsibilities" homepage was set up. This illustrates a deepening of the transatlantic relationship. Research, education and exchanges are explicitly mentioned in the section "economy".*[2]

1 **AGREEMENT for scientific and technological cooperation between the European Community and the Government of the United States of America**. Official Journal, published 20 October 1998 (L 284/37) introduction

2 **European External Action Service** EU-US global partners – global responsibilities" http://eeas.europa.eu/us/flash/index_interface.html [22 January 2012]

1. INTRODUCTION

In 2007, the European Union stated in a publication on science and technology cooperation,

> *"In an increasingly globalized world, science and technology are at the forefront of innovation and economic growth."*[3]

1.1. Thematic approach

For the topic of this thesis, which broadly spoken is the transatlantic research cooperation, two issues are relevant: the international science, technology and innovation policy, to which in recent years more and more attention has been paid and transatlantic relations in general, with the formal relationship starting in 1990.

1.1.1. Growing attention for international science, technology and innovation

In recent years, international science, technology and innovation have appeared on the political agenda. This growing attention is due to **five "triggers"**[4]**,** which are "changing global trends" and "non-science objectives". These triggers are seen as an opportunity as well as a challenge:

1. **Brazil, Russia, India, and China (BRIC)**: these emerging countries do have a great capacity when it comes to research and technology and already reach "high international quality standards".
2. **Global challenges**: the increasing political debate on global challenges like "climate change, health issues and sustainable energy resources".

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3 **European Commission** 2007. *EC-U.S. Scientific and Technological Cooperation*: Reaching New Frontiers p.1

4 **Boekholt, Patrice / Edler, Jakob / Cunningham, Paul / Flanagan, Kieron** 2009**.** *Drivers of international collaboration in research*. Final report to European Commission. DG for Research. Brussels p.8

3. **Globalization of research and development**: this is more visible in industrial research and mobility of researchers, although both are not a new development.
4. **Demographic developments**: the number of graduates in science and engineering is decreasing, which leads to a lack of research talent.
5. **Policy debates in Europe**: the claim for international competitiveness and the discussions about the European Research Area reached a very high degree. In this sense "partnering with the best plays a major role".

These policy debates on the European Research Area (ERA) have spurred the discussions on science and technology cooperation with non-EU countries.[5] The European Union's science and technology policy already represents an example for "international STI cooperation"[6] (Science, Technology and Innovation) with the Framework Programmes (FP) as their major tool. These are a success story and are currently in their 7th period.

When it comes to cooperation and competition, this dichotomy has always played a role in the history of the EU's science and technology policy. Where "to draw the line"[7] and how to achieve a "balance"[8] has always been a central topic for this European policy. Although, cooperation within the Union is highly fostered, as is building up the ERA, it is the cooperation with non-EU countries, which got increasing attention over the last years. The cooperation with the so-called third countries represents a new facet of the European Union's external relations.[9]

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5 ibid p.8

6 **Stein, Josephine Anne** 2002. Science, technology and European foreign policy: European integration, global interaction. In: *Science and Public Policy*. volume 29, number 6 December. p.463

7 **Ruberti, Antonio** 1995. Preface In: Guzzetti, Luca *A Brief History of European Union Research Policy.* European Commission Studies. Luxembourg

8 **European Commission** 2008. *Challenging Europe´s Research: Rationales for the European Research Area (ERA*). Report of the ERA Expert Group. Brussels p.8

9 **Stein, Josephine Anne** 2002. p.463

It is this "interplay between science, technology and foreign policy"[10] that is the core topic of this thesis, with a special focus on the European Union-United States of America (EU-USA) cooperation.

1.1.2. EU-USA relation

As already mentioned, it is the relationship of the two most important[11] partners in the world: the European Union and the United States of America that is the second major issue discussed in this thesis. Scholars called the USA the "most significant other of the European integration project in the world arena."[12] A lot has been written on the relationship between these two powers, and even by only paying attention to the daily news, the various spheres of this relationship become apparent: it encompasses culture, politics, security and economics. For the purpose of this thesis, the focus is on the political and trade relations under the aspects of science and research.

The origins of this relationship go back to the 17th century. The strong cultural and societal ties over the Atlantic started with the migration from the "old world" to the "new world". Way down the road, in the middle of the 20th century, as WWII was over and great parts of Europe were in ruins, the USA's interest in Europe grew immensely. The USA feared that greater parts of Europe would become part of the rival USSR. Therefore, the USA paid particular diplomatic, military and financial attention to selected European countries. The overall goal[13] was an alliance with Europe. Compared to this goal, the rebuilding of Europe's economy was the less important

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10 ibid p.464

11 **Bücherl, Wolfgang** 2007. Europäisch - amerikanische Beziehungen [European-american relations]. In: Weidenfeld, Werner; Wessels, Wolfgang (edts.): *Europa von A bis Z. Taschenbuch der europäischen Integration*. 10th edition. Nomos. Berlin. p.140

12 **Smith, Michael / Steffenson, Rebecca** 2005. The EU and the United States. In Hill, Christopher; Smith, Michael: *International Relations and the European Union*. The new European Union Series. Oxford University Press. Oxford. p. 343

13 **Bierling, Stephan** 2002. Die Europäische Union und die USA [The European Union and the US]. In: Weidenfeld, Werner (eds.): *Europa- Handbuch*. Bertelsmann. p.639-659

issue[14]. This was done through the so-called "Marshall Plan" from 1948-1952, which the USA sponsored. According to Bierling, this deal made Europe safe against the nuclear power Soviet Union.[15]

In any case, in this phase of rebuilding Europe as well as in the early European cooperative attempts and the European integration process, the USA played a major role. It is even said, that the USA can be seen as the "Geburtshelfer Europas" (Europe's midwife).[16]

Although, this partnership lasted until 1990, it did not lack smaller and bigger disputes. In the past, these disputes were primarily about safety, such as possible nuclear attacks from the former Soviet Union, while trade issues, several regional crises or currency problems were only of minor interest. As these issues were relatively minor compared to the threat of the "red power", the maintenance of the relationship was out of question.[17] However, with the breakdown of the Soviet Union and the end of the Cold War, the original reason for the stable EU-USA partnership became obsolete.

This was then the starting point for a new definition of the EU-USA relations: "Sustaining the alliance would require a new and different rationale and a different modus operandi."[18] The new definition of the EU-USA relations started in 1990 with the Transatlantic Declaration.[19] It was followed by more agreements. These economic-driven agreements should even deepen the relation of the two biggest economies in the world. Although the world has been majorly shaped by these economic relations it also faces severe problems, which "encompass complexity and diversity".[20]

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14 **Ilgen, Thomas L.** 2006. The Atlantic Alliance and the Integration of Europe. In: Thomas L.Ilgen.: *Hard power, soft power and the future of transatlantic relations*. Ashgate Publishing Limited. Hampshire. England p.12

15 **Bierling, Stephan** 2002.

16 **Neuss, Beate** 2000. *Geburtshelfer Europas? Die Rolle der Vereinigten Staaten im europäischen Integrationsprozeß 1945-1958*. [Europe´s Midwife? About the role of the United States of America in the european integration process 1945-1958] Baden-Baden

17 **Bierling, Stephan** 2002. p.640

18 **Ilgen, Thomas L.** 2006. p.15

19 **Transatlantic Declaration** 27 February 1990, Washington

20 **Smith, Michael** 1998. Competitive co-operation and EU-USArelations: can the EU be a strategic partner for the USAin the world political economy? *Journal of European Public Policy* Routledge. 5:4 December 2008. p.562

1.2. Research design

1.2.1. Questions and hypothesis

As the title of the thesis suggests, the main research question deals with the interplay of cooperation and competition within the transatlantic relationship. In this framework, the science and technology cooperation policy will be analyzed.

The thesis aims to address the subsequent research questions and to verify the following hypotheses:

1) **How did the European Union's science and technology policy evolve and did the USA play a role in this process?**

   Hypothesis: *Similar to the economic and political integration, European science and technology policy (STP) evolved over time and its competence was extended with each EU treaty.*

   Hypothesis: *The USA played several roles in the history of European integration process as well as in the process of establishing a European STP.*

2) **When did the EU-USA cooperation start and what was the role of science, research and technology in this cooperation?**

   Hypothesis: *The transatlantic relationship had a specific starting point in history and has developed since then. The topics science, research and technology have formed an integrate part from the beginning.*

3) **What reasons can be identified for the EU and USA cooperation in science and technology?**

   Hypothesis: *Even though competitiveness is a strong rationale for European STP, it is not the only one. There are other relevant rationales, which might not follow the same logic.*

1.2.2. Analytical Framework

To answer these research questions, the transatlantic science and technology relationship will be discussed on the policy level, rather than assessing the actual day-to-day activities or policy impacts. The analytical framework of this thesis can be visualized as follows:

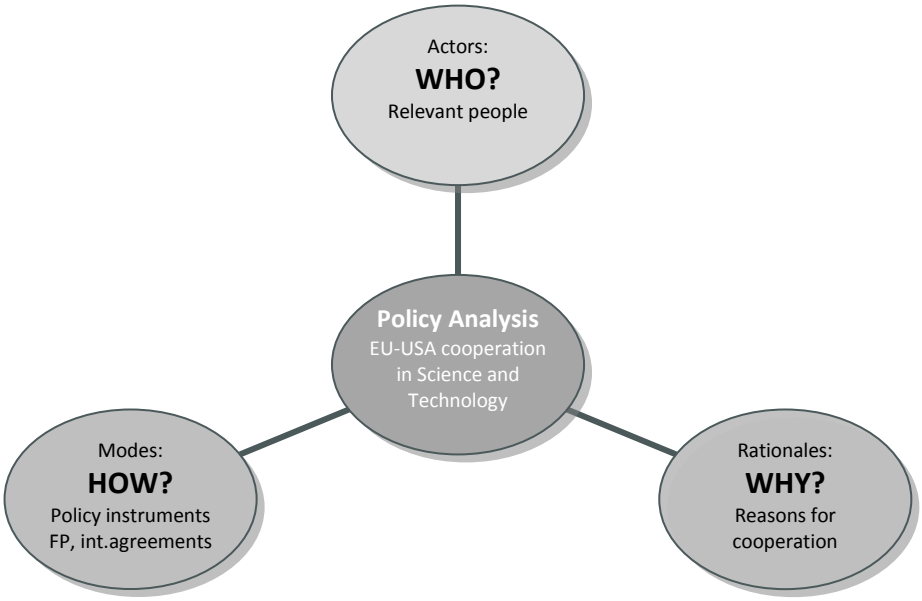

Figure 1 Analytical framework of the thesis

Concerning the modes, or to address the question **"HOW?",** three policy instruments used by the EU will be analyzed. Firstly, the Framework Programmes, which are a cooperation process, secondly the EU-USA Science and Technology Agreement and thirdly the EU-USA economic relations, which include numerous competitive and cooperative elements. No attention will be paid to the cooperation between individual EU Member States and the USA.

In the policy fields of science and technology and economy, the emphasis will be on searching for relevant actors, thus addressing the question **"WHO?". Finally,** the

written justifications, or rationales, for the evolving cooperation will be investigated, thus addressing the question **"WHY?".**

References

This analytical framework will foremost be applied to legal and official documents, which are of special importance when analyzing policies. These are the Council decisions regarding the European Framework Programmes, European Union Parliament documents, the Treaties of the European Union and the original transatlantic agreements as well as their subsequent working plans.

The secondary references consist of relevant book chapters, scientific articles, online information and, especially important, scientific studies or assessment reports from related academic fields.

For general orientation and in order to be able to more clearly define the direction of the thesis, several expert interviews were made. Gläser/Laudel[21] described experts as people, who have specialized knowledge. In the context of this thesis, these are (former) employees of the Austrian Ministry of Science and Research as well as the Ministry of Innovation, Transport and Technology.

Notes about the language

Although the author's mother tongue is German, she decided to use English as the language of this thesis. This choice was made due to two reasons: firstly, most of the sources were only available in English. Thus, choosing English as the working language was a practical decision. Secondly, this thesis might be of interest for a broader audience, thus English is a way of satisfying this potential interest.

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21 **Gläser, Jochen / Laudel, Grit** 2004. Expertininterview und qualitative Inhaltsanalyse [Expert Interview and qualitative content analysis]. VS. Wiesbaden p.11

1.2.3. Overview of Contents

This thesis is divided into six chapters. After the introduction, the following issues will be addressed: theoretical approach, European science and technology policy, agreements between EU and USA as well as international cooperation, followed by a conclusion.

In the chapter on the **theoretical framework** relevant terminology will be defined. Additionally, a first overview on the policy fields relevant for international science and technology cooperation will be provided. In the following part several theories, which all intend to explain the relationship of cooperation and competition, will be presented. Nye's theoretical approach of "Soft Power" will play a special role.

For the chapter **European science and technology policy**, a historical approach will be chosen. A close look will be taken at the evolution of the EU's science and technology policy from 1957 until 2009. The chapter will have three intentions: on the one hand, the changes in legal justification will be observed in an in-depth way. Among these justifications are the founding Treaties, the Single European Act, the Maastricht Treaty, the Amsterdam Treaty as well as the current Lisbon Treaty. It will be pointed out, how the EU competences were extended over time and which major changes took place. Further on, the evolution of the Framework Programmes (FP) from FP 1-7 including their aims, budget and most importantly, their objectives, will be analyzed. All of these will show the emphasis of the Commission. Furthermore, evidence for the significant role of the USA especially in the evolution of the STP will be searched for.

There will be no examination of a specific program such as Human Resources (HR) or International Cooperation (INCO). The "Europe 2020" strategy will not be part of the analysis nor will the current ongoing discussions on FP8, called "Horizon".

For the chapter **transatlantic agreements and their relevance for science, research and technology,** also a historical approach will be chosen. The economic relationship

between the EU and the USA from 1990-2007 will be examined. The following cooperative agreements will be discussed: the Transatlantic Declaration, the New Transatlantic Agenda, and the Transatlantic Economic Partnership until the most recent- the Transatlantic Economic Council. Shortly, the annual summits between the EU-USA will be mentioned. The relevance of these agreements in regard to science and technology will also be discussed.

This part also will focus on the policy level and will not assess the impact of the agreements in detail. The suggested Transatlantic Free Trade Area (TAFTA) nor actions on the multi-lateral level like the ones of World Trade Organization (WTO) will be discussed.

In the chapter **international cooperation in science and technology,** several aspects of this type of cooperation will be described: The EU-USA science and technology cooperation agreement will be described, as is the opening of the ERA and most importantly, the rationales for international science and technology cooperation. It is the core topic of the thesis.

In the **conclusion** the findings will be summarized and the hypotheses will be commented on and finally, a short outlook for further research will be made.

2. THEORETICAL FRAMEWORK

The theoretical framework consists of two parts: First, the relevant definitions and policy fields will be described and second, some relevant theoretical approaches will be introduced.

2.1. Definitions and policy fields

2.1.1. Policy

The basic term is ***policy***. Within the European Communities (EC), this is an umbrella term for goals in a particular field. For achieving these goals actions are designed. Actions can be "proposals, initiatives and legislation".[22]

For this thesis, several policy fields are relevant and will be introduced: On the one hand there is ***science policy***, ***technology policy*** and ***innovation policy***. They are often perceived as one single policy field but, at a closer look, different actors, rationales and actions become visible. On the other hand there are ***transatlantic policy*** and ***external trade policy*** which are highly interrelated.

From the synopsis of all these policy fields, a new one emerges: ***international science and technology cooperation policy***. In recent years, this policy field became more and more recognized by politicians and civil servants. As not much political research has been done, the intention of this thesis is to contribute to the investigation of the relationships between these areas.

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[22] **The Europa Publications EU Information Series** 2008. European Union. Encyclopedia and Directory 2009. Routledge 9th Edition. London p.148

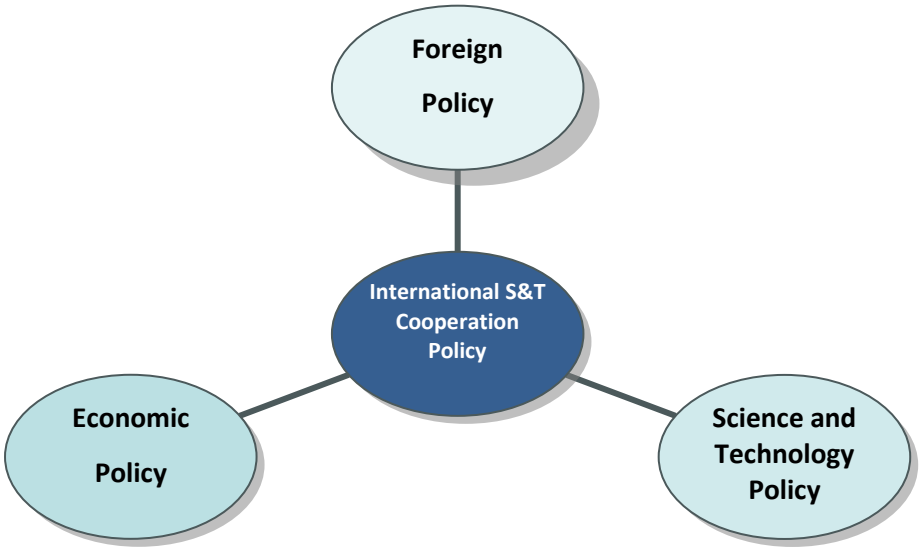

Figure 2 Policy field International Science and Technology Cooperation

2.1.2. Science, technology and innovation policy

Lundvall/Borrás are icons in the study of science, technology and innovation. They pointed out that these three policy fields, although emerged and developed slowly in time, cannot be seen as chronological phases in history and do not succeed or replace each other. Science policy and technology policy are not outdated, they still coexist and relate to the greater concept of innovation policy.[23] By defining these policy fields, the authors also paid attention to the Organization for Economic Cooperation and Development (OECD), which sets international standards in science and technology studies.[24] For Lundvall/Borrás, the policy fields did not exist in ideal types. For understanding the complexity of the topic, they found it helpful to explain objectives, issues, policy actors and instruments:

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23 **Lundvall, Bengt-Ake / Borrás, Susana** 2006. "Science, Technology and Innovation Policy". In: Fagerberg, Jan (edts.): *The Oxford Handbook of Innovation*. Oxford University Press p. 602

24 For more information on the related OECD documents see pages 603-604 of the book chapter by Lundvall/Borrás.

Science Policy

Lundvall/Borrás laid down the history of science policy. It emerged in the late 1930s, when the scientist John Desmond Bernal made recommendations on the increase of research and development (R&D) activities. In his book "The Social Function of Science" he stated that science policy would stimulate economic growth and welfare. In 1945, Vannevar Bush had a significant impact on the shaping of USA post-war science policy. With his work "Science: The Endless Frontier", Bush outlined the aims for science policy as "contributing to national security, health and economic growth".[25] Both saw that investments in science would have an economic impact, and so had Dieter Schumacher[26] in 1975, as he wrote about international science cooperation. In addition Schumacher identified the impact of science policy in the fields of society, infrastructure and science itself:

- Society: with actions for the advancement and sake of the society
- Infrastructure: with actions for the infrastructure in science and technology
- Science itself: with actions in the field of general education, science and cultural relations

In 2006, Lundvall/Borrás[27] characterized science policy as follows:

- **The major objectives** are diverse and besides economic targets they also include "national prestige and cultural values besides social (and) national security (…) activities".
- **The major issues** are investing sufficient resources, including human resources (i.e. number of students and researchers) on science and technology and, consequently, allocating them in a reasonable proportion

25 **Lundvall, Bengt-Ake / Borrás, Susana** 2006. p.605

26 **Schumacher, Dieter** 1975. Perspektiven einer internationalen Forschungspolitik. Problemskizze am Beispiel der Europäischen Gemeinschaften [Perspectives of an international research policy.The European Union- an analysis]. Verlag Otto Schwartz&Co. Göttingen. p.11

27 **Lundvall, Bengt-Ake / Borrás, Susana** 2006. p.605

among the disciplines and programs, thus securing the impact of science on social welfare.

- **The major policy actors** are public institutions such as ministries of education and research or research councils.
- **The major instruments** are "budgetary decisions", either financing universities or giving tax relieves to private research institutions- and of course connecting universities and the private institutions. The regulations on intellectual property is another instrument of science policy.

Technology policy

When it comes to technology policy[28], it are the size and the level of economic well-being of a state which define the policy area. Big "science-based technologies" such as "nuclear power, space technology, computers, drugs and genetic engineering" are considered as key technologies. Depending on the size of a state, the focus is either on "producing" and "applying" or "absorbing" and "using" these technologies. While high-income countries mostly produce and apply, smaller countries mostly absorb and use these technologies.

According to the "strategic" technologies and sectors identified, states formulate their policies and implement them: A well-known example is the 1957 "Sputnik" project (described in detail later in the thesis) where the invention by the former Soviet Union caused a very ambitious space program in the USA. The book "The American challenge" by Servan-Schreiber[29] gave a poor picture of European competitiveness confronted with the American high-technology sectors. This book, which had a great impact on the shaping of Europe's technology policy, will be described later in the thesis in Chapter 3.2.2 .

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28 ibid pp.608

29 **Servan-Schreiber, Jean- Jacques** 1968. *The American Challenge*. Hamish Hamilton translated from the French by Ronald Steel. London

Lundvall/Borrás described technology policy as follows: [30]

- **The major objectives** are mainly the same as those of science policy, but with a hands-on approach on national prestige and economic growth.
- The **major issue** is legitimation of state subsidies for technological advancement.
- The **major policy actors** are ministries. In the USA, these are the ministries of telecommunication, defense, health, transport and energy. In Japan, the most involved ministries are those responsible for industry and trade. In addition other public institutions are involved, e.g. ministries for education and authorities responsible for industrial competition.
- The **major instruments** are "public procurement", "subsidies and tax reduction" and financing of public research on new technologies.

It is important to understand that Lundvall/Borrás' characterization of science and technology policy by means of its objectives, issues, actors and instruments serves only for academic purposes. They stressed that in reality these policy types do not exist disconnected from each other. Innovation policy is the third type they characterized, which generally spoken is a wider collection of different policies.

Innovation policy

Innovation policy[31] can be considered as a significant form of "economic policy", because it covers all stages of the innovation process: from "diffusion, use and marketing of new technologies."[32]

Innovation policy has two different approaches: The first can be called "non-interventionistic" and the second "systemic". Whereas in the "non–interventionistic" approach only "framework conditions" for certain sectors are guaranteed, in the "systemic" approach we speak about an "innovation system". A radical non-

30 **Lundvall, Bengt-Ake / Borrás, Susana** 2006. p.608
31 ibid p.611-615
32 ibid p.612

interventionistic innovation policy only secures the basic funding education and basic research. It is left to the business enterprises to decide what is the best for themselves. On the other hand, the "systemic" approach considers many other policy fields and how they may interact best with each other.

As far as market and competition is concerned, in the first approach competition is the "most important prerequisite", while in the second type, although competition is appreciated, "closer cooperation vertically between users and producers and sometimes even horizontally among competitors"[33] is considered vital.

In innovation policy, universities and institutions in the technological sector are no longer in the centre of interest, as they were in science policy and technology policy. In innovation policy all areas of economy are requested to contribute to an overall innovation system.

Lundvall/Borrás characterized innovation policy as following: [34]

- The **major objectives** are economic growth, international competitiveness and "social cohesion". In the context of the European Union, the overall goal is economic well-being.
- The **major issues** are the limits of public interventions, innovation within the institutions or rather innovating and changing the institutions.
- The **major policy actors** are ministries of economics or ministries of industry, but also all other public offices, trade unions and private business are involved.
- The **major instruments** are the implementation of intellectual property rights (IPR) and accessibility to "venture capital".

This thesis will show that nowadays the systemic type of innovation policy prevails in the European Union. Thus the terms "competitiveness and economic growth" are almost used in an inflationary way. In addition, not only competition but also more cooperation is being promoted. In the Lisbon Strategy for the period of 2000 - 2010,

[33] ibid p.612
[34] ibid p.612-613

public spending on R&D and the promotion of an innovation system have been implemented as part of Europe's economic policy. Even though the Strategy's goals were not achieved, at least it gave a boost to Europe's science and technology policy. This issue will be discussed in detail in Chapter 3.5.1.1 The successor policy is “Europe 2020”. In the new strategy, the goal prevails: 3% of GDP on public and private spending on R&D.

For a better understanding of the relationship between science, technology and innovation policy, Lundvall/Borrás created the following figure:

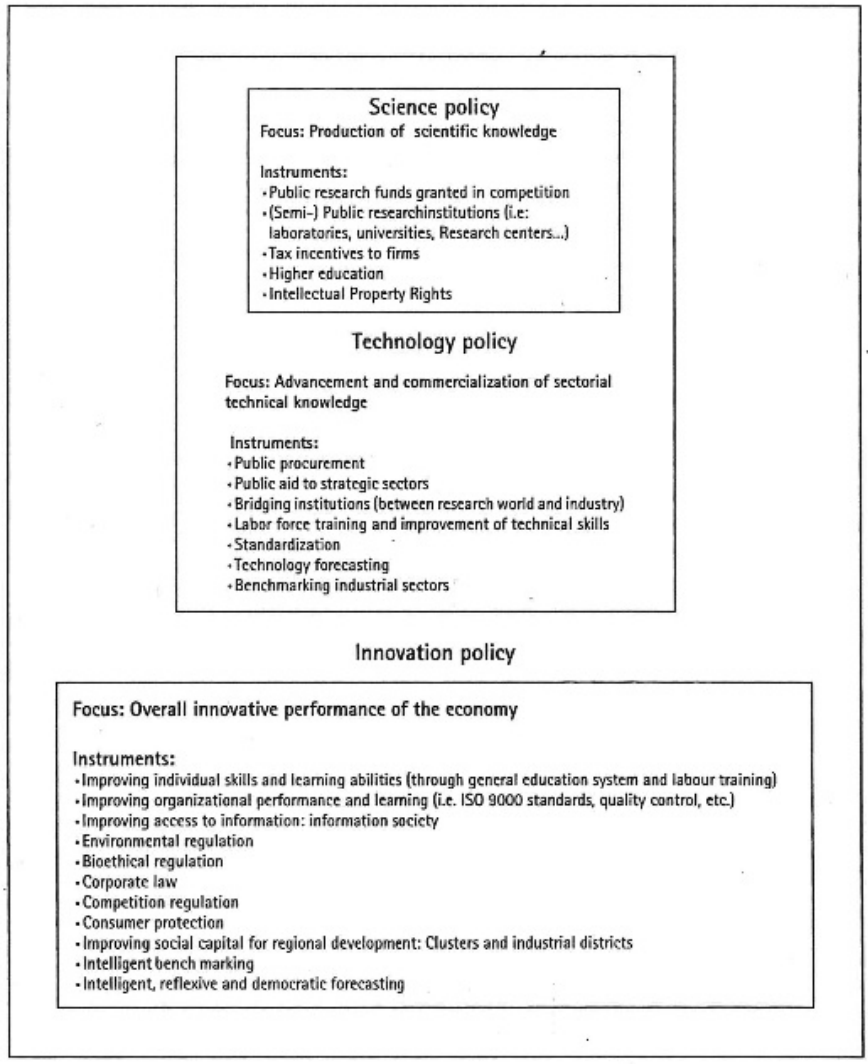

Figure 3 Relationship between science, technology and innovation policy[35]

[35] ibid p. 615

Lundvall/Borrás suggested, that policy makers need to consider a "broader social framework" for a successful innovation system, even when the aim is "to promote economic wealth creation".[36] According to the authors, also competence building is essential. Competence building refers to learning and renewals of skills and know-how. This is a social process since it happens as an "interaction between people and organizations" based on "trust, power, and loyalty".[37] Trust, power and loyalty are essential pillars of diplomacy. Science diplomacy can help to build these pillars.

2.1.3. External Relations and Transatlantic Policy

Defining it accurately, one can say that the ***external relations*** of the European Union incorporate two types:[38] First, bilateral and multilateral trading agreements between the EC and third countries such as "Association Agreements, Co-operation Agreements, Europe Agreements, Partnership and Co-operation Agreements". Second, the development of a European foreign policy (CFSP) through "political co-operation and the common foreign and security policy."

Both types are the outcome of a very complex[39] decision-making process on different political and administrative levels. This makes the study of external relations rather delicate. Several policy areas such as security, trade, development aid and the participation in international organizations play major roles in shaping the policy. In addition further policy areas become more and more important and relevant to external policy such as: culture, environment, education, as well as research and technology.

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36 ibid p.617

37 ibid p.617

38 **The Europa Publications EU Information Series** 2010. European Union. Encyclopedia and Directory 2011. Routledge 11th Edition. London p.107

39 **Schmalz, Uwe / Diedrichs, Udo** 2010. Europäische Union als internationaler Akteur [The European Union as an international actor]. In: Woyke, Wichard(ed.): Handwörterbuch Internationale Politik. 12th edition. Verlag Barbara Budrich Opladen&Farmington Hills p.154- 168

The Treaty of Lisbon (2009) introduced rather fundamental changes of the European Union's external policy: Not only were the external policy re-organized and the policy competence extended, but also an EU "High Representative of the Union for Foreign Affairs and Security Policy" was installed. Baroness Catherine Ashton currently fills this position and is therefore also heading the "European External Action Service" (EEAS).

A specific area of the external relations policy is the ***transatlantic policy***[40]. The transatlantic relations are defined as a "strategic partnership" because the EU and the USA are the biggest trading partners on the globe. In addition, they cooperate in several areas as for instance in security issues. The legal basis for the EU's cooperation with the USA is Article 207 Lisbon Treaty on the common commercial policy (ex Article 133 TEC). The evolution of this bilateral cooperation begins in 1990 with the Transatlantic Declaration. Chapter 4 of the thesis discusses this topic, in terms of their relevance to cooperation in science and technology.

2.1.4. International Science and Technology Cooperation Policy

Where external policy and science policy overlap, ***international science and technology cooperation policy*** is the outcome as shown in Chapter 2.1.1.
It is defined when federal employees take measures to:

> *"influence the intensity, content and direction of collaboration between research performers in the public and private sectors across borders."*[41]

For international science and technology cooperation policy, several instruments[42] can be used:

- EU Framework Programmes
- Bilateral collaboration agreements

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40 **European Parliament**. Factsheets European Union online. Transatlantic Relations: The USA and Canada http://www.europarl.europa.eu/parliament/expert/displayFtu.do?language=en&id=73&ftuId=FTU_6.4.7.html [7 November 2011]

41 **Boekholt, Patrice / Edler, Jakob / Cunningham, Paul / Flanagan, Kieron** 2009**.** Brussels p.7

42 ibid p.7

- Fellowship programs, exchange programs
- Memoranda of understanding
- Financial investments
- European multi-lateral organizations

In this thesis, the EU Framework Programmes and the bilateral collaboration agreement EU-USA will be described.

2.1.5. Competitiveness

Competition and competitiveness are core terms in political economy and business administration. When talking about competitiveness, it is important to distinguish competitiveness on the level of business enterprises on the one hand and on the level of state on the other. Business administration focuses on the competitiveness of firms, like small and medium - sized enterprises (SME). Business administration deals with optimizing those decisions of SMEs that ensure their competitiveness, that are decisions about offers, organizational matters, personnel, material, goods, services, knowledge, concepts, etc.[43]

On the other hand, there is **competitiveness on the state level,** and since the EU traces its origins from an economic project, competitiveness is as well a crucial issue within the EU. Various economic schools of thought approach competitiveness differently, thus making a brief definition difficult. For the purpose of this thesis, it will be outlined descriptively rather than studied in-depth.

Competitiveness on the state level is achieved through the quality of location.[44] The OECD defined competitiveness as:

> *"a measure of a country's advantage or disadvantage in selling its products in international markets."*[45]

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43 **Koch, Eckart** 2006. Internationale Wettbewerbsfähigkeit [International competitiveness]. In: Eckart, Koch: *Internationale Wirtschaftsbeziehungen*. Verlag Franz Vahlen 3rd edition München p.245

44 ibid pp.245

John Cantwell[46] saw the prerequisite of the advantage in "the possession of the capabilities needed" and the constant observation of these capabilities in international trade.

Eckart Koch[47] described Eßer's systemic approach on competitiveness on the state level. State action can be taken on three different levels: meta-level, macro-level and meso-level.

Actions on the **meta-level** are the definition of policies that support an overall awareness of entrepreneurship. For example, deregulation, education measures, social welfare and environment policies. Also related policy fields are: external trade, capital market policy and tax policy.
Actions on the **macro-level** target the legal framework, where suitable laws and regulations for competitiveness are formulated.
The actions on the **meso-level** aim directly at strengthening competitiveness. A so called "sector policy" can be formulated, where specific business sectors or regions are boosted. The collective term for these actions is "industrial policy". This interventionistic approach aims at optimizing conditions of market and locations. Even though the state might support the competitiveness of the business sector, it is important to collaborate with other private sectors, research institutions, and labor unions. Further policy fields are involved: subsidies, interest- and credit policy, as well as research and science policy.

Competitiveness policy in the European Union

Although the idea of competitiveness had been on the EU's agenda before, it was in 1994, that the Commission[48] proposed a "White Paper on Growth, Competitiveness

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45 **Organization of Economic Cooperation and Development**: economics glossary online http://www.oecd.org/glossary/0,3414,en_2649_34573_1968510_1_1_1_1,00.html#1966912 [11 October 2011]

46 **Cantwell, John** 2006. Innovation and Competitiveness. In: Fagerberg, Jan (edts.): T*he Oxford Handbook of Innovation*. Oxford University Press. p.544

47 **Koch, Eckart** 2006. pp.252

and Employment". In this paper, the Commission focused on global competitiveness and four policy aims were given: support for European enterprises, firms benefitting from the competitive advantage, sustainable industrial development and the reduction of "time differential between the pace of change in supply and the corresponding adjustments in demand".

Competitiveness through science and technology policy

As described before, the interventionistic competition policy is characterized by state actions e.g. financing science and technology (S&T).[49] Although some theorists argued that the state should not be in charge of supporting S&T at all, others take different approaches. The FPs or the international agreements of the EU are other interventionistic approaches in order to foster competitiveness.

Funding of S&T must be supplemented by STP relevant to markets, patent and intellectual property rights, general education and specific education and training in science, as well as partnerships between universities, research institutions and SME´s.[50] Peterson/Sharp identified "the application of new technology"[51] as a prerequisite for competitiveness.

2.1.6. Research and Experimental Development

The OECD took a leading role in defining the terms and set up the "Frascati Manual". In its current issue from 2002, research and experimental development (R&D) was defined as:

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48 **The Europa Publications EU Information Series** 2008. European Union. Encyclopedia and Directory 2009. Routledge 9th Edition. London p.40

49 **Koch, Eckart** 2006.

50 ibid p.252

51 **Peterson, John / Sharp, Margret** 2007. *Technology Policy in the European Union*- The European Union Series. MacMillan Press LTD 10th edition. New York p.2

> *„creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications."*[52]

In addition, the OECD systematized types of research:[53]

- **Basic research:** This type of research is "experimental or theoretical work". It is done without a specific goal or outcome in mind, but rather with the intention of understanding how and why certain things function.
- **Applied research:** For this type of research, the target is not only the understanding of functions, its main focus is on a specific goal, for example the design of a new product.
- **Experimental development:** This type is a "systematic work" taking know-how and knowledge as a basis and trying to improve it. It helps to improve materials, inventions, processes etc.

The "Frascati Manual" is internationally recognized, and is only one manual of the so-called "Frascati family". This "family" of manuals also includes the "Oslo Manual" and the "Canberra Manual". In the "Oslo Manual" the measurement of innovation is outlined, whereas in the "Canberra Manual" a classification of human resources in science and technology is made. All these papers suggest standards for measuring and evaluation of the many components of the innovation system. These standards build the ground for comparisons between states.

While Lundvall/Borrás discussed science, technology and innovation policy (STI), others suggest to substitute the term "science" with "research". Nowadays, the acronym "RTI" is more and more used.

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52 **Organization for Economic Co-operation and Development** 2002. Frascati Manual. 6th edition p.31

53 ibid p.31

2.1.7. Cooperation in Science and Technology

Cooperation and competition are as old as humankind itself. A rough definition of cooperation is therefore:

> *"an interaction between entities that results in a net benefit to each of them."*[54]

Not only working together, but distinguishable advantages for both of the partners are a precondition.

For the purpose of this thesis, we need to differentiate between ***formal and informal cooperation in S&T***. In his often cited paper on "Global cooperation in research", Luke Georghiou[55] from the University of Manchester described these two types of cooperation. The decisive criterion of distinction is whether it is based on a contract or not.

Informal Cooperation: These are activities without any formal / legal contract. As scientists travel to conferences, exchange ideas with colleagues or share the same basic, data informal collaboration is going on. This type of collaboration is presumably as old as science itself. It is a constituent part of the science community. Co-authorship for example represents informal cooperation and is a prevalent indicator of scientific cooperation. To this regard, at the end of the 1990s, Georghiou concluded in his paper that a "very substantial increase in activity between Europe and the other industrialized countries" was taking place.[56]

Formal Cooperation: This covers any type of cooperative activity based on whatever kind of contract, within or among institutions. These are: large centers (e.g. CERN), Programs (e.g. Framework Programme) or scientific agreements (e.g. bilateral agreement EU-USA).

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54 N**oë, R.** 2010. Cooperation. *Encyclopedia of Behavioral Neuroscience* G. Koob, M. Le Moal and R.Thompson (eds). Academic Press, Oxford, UK p.346

55 **Georghiou, Luke** 1998. Global cooperation in research. In: *Research Policy* 27, p.611-626

56 ibid p.614

This thesis focuses on formal cooperation between the EU and the USA - rather on the policy level than on the day-to-day micro level. One important policy tool are the "Framework Programmes":

2.1.8. Framework Programmes

The so called ***Framework Programmes***[57] (FP) are the main instrument of the EU's science and technology policy (STP). Originally named as "Framework Programmes for Research and Technological Development and Demonstration" also known as the "Research Action Programmes (RAP)", funding was not only provided for research but also for demonstration, training and dissemination. First intended to "strengthen the scientific and technological bases of Community Industry", the FP are now as well open to non-EU Member States. Funding is granted only for research which is considered "pre-competitive", thus leaving product development and marketing to the private industries.[58]

The first Framework Programme (FP1) covered the period 1984-1989. Currently we are in FP7 running from 2007-2013. The evolution of the FP is described in Chapter 3 and represents a success story of the EU. The FP are performed through specific programs where the details are defined. In the current FP, "Cooperation" is such a specific program.[59]

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57 **European Commission** 2000. *Towards a European Research Area.* Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of Regions. 18 January 2000 COM(2000) 6 final, Brussels p.86

58 **Jones, Robert A.** 1996. Competition, Industrial and Research and Technological Development Policies. In: Jones, Robert A. *The Politics and Economics of the European Union. An Introductory Text*. Elgar Publishing. Cheltenham p.204

59 **Council Decision** of 19 December 2006 concerning the Specific Programme "Cooperation" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013). Official Journal of the European Union. L400/86 from 30 December 2006 p.1

As stated above, the FPs were originally designed to promote industrial competitiveness, over time their purpose has changed. As Georghiou[60] argued, the FPs lead to "broader political or economic opportunities."

2.1.9. Rationale and Driver

To put it short, the term ***rationale*** means "the reasons for doing something."[61] The Oxford Dictionary defines it as:

> *"a set of reasons or a logical basis for a course of action or a particular belief".*[62]

Identifying a rationale means answering the question of "Why did something occur?" or "What are the reasons for the current situation?"

Another term used as a synonym in this thesis is ***driver***. This is

> *"something that creates and fuels activity, or gives force or impetus".*[63]

2.2. Relevant theoretical approaches

In the following Chapters, some relevant theoretical approaches are introduced. At this point of the thesis, none of them are prioritized.

2.2.1. International cooperation

Theories of international relations deal with the two terms ***cooperation*** and ***competition*** as the two sides of one coin. Correspondent terms are „peace" and „war".[64]

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60 **Georghiou, Luke** 1998. p.622

61 **European Commission** 2008. Challenging Europe´s Research: Rationales for the European Research Area (ERA). Report of the ERA Expert Group. Brussels p.8

62 **The New Oxford Dictionary of English** 1998. Oxford University Press. New York. p.1539

63 **The free dictionary** http://www.thefreedictionary.com/driver [4 November 2011]

64 **Meyers, Reinhard** 2006. Theorien internationaler Kooperation und Verflechtung. [Theories of international cooperation and interdependence] In: Woyke, Wichard (eds): *Handwörterbuch Internationale Politik*. Lizenzausgabe für Bundeszentrale für politische Bildung. Bonn p.482

When looking at theories of international relations, according to Reinhard Meyers[65] five different hypotheses can be identified on the reasons why two actors cooperate:

- Basically, actors cooperate in order to maximize their benefit (Axelrod 1984).
- Future expectations are relevant. The more opportunities for sustainable cooperation are expected in the future, the closer cooperation will be in present. (Milner 1992)
- International regimes boost cooperation. In the international arena the level of confidence raises due to the fact the actors get to know each other, learn about each other's behavior, experience benefits through cooperation that is based on following the rules. (Keohane 1984)
- The power of "epistemic communities" in the course of decision-making processes. "Epistemic communities" are groups of experts which share the same scientific basis and values, identify the same problems and suggest the same approaches to solutions. These groups influence the sustainability of cooperations. (Haas 1992)
- Asymmetrical relations between the actors can lead to cooperation. This is the case when "hierarchical dependencies" evolve and the stronger actor attracts and motivates the weaker actor to cooperate by means of benefits and awards.

2.2.2. Competitive cooperation

In 1998, Michael Smith[66] wrote about the transatlantic relationship, predominantly from the economic viewpoint, and he characterized it as "competitive cooperative". He defined competitive cooperation as "several linked levels at which competition and co-operation are to be found".

He came to this conclusion by analyzing the EU-USA relations on four different levels: bilateral institution-building, inter-regional and inter-system competition, multilateral

65 ibid p.482

66 **Smith, Michael** 1998. Competitive co-operation and EU-USArelations: can the EU be a strategic partner for the USAin the world political economy? *Journal of European Public Policy* Routledge. 5:4 December 1998: p.561-577

rule-making, and private management of the global political arena. He then asked if the EU could be a strategic partner for the USA, predominately looking at the economic relationship where sustainable "strategic bargains"[67] could become reality.

The first level he analyzed, is what he called "**bilateral institution-building**" that started with the Transatlantic Declaration in 1990. Roughly speaking, this level can be defined as:

> *"the making of institutional bargains and the constituting of institutions themselves with the explicit aim of regulating EU-USA economic relations".*[68]

It was the first time such discussions of economic and political issues were held - as a consequence of the end of the Cold War. However, it is essential to bear in mind, when discussing the EU's external actions, that these institutions have always been the result of long internal EU consultations.[69]

The second level, according to Smith, is the **inter-regional and inter-system competition** resulting from "regionalization of economic processes". Smith cited Cable/Henderson (1994), who described inter-regional competition as the "intensification of regional processes of production and exchange" which is "often accompanied by formal institutionalization".[70] Both, the USA and the EU, are active in these economic fields, hence becoming competitors with respect to other geographical areas of the world, e.g. the Asia-Pacific region and Latin America. In this respect the EU may have a "competitive advantage" resulting from deep-rooted experience in integrating markets since the very beginnings of the EU.
On the other hand, the USA may have the ability to attract potential economic partners through existing bonds by using "soft power". To this respect, Smith saw the USA clearly in advantage. The theory of "soft power" that goes back to Joseph Nye is

67 ibid p.563
68 ibid p.570
69 ibid p.570
70 ibid p.571

also relevant in order to explain research cooperation and will be discussed in detail later on.

The third level is the **multilateral rule-making** where Smith refered to the Bretton-Woods system and the General Agreement on Tariffs and Trade (GATT). Smith called this issue "one of the key areas of mutual entanglement" between the EU and the USA. He pointed out that the EU has enjoyed credibility in "multilateral rule-making from an early stage".[71] In recent years, the GATT was integrated into the World Trade Organization (WTO), where the EU achieved the "status of *interlocuteur valable*" (valid negotiator). In this respect actions taken by the EU, and therefore legitimated by the EU Member States, according to Smith, often lead to a beneficial outcome. The EU has become not only a strong but also a "strategic actor" when it comes to international trade issues.

The fourth level is the **private management of the global political economy**. Smith argued that EU takes advantage due to profound experience in managing and acting in the multinational arena. A disadvantage might only result from the existing cultural differences among the Member States of the EU, which may restrict the liability of the EU as a "strategic actor" on this level.
The regulation and observation of business is a prime facet of the Transatlantic Economic Partnership, as well as public and private interests have to be balanced sensitively. The Transatlantic Business Dialogue was thus set up in 1995, giving the private sector an arena. Both will be discussed in Chapter 4.

In summary, the EU-USA cooperation will continue to be accompanied by policies within the EU which are of competitive nature. In addition, cooperative actions taken on bilateral, regional or multilateral basis can become "a strategic instrument", leading

[71] ibid p.572

to a "control (of) competing actors" based on bargains and dedications and the resulting entanglement.[72]
Competitive cooperation is therefore a "complex of mixed motives, actions and processes".[73]

On the political level, Smith/Steffenson[74] identified the notion of "competitive cooperation" in the transatlantic relation as a result from the twofold role that the USA played in the European integration process: first, European leaders took the American federal system as a model (Jean Monnet) and the idea of the "United States of Europe" was born. Second, Europe's vision of "creating a third force" against the superpowers USA and the former Soviet Union was a significant factor in the integration process. Smith/Steffenson said, that

> *"This ambivalence - the USA as a key partner and leader but also as a potential rival in world politics - has been central to EU-USA relations and to the international relations of the EU ever since".*[75]

2.2.3. Interdependence

With the current economic crises in Europe and the USA "interdependence"[76] becomes manifest: The actions or non-actions of one state cause problems in other states. Besides the economic crises, along with other transnational issues as climate change and global security also civil society and state leadership came into the focus of interest. All these issues clearly prove the mutual dependency between states.

Scholars of international relations theory have moved the focus of their work to interdependence. It is only by understanding the effects of interdependence that

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72 ibid p.563
73 ibid p.574
74 **Smith, Michael; Steffenson, Rebecca** 2005. The EU and the United States. In Hill, Christopher; Smith, Michael: *International Relations and the European Union*. The new European Union Series. Oxford University Press. Oxford. p. 344
75 ibid p. 344
76 **Spindler, Manuela** 2010. Interdependenz [Interdependence]. In: Schieder, Siegfried/ Spindler, Manuela: *Theorien der internationalen Beziehungen*. 3.Auflage. UTB.Opladen&Farmington Hills p.97-130

political leadership can be adjusted. Spindler[77] suggested, that interdependence is not a theory of international relations as such, but rather an "analytical concept" for international cooperation and coordination.

Two political scientists have been working intensively on "interdependence" since 1977: Robert O. Keohane and Joseph Nye. In their book "Power and Interdependence. World Politics in Transition" they saw a change going on within the international system. The change becomes evident as the national states have to face more and more obstacles in their scope of action in certain policy fields. These obstacles limit the achievement of economic and political targets on a national level.[78]
In addition to domestic policies, the states must focus not only on foreign politics (optimizing tools of foreign policy) but also on international politics (cooperation with other states) in order to achieve their goals. [79]

The question on how interdependence can be measured is central. Basically, it is a question of methods. In political economy, quantitative methods often measure transactions between states in order to describe interdependence. It is often the trade flows and transactions that are used for this purpose. In this quantitative sense, Spindler refered to Inkeles who introduced the term "**interconnectedness**":

> Interconnectedness *"refers to the volume or frequency of communication, interaction, or exchange between two socio-cultural systems. It is most often expressed in the exchange of goods and services, i.e., in trade (…)"*[80]

The corresponding data for the transatlantic relation are outlined in 4.1.1 in this thesis. With these data, the EU and the USA both point out their importance for each other's economy.

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77 ibid p.103
78 ibid p.102
79 ibid p.102
80 ibid p.105 Spindler cited Inkeles 1975 p.469-470

But according to Keohane/Nye the term "**interdependence**" goes one step further[81]: it is not a purely quantitative phenomena, it also has political significance. Interdependence as they define it, has to do with "costs". "Interdependence only exists if mutual interactions cause costs on both sides". However, the costs can be unequally distributed between the two partners.
In the other cases, where interactions do not cause (major) costs, we speak of the above described concept of "interconnectedness".

However, interdependence not only causes costs, but normally brings also "benefits in both directions"[82] as for example in economic and ecologic issues. Nowadays, "mutual advantage" in these issues can only be achieved by means of cooperation.[83]

Even though it seems that interdependence causes mutual advantage, "harmony" is not the prerequisite. Interdependence does not mean a balanced situation. Normally it is a "mutual dependence" where the weaker part is threatened by the stronger part. Misbalance arises from several areas, as for example from "security, trade and finance". The weakness or the strength in either area constitutes the partners' bargaining power which characterizes "the art of the power game". [84]

How to act in this "power game" is an essential issue in international relations. The concept of "hard power" or "soft power" is just one possible way to discuss it. Soft power is regarded as especially important for this thesis and will be described in detail subsequently.

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81 ibid p.105 Spindler cited Keohane/Nye 1977 p.9
82 **Nye, Joseph S. Jr.** 1990. Soft Power. In: *Foreign Policy* Nr.80 Autumn p.167
83 ibid p.158
84 ibid p.158

2.2.4. Soft Power

The American political scientist Joseph Nye introduced the term "soft power" in his article of 1990. Ever since it has been discussed in theory and practice of international relations. Joseph Nye, who had earlier introduced the analytical concept of interdependence, together with Keohane, worked on his concepts from an US- point of view, in order to optimize the foreign policy of the USA. Nevertheless, he developed a general theoretical basis which is highly relevant for the purpose of this thesis.

Nye started with a **definition of power** taken from a dictionary:

> *"Power is the ability to do things and control others, to get others to do what they otherwise would not."* [85]

In this definition, the "possession of certain resources", as there are "population, territory, natural resources, economic size, military forces, and political stability"[86] needs to be taken into account. Only by owning at least some of these resources power can be exercised over others.

Looking back in history, military forces and territory were of great importance. In addition to these two terms, economic strength is what Nye called "**hard power**".[87] It is exercised when a state is "*ordering* others to do what it wants"[88] and "the ability to coerce" [89]. Although "hard power" is still the "ultimate form of power"[90] other issues have proofed to be also effective in international relations. These are for example:

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85 ibid p.154
86 ibid.p.154
87 **Nye, Joseph S. Jr**. 2006. Soft Power and European-American Affairs. In: Thomas L.Ilgen.: *Hard power, soft power and the future of transatlantic relations*. Ashgate Publishing Limited. Hampshire. England p.29
88 **Nye, Joseph S. Jr.** 1990. p.166
89 **Nye, Joseph S. Jr**. 2006. p.29
90 **Nye, Joseph S. Jr.** 1990. p.157

"communications, organizational and institutional skills, and manipulation of interdependence".[91]

All these examples are part of a new form of power which has become relevant in international politics: **"soft power"**. This new "face of power" or "co-optive power"[92] as Nye called it, "occurs when one country gets other countries to *want* what it wants"[93]. In this concept, attraction[94] becomes a great pull factor. This co-optive power is therefore the

> *"power of attractive ideas or the ability to set the political agenda and determine the framework of debate in a way that shapes other's preferences."*[95]

Nye identified the sources of soft power as follows:[96]

- Culture
- Domestic policies and values
- Foreign policy

Therefore, soft power is not only in the hands of policy makers, e.g. when we look at "culture".

One example of USA culture playing a decisive role in history is, when the economically motivated Marshall Plan was imposed to and introduced in post-war Europe. At that time, blue jeans, Coca-Cola or special cigarettes had already started to become attractive to the youth. Values such as "freedom, casualness, vitality, liberty, modernity and youthfulness"[97] were transported through the popular culture and boosted the success of the Marshall Plan. So, both policy and culture were vital to meeting the goals of the USA in post-war Europe. Nye expressed this more radically as

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91 ibid p.158
92 ibid p.166
93 ibid p.166
94 **Nye, Joseph S. Jr**. 2006. p.26
95 **Nye, Joseph S. Jr.** 1990. p.166
96 **Nye, Joseph S. Jr**. 2006. p.29
97 ibid p.29- Nye cites Wagnleitner 1999, p.151: "The Empire of Fun, or Talkin´Soviet Union Blues: The Sound of Freedom and U.S. Cultural Hegemony in Europe," Diplomatic History, 23 p.515

he stated: "If its culture and ideology are attractive, others will more willingly follow".[98]
It is also, when the "style" of foreign policy is "inclusive", not shaped too narrowly but more farsighted that others might want to follow.[99]

In 2004 Nye introduced a further "face of power" which he called "smart power". This occurs when a state differentiates and uses either hard or soft power. For the purpose of this thesis, it is not relevant and will not be described any further.

The appearance of "soft power" is somehow related to the changing political arena. Nye built his theory at the end of the Cold War, acknowledging a new actor in the political arena and thus verifying a new "diffusion of power": the smaller states and the transnational corporations appeared on the arena of world politics. Although the latter having "enormous economic resources", it is still the states that have the greater influence.[100] Due to the appearance of these new actors, new state "goals" arose in order to secure state safety. These are for example issues in the field of economics or environment. The "diffusion of power" can be identified with five phenomena: "economic interdependence, transnational actors, nationalism in weak states, the spread of technology, and changing political issues".[101]

For the purpose of this thesis, "economic interdependence", "the spread of technology" and "changing political issues" are especially important. New technologies made communication and transportation easier and more efficient and, on the long run, cheaper as well. This had an enormous impact, resulting in the so called "economic interdependence" which entailed an extreme expansion of world trade.

98 **Nye, Joseph S. Jr.** 1990. p.167
99 **Nye, Joseph S. Jr**. 2006. p.27
100 **Nye, Joseph S. Jr.** 1990. p.157
101 ibid p.160

The upcoming new technologies not only caused economic interdependence but also changed the power game: in defense industry where knowledge and technology is no longer limited to a few "superpowers". With more and more states being able to produce weapons and even nuclear weapons, the distribution of power changes considerably.

Nye also payed attention to the "changing political issues" such as "ecological changes, (…) health epidemics such as AIDS, illicit trade in drugs, and terrorism." These issues are not only relevant for one state, they are "transnational" and consequently can be resolved only by international cooperation. All these factors increase the level of interdependence between states.

2.2.4.1. Soft power - the EU and the USA

As mentioned above, Nye was thinking about optimizing the US foreign politics. But he also identified the EU's soft power, which he saw as "the closest competitor to the United States in terms of soft power resources".[102] As a matter of fact, one single European state can not "compete" with the USA, but the European Union with its enormous seize and population has a "good deal of soft power". The integration process led to peace and economic wealth on the continent, thus presenting a "positive image" around the world. Nye recognized the strong soft power of the European countries in "art, literature, music, design, fashion, and food".[103] However, also domestic policies such as social policy and regulations on economic matters make the EU attractive to young people in the world. In terms of foreign policy the positions of the EU in global problems like "climate change, international law, and human rights treaties"[104] make it very attractive.

This enormous source of European soft power may become a problem for American soft power, because it could interfere with American objectives, Nye pointed out. On

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102 **Nye, Joseph S. Jr**. 2006. pp.30
103 ibid p.30
104 ibid p.32

the other hand: "Soft power can be shared and used in a cooperative fashion."[105] This means, where the values of the EU and the USA are congruent, as for example in "promotion of democracy and human rights", working together would lead to a higher pay-off in world politics.

2.2.4.2. The soft power of science

As discussed in the previous section, Nye identified a changing "diffusion of power", and soft power becomes more and more relevant. In earlier times, the military power (hard power) of a country indicated its overall status in world politics. Now other features shape power in the world, as Nye defines:

> *"The factors of technology, education and economic growth are becoming more significant in international power."*[106]

Bringing it more to the point, Keohane/Nye wrote later that "KNOWLEDGE IS power".[107] Subsequently - by seeing science as organized knowledge - the one who leads in science has an advantage over others. Keohane/Nye provided a theoretical basis for this view.

Norman Neureiter, the director of the American Association for the Advancement of Science (AAAS) Center for Science, Technology and Security Policy in Washington D.C., brought together the concept of "soft power" with "science cooperation". Looking from the USA perspective, he argued that:

> *"International scientific and technical cooperation have the potential to be one of America's most powerful and effective soft-power instruments for a constructive foreign policy."*[108]

Mostly, he directed his thoughts towards U.S. cooperation with the Muslim World, where diplomatic relations are particularly weak. But by cooperating in matters of

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105 ibid p.33

106 **Nye, Joseph S. Jr.** 1990. p.154

107 **Keohane, Robert O / Nye Joseph S. Jr.** 1998. Power and interdependence in the information age. In: *Foreign Affairs*. Sept/Oct 1998. Vol. 77, Iss. 5, New York p. 86

108 **Neureiter, Norman** 2008. The Soft Power of Science Cooperation. In: *bridges* vol.18 July 2008 available online: http://www.ostina.org/content/view/3265/1/ [20 August 2008]

S&T, the USA gained respect. Neureiter brought to the point, that the role of the USA scientists is so important because they establish dialogues on a daily basis.

This "critical link" between international relations and science must be strongly recognized by policy makers and actions must follow, so Neureiter. He said that the use of this soft power as a tool by the USA would will create the opportunity for establishing "global diplomacy", which means that even in times where the USA does not have a prevalent positive image in the world, cooperation in science can foster diplomatic relations. It is in that sense what Nye had stated earlier:

> *"soft power is about mobilizing cooperation from others without threats or payments."*[109]

The soft power of science and its interplay with traditional diplomacy is shown in the following graph:

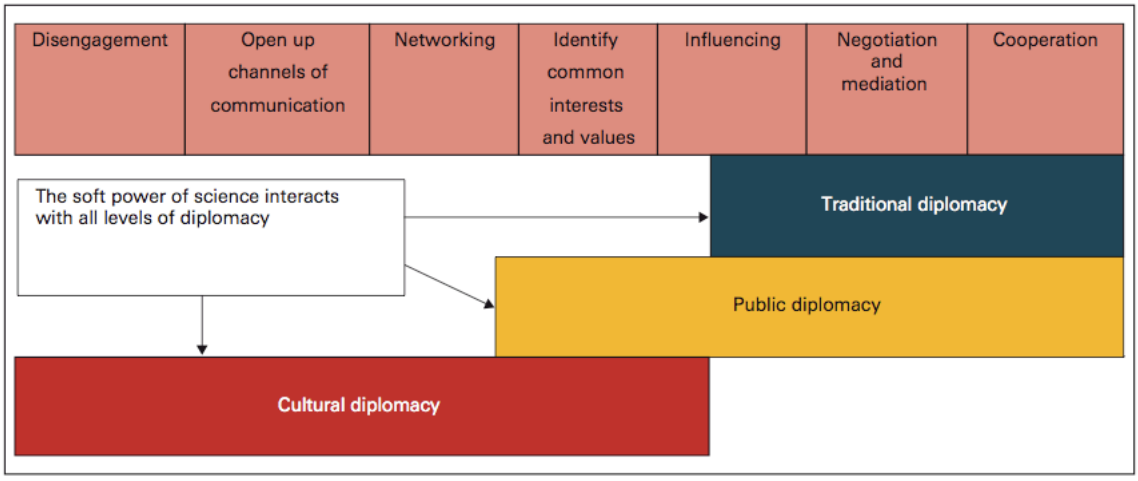

Figure 4 The soft power of science[110]

109 **Nye, Joseph S. Jr**. 2006. p.27

110 **The Royal Society and AAAS** 2010. New frontiers in science diplomacy. Navigating the changing balance of power. London. p.11

3. THE EUROPEAN SCIENCE AND TECHNOLOGY POLICY

3.1. Overview

Stein/Ahmed[111] characterized the EU´s science and technology policy (STP) as:

> *"The European approach combines scientific objectives with common political, social, economic and environmental aims through a form of partnership based on dynamism, collective decision-making and the distribution of research responsibility."*[112]

The most important EU activities in the field of S&T are the so-called multi-annual "Framework Programmes" (FP). Since the first FP in 1984, the areas covered, budget spent and participation, have somehow evolved dramatically. In the beginning S&T was not an integrated policy area in the EU, but it soon became a central topic in the overall innovation policy. Since 1952 policymaking, administration, and terms of application have continued to change. This Chapter presents a comprehensive historic overview of the STP of the EU. It covers the changes made by the Lisbon Treaty, including the entire process from the beginning to the current FP7.

An synopsis of the S&T Articles can be found on page 167. The current S&T Articles in the Consolidated Version of the Lisbon Treaty (2010) are to be found from page 170 onwards.

3.2. The Beginning

Guzzetti, who authored a comprehensive history of the European Union´s science and technology policy described the first years of the EU´s STP as following: After the war, Europe still "physically and morally in ruins", the European governments were not preoccupied with science and technology policy.[113] Nevertheless, in the eyes of some

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111 **Stein, Josephine Anne / Ahmed, Allam** 2007. The European Union as a Model of International Co-operation in Science, Technology and Sustainable Development. In: *British Journal of Politics & International Relations*. vol.9. p.654

112 ibid p.654

113 **Guzzetti, Luca** 1995. p.2

pro-Europeans and scientists, scientific cooperation could become a contributor to both reconstructing and uniting the continent.

In 1949 the Council of Europe was created to focus not only on the cooperation of Member States (MS) in legal, social, and administrative affairs, but also in scientific affairs. This mentioning of scientific affairs was due to the presence of Raoul Dautry (French defense minister before the war) and some other scientists, such as Pierre Auger and Edoardo Amaldi. Not playing a major role in the field of S&T, the Council of Europe would serve as a first debating chamber of Europe and bring forward some ideas in this policy area such as CERN,[114] the European Organization for Nuclear Research, located in Switzerland. American Vannevar Bush described this period in history by saying science is an "endless frontier", which is a prerequisite for a prosperous future.[115]

3.2.1. The Community Way: ECSC, ECC, EURATOM

The European Coal and Steel Community (ECSC), established in 1951 in Paris, is usually seen as the beginning of the European integration process. In 1957, the "Treaties of Rome" established the basis for the European Economic Community (EEC) and the European Atomic Energy Community (EURATOM). Although all three treaties somehow referred to a STP, these treaties in general gave no clear legitimation for a European STP. A legal basis of research was only established in the field of energy and agriculture.[116] During that early stage of community research, the control of energy sources was seen as the "key to political stability and industrial development".[117] Two energy types were in focus: the traditional coal energy and the advanced atomic energy.

In the next section, the three treaties will shortly be discussed in relevance to STP.

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114 ibid p.2

115 **Bush, Vannevar** 1945. *Science- The Endless Frontier*. A Report to the President from the Director of the Office of Scientific Research and Development, July 1945, USAgoverning printing office, online: http://www.nsf.gov/about/history/vbush1945.htm [28 October 2008]

116 **Peterson, John / Sharp, Margret** 2007. p.28

117 **Guzzetti, Luca** 1995. p.1

European Coal and Steel Community

On 9 May 1950 the French Foreign Minister Robert Schuman changed the history of the European countries significantly. He suggested placing both French and German coal and steel production under a single authority in addition to establishing a common market for coal and steel. Schuman´s German partner was the chancellor Konrad Adenauer. He, as Schuman, was a Christian Democrat. Opposed to the mistrust that existed between both countries that remained from the two World Wars, Adenauer and Schuman trusted each other.[118] Schuman´s plan was also inspired by Jean Monnet, a French entrepreneur, who would also become one of the founding fathers of the European Union. More countries were invited and subsequently Belgium, Italy, Luxembourg and the Netherlands joined. These countries then established the European Coal and Steel Community (ECSC) in Paris on 18 April 1951, which came into play on 23 July 1952.

Science and technology in the ECSC: In this treaty the **beginning of common research** can be traced back to Article 44.[119] Some limited research objectives were given. The High Authorities were assigned to encourage the "research into technological and economic aspects of production and growth in the consumption of coal and steel". Research should also be done in matters of "safety at work" in the coal industry.[120]
The policy instruments used at that time were coordination and subvention, rather than organizing extra research programs.[121]

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118 **Bomberg, Elizabeth / Stubb, Alexander** 2003. *The European Union: How Does It Work*?. The new European Union Series Oxford University Press, New York p.23

119 **Bieber, Roland / Epiney, Astrid / Haag, Marcel** 2005. §28. Forschung und Technologie [Research and Technology]. In: *Die Europäische Union. Europarecht und Politik*. 6. Auflage. Nomos. Baden-Baden p.553

120 **Guzzetti, Luca** 1995. p.4

121 **Bieber, Roland / Epiney, Astrid / Haag, Marcel** 2005. p.553

Spaak Report

In April 1956 Paul-Henri Spaak took the next step. The Belgian Minister presented a paper commonly known as the "Spaak Report" which examined European cooperation in certain economic areas.[122] This became the ground for further negotiations, resulting in the "Treaties of Rome" which were to lead Europe into further integration. In the Spaak report, cooperation was seen as essential in order to catch up with the great nuclear powers such as USA, former Soviet Union, and Great Britain.

Treaties of Rome: European Economic Community and EURATOM

The Treaties of Rome were signed and ratified on 25 March 1957 by the six Member States of the ECSC and established the European Economic Community and the European Atomic Energy Community.

The goals of the **European Economic Community** (**EEC)** were, according to Article 2, "establishing a common market and progressively approximating the economic policies of Member States". This should lead to stability, rising of the standard of living, and a closer relationship among the members. The freedoms of movement for people, services, and capital find their origin in this Treaty, as well as a common policy for agriculture and transport. The Treaty also established Community competence in competition policy, tariff union, state aid, and the harmonization of national laws. On the institutional level an Assembly, a Council, a Commission, and a Court of Justice were to carry out the tasks of the Community and shall be advised by the Economic and Social Committee.[123]

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122 Presented by the Belgian Minister Paul-Henri Spaak on 21 April 1956 as chair of the Inter-governmental Committee set up by the Messina Conference.

123 **Treaty establishing the European Economic Community**, 25 March 1957 online: http://eur-lex.europa.eu/en/treaties/index.htm [9 November 2008]

Science and technology in the EEC: some experts argued, "that there were components of an industrial policy but no overall framework",[124] because Article 35 would support research only in the area of agriculture.

Further research was based on Article 235 - the so called "general (elastic) clause"[125]

The original wording of Article 235 EEC Treaty was:

> *"If any action by the Community appears necessary to achieve, in the functioning of the Common Market, one of the aims of the Community in cases where this Treaty has not provided for the requisite powers of action, the Council, acting by means of a unanimous vote on a proposal of the Commission and after the Assembly has been consulted, shall enact the appropriate provisions."*[126]

This Article was the most important tool for forming the S&T programs, yet spurred discussions about legitimation of its usage. These discussions were solved at the summit talk in Paris in 1972, but only for a short period of time. The general elastic clause was significant for S&T actions until the Single European Act (SEA) in 1987. Undertakings were proposed under this Article, so Peterson/Sharp, were subject to complicated and long lasting negotiations.[127]

In the historical context the Suez crisis of 1956 had stressed the risk that the "oil supply could be jeopardized by political factors."[128] Therefore, the established **European Atomic Energy Community (EURATOM)** became important for the energy policy. It was hoped the provision of low-cost atomic power might free Europe from "its heavy dependence on deep-mined coal and imported oil."[129] Civilian nuclear power was seen as the innovative technology, which would provide the people with affordable energy.[130] In the context of this advanced energy type, Guzetti described

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124 **Stubbs, Peter** 1997. p.148
125 **Bieber, Roland / Epiney, Astrid / Haag, Marcel** 2005. p.553
126 **Treaty establishing the European Economic Community**, 25 March 1957 online: http://eur-lex.europa.eu/en/treaties/index.htm [9 November 2008]
127 **Peterson, John / Sharp, Margret** 2007. p.28
128 **Guzzetti, Luca** 1995. pp.7
129 **Stubbs, Peter** 1997. p.149
130 **Guzzetti, Luca** 1995. p.7

the "myth of the atom" where the atom symbolized "progress, power, and prestige".[131]

The objectives were outlined in the Treaty as: rising of the standard of living and the creation of "conditions necessary for the speedy establishment and growth of nuclear industries".[132]

Science and technology in EURATOM: Guzzetti saw a change of goals in the first two years of the EURATOM: from an institution for energy policy toward a research institution. At first, atomic energy was seen as the "cornerstone of a new technological revolution"[133] but then progressed as an institution where Member States installed vague projects:

Developing nuclear research was central in the EURATOM Treaty. The Treaty was a "mirror of Europe's hopes, and optimism for science and technology".[134] According to Articles 4-10[135], EURATOM had tasks in the co-ordination, promotion, and complementation of national projects.

Because of the cost-intensive atomic research, no single European country could meet its financial needs. Therefore cooperation also meant sharing the cost.[136] In one of the first documents the executive arm of the EURATOM, the Commission, pointed out the aims of the research and training programs:

> *"to avoid duplication, to co-ordinate national contributions, to cover gaps in national Programmes, to standardise measures and equipment, to promote the exchange of ideas and methods".*[137]

A broad area of research was outlined in the first annex to the EURATOM Treaty covering all facets of nuclear research; e.g. raw materials and the physics of nuclear

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131 ibid p.3

132 **Treaty establishing the European Atomic Energy Community**, 25 March 1957 online: http://eur-lex.europa.eu/en/treaties/index.htm [9 November 2008]

133 **Guzzetti, Luca** 1995. p.12

134 ibid p.4

135 **Bieber, Roland / Epiney, Astrid / Haag, Marcel** 2005. p.553

136 **Guzzetti, Luca** 1995. p.3

137 ibid p.12

energy. Stubbs described this era when "atomic energy was perceived as one of the most dazzling and important frontiers of science".[138]
On the other hand, nuclear research was also vital to military development and therefore collides with national interests. Logically, research that involves military usage was a tension for the supra-national level.[139]

The USA were great supporters of the EURATOM. Strengthening Western Europe politically and in economic matters could serve as an anti-Soviet measure and could also open markets for American industries.[140]
Guzzetti raised one aspect: The idea of having a solid scientific and technological base for a European nuclear industry in the future would soon become less relevant. Nuclear power stations were built immediately by co-operating with the USA- e.g. EURATOM and the USA government signed a cooperation agreement on the production of electricity.[141]

3.2.2. The technology gap and fear of American dominance

In the mid 1960´s a debate about the "technology gap" emerged. It was perceived that this gap would separate the USA and Europe. While Europe was in the post-war stage and its economy was growing, the USA economy grew even faster and was growing qualitatively. In the 1960s, society and industry were revolutionized by technology: the organization of work was transformed, new sectors were created, and the speed of innovation was extraordinary.
This debate[142] about the technology gap was of fundamental importance for the development of STP at both national and European level. Great Britain as the most developed country in Europe, and not yet member of the Community, was even involved, according to Guzzetti.

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138 **Stubbs, Peter** 1997. p.149
139 **Guzzetti, Luca** 1995. p.3
140 ibid p.7
141 ibid p.7
142 ibid pp.36

Probably the most influential book opening the previously mentioned broad discussion was written by the French Jean-Jacques Servan–Schreiber and was titled "Le défi américain". He described a war not fought with weapons and armies, but with organizational talent and imagination. It was to become a bitter confrontation, which required all of the European strength to win. At that moment, Europe seemed to move rather slowly. Although it was going in the right direction, it would not have changed much if Europe had not become aware of what was at stake.

The Common Market in Europe - without the implementation of further political or economic institutions - would open the door for USA firms, according to Servan-Schreiber. He described it:

> *"Fifteen years from now it is quite possible that the world's third greatest industrial power, just after the United States of America and Russia, will not be Europe, but* American industry in Europe*".*[143]

Europeans were not aware of the potential, but Americans were and the author mentioned an anonymous "American industrialist from Frankfurt" who praised the Treaties of Rome, which almost invited the USA to do their business in commerce and industry with better prospects in Europe than in the USA.

USA firms seemed to have substantial advantage compared with the European industry: a larger scale, substantial ability to raise finance, higher productivity, massive investment in research and development, and financial support for innovation from the Federal government.

According to Guzzetti the technological gap existed in two areas: First, in well-established industrial areas where investment on a large scale would be required. Second, in ground breaking technologies, so called "cutting-edge technologies", with a stimulating intellectual atmosphere and flexible availability of capital so that small business can develop.[144]

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143 **Servan-Schreiber, Jean- Jacques** 1968. *The American Challenge*. Hamish Hamilton translated from the French by Ronald Steel. London. p.3

144 **Guzzetti, Luca** 1995. p.36

He mentioned two factors that caused the "technology gap": First, in the USA the "cross-fertilization" was quicker. This term refers to the fact that research on different levels like government initiatives, research in large companies, and at universities made inventions that contributed to technological innovations and soon became products on the market.
Second, the importance of human capital was seen differently. In the USA there was a different attitude toward education and training and also toward adult education. Guzzetti described it as "an investment, (and) not a form of humanitarianism."[145] According to him, this led to the so-called "brain-drain" from Europe to America in the 1960´s. This problem was also considered by Servan-Schreiber: the technology gap was above of all a "management gap", meaning the poor training programs which were restricted to a minority and the hierarchical structures at universities hindered young talents.[146]

Multinational companies were seen as the "vanguard of a new technological imperialism" and Europe was perceived as "subservient."[147] To handle the commercial and technological offensive of the USA, individual European governments had proposed and tried out different policy approaches (or a combination of them) at national levels:

- Encouraging those American companies that had European subsidiaries and had profited from the advantages offered by the Common Market to find new markets
- Acquire the technological know-how from the USA and abandon research, innovation, and training
- Rigid protectionist policy, which would exclude all American investment from Europe

145 ibid p.36
146 **Servan-Schreiber, Jean- Jacques** 1968. p.3
147 ibid p.4

But all of those policy approaches had great disadvantages and the obvious solution was the Community option: Working together and "creating a whole which would be greater than the sum of their parts."[148] A response from the European governments and the Commission was to promote funds for collaboration. New programs were brought to live like ESPRIT, BRITE, RACE and EUREKA. These can be seen as the first steps to face the technological gap, but they were challenged by several problems: above of all, by the lack of legal justification.

3.2.3. The first steps as a reaction to the technology gap

3.2.3.1. Above - sectorial Programs

Even though the creators of the Treaties of Rome did not explicitly mention STP from the mid 1960s to 1974, several conferences were held on this topic[149] shaping the basis for a common STP significantly. In October 1972, at the summit talk in Paris, it was commonly agreed upon to use the described above Article 235 EEC, the so-called "general (elastic) clause" (Article 352 Lisbon Treaty). With this step, criticism toward the lack of a legal basis for STP was diminished for the time being, according to Sturm.[150] In Schumacher´s view, this was a silent extension of the Community´s competences.[151]

Finally, in the Council´s decision on 14 January 1974 a common policy in the field of S&T was developed. Two aims were identified:

1. Coordination of Member State´s polices
2. Implementation of research programs and projects of European Community´s interest

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148 **Guzzetti, Luca** 1995. p.37

149 **Schumacher, Dieter** 1975. Perspektiven einer internationalen Forschungspolitik. Problemskizze am Beispiel der Europäischen Gemeinschaften [Perspectives of an international research policy.The European Union- an analysis]. Verlag Otto Schwartz&Co. Göttingen p.35: The three conferences were: Den Hague (Dec.1969), Paris (Oct.1972) and Copenhagen (Dec.1973)

150 **Sturm, Roland** 2004. Die Forschungs- und Technologiepolitik der Europäischen Union [The research and technology policy oft he European Union]. In: Weidenfeld, Werner (eds.) *Europahandbuch*. Bertelsmann Stiftung. p.294

151 **Schumacher, Dieter** 1975. p.43

On the basis of Article 235 EEC, the Council approved eight separate research programs in May and June 1974.[152] The allocated budget for these programs could by no means be compared to the budged spent by Member States on their own national research programs. It only ranged between 1% and 2% of the total EU budget, according to.[153]

Ten years later, in the report "Research and Technology policy in the European Community: Developments until 1984"[154] published by the Commission in, the new strategy was put into a broader perspective: The strategy integrated all activities at the national and European level. An international view was also presented. The report presented activities reaching over the boarders of Europe and international actions. Furthermore, the strategy was designed to prevent mistakes that were made in the past. It enabled bridges between basic research and applied research and addressed problems of mobility for scientists within Europe.[155]
In that context, CREST, the Scientific and Technical Research Committee (French: Comité de la Recherche Scientifique et Technique), was brought to life. Up to now it is an important counseling body for EU´s STP, and a composed of national advisers.[156]

In the late 1970s some of the key issues the Commission addressed concerning S&T. Stubbs formulated these as "tentative proposals for action"[157]. For the time period between 1977 and 1980, those guidelines addressed four prime objectives[158]:

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152 **Pelzer, Christina Maria** 2004. Die Kompetenzen der EG im Bereich Forschung. Eine Analyse ihrer Reichweite und Grenzen vor dem Hintergrund des Art.5 Abs.3 GG [European Union´s competences in reserach and science. An analysis of scale and boundries with special emphasis to Art.5 P.3]. Edition 24: Kölner Schriften zu Recht und Staat. Europäischer Verlag der Wissenschaften. Peter Lang. Frankfurt am Main. p.63

153 **Guzzetti, Luca** 1995. p.37

154 **Kommission der Europäischen Gemeinschaften** 1984. Forschungs- und Technologiepolitik der Europäischen Gemeinschaften: Entwicklungen bis 1984, Luxembourg p.3

155 ibid p.4

156 **Pelzer, Christina Maria** 2004. p.62

157 **Stubbs, Peter** 1997. Science and Technology Policy In: Artis, Mike and Lee, Norman (eds.) *The Economics of the European Union* Oxford University Press. p.153

158 ibid p.151

1. Security of long-term supply of resources - namely, raw materials, energy, agriculture, and water;
2. Promotion of internationally competitive economic developments;
3. Improvement of living and working conditions; and
4. Protection of the environment and nature.

To understand the developments of the late 1970s, one needs to look over the Atlantic and consider the new context: In the USA deregulation "unleashed" two big firms: AT&T and IBM. Therefore, the biggest telecommunication firm on earth and the biggest computer firm were about to challenge the telecommunication market in Europe.[159]

The Davignon initiatives were a reaction to those developments:

The Davignon initiatives

Etienne Davignon (Commissioner for Industry from 1977-1985 and Commissioner for Research from 1981-85) initiated something new in order to respond to the developments in the USA.

In a document he criticized the Community´s fragmented effort in research and proposed an "explicit industrial strategy".[160] The outcome was the "Big 12 Roundtable": Representatives from the major European technology firms discussed the idea of collaboration in order to boost their performance. Davignon suggested Community actions to support the modernization process of knowledge and methods of the firms. In return, the firms had to resign from their focus on national market and counter the USA dominance by attacking foreign markets as European - based multinationals"[161]. That initiative was seen as an important "breakthrough" in European STP.[162]

159 **Peterson, John / Sharp, Margret** 2007. p.5 cited Dang Nyugen 1985
160 **Jones, Robert A.** 1996. p.204
161 **Peterson, John / Sharp, Margret** 2007. p.6
162 **Peterson, John / Bomberg, Elizabeth** 1999. p.203

New programs as part of technology policy: Davignon provided a strategy, of which ESPRIT was an offspring. It was followed by BRITE and RACE.[163]
All of those programs shared common characteristics:[164]

1. **Collaborative**: Participation of firms or research institutions from at least two EU countries
2. **Funding on a shared- cost basis**: Industrial partners paid 50%
3. **Priorities**: Commission set priorities with previous consultation with experts and user groups
4. **Election process**: Technological or academic excellence were the basis for accepted application, judged by an independent expert group
5. **Pre-competitive**: Support for purely basic and not applied research

A model for the criteria described above was Japan´s Very-Large Scale Integration Program (VLSI).[165] The Programs ESPRIT, BRITE, RACE and EUREKA, which are discussed below, became a full success. Large firms connected and verified their "collective problems and needs" and recruited further companies to join the Commission´s initiatives.[166]
These initiatives reflected the new policy predominantly oriented on technology policy[167]:

ESPRIT

ESPRIT is the acronym for "European Strategic Programme for Information Technology". It was a European Commission initiative established in 1984 for fostering the cooperation of the Member States in S&T and technological development. In the five-year program European Community´s (EC) resources in "information technology to

163 **Jones, Robert A.** 1996. p.204
164 **Peterson, John / Sharp, Margret** 2007. p.7
165 For further information see Peterson/Sharp. p.6
166 **Peterson, John / Bomberg, Elizabeth** 1999. p.206
167 **Sturm, Roland** 2004. p.296

full-systems capability based on semiconductor technology“ were developed.[168] Within a strategic program the collaboration between major European companies, SMEs and universities, and research institutions was aspired.[169]

Turek[170] called ESPRIT even a qualitative bounce of the STP, because the program was developed jointly with the industry and science community and was approved at the research council although some Member States´ opposition to the program.

Despite the skepticism of the firms (they feared bureaucratic delays) the success for ESPRIT was striking. As a consequence, a 10-year program (1984-1993) was established, extended for another five years in 1994, and finally in 1998 it became part of the new Framework Programme - the Information Society Technologies (IST) Programme.[171] Sandholtz[172] identified a change in patterns of cooperation: With ESPRIT, European firms looked for European partners, while formerly partnerships with American companies were the priority.

BRITE

BRITE means “Basic research in Industrial Technologies for Europe Programme” and was an important program for industrial innovation. Raising the technological level, and therefore the competitiveness, of European industry was the major aim. The funded projects were pre-competitive research.[173]

RACE

RACE stands for “Research and Development in Advanced Communications Technologies in Europe” and was launched in 1987. This major European Commission

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168 **The Europa Publications EU Information Series** 2008. European Union. Encyclopedia and Directory 2009. Routledge 9th Edition. London p.97

169 **Peterson, John / Sharp, Margret** 2007. p.71

170 **Turek, Jürgen** 2007. Forschungs-und Technologiepolitik [Research and technology policy]. In: Weidenfeld/Wessels (edt.) *Europa von A bis Z* Bundeszentrale für politische Bildung. Bonn. p.262

171 **Peterson, John / Sharp, Margret** 2007. p.72

172 **Peterson, John / Sharp, Margret** 2007. p.73 cited Sandholtz

173 **Council Decision** of 12 March 1985, concerning a multiannual framework programme of the European Economic Community in the fields of basic technological research and the applications of new technologies (Brite) (1985 to 1988) Official Journal 25 March1985: L83

initiative aimed toward the EC competitiveness in telecommunications and complemented ESPRIT.[174]

The aim was the introduction of broadband communication with ISDN and the possibility for the population to use these technologies in a cheap way. RACE was therefore more market oriented than ESPRIT. [175] It was replaced by ACTS in 1994.[176]

EUREKA

Soon after ESPRIT a different program was established: EUREKA. For Edler et al.[177] this was the most important initiative in terms of innovation policy. It also had a much wider membership than the EC itself, including EFTA countries like Turkey and later Eastern Europe and Russia. It was launched to strengthen the competitiveness and productivity of European industry by stimulating cooperation between research institutes and companies in advanced civilian technologies. Therefore EUREKA has always been closer to the market than the upcoming FP will ever be. In other terms,[178] this "loose intergovernmental initiative", which was not exclusively set up by and for EU Member States was established "to promote "near-market" research: that is R&D leading to "products, processes and services having a world-wide market potential."

The idea for the program came from the French president, François Mitterand and his counselor Jacques Attali. It was planned in order to have an alternative to the USA programme SDI (Strategic Defense Initiative) involvement under the Reagan administration. The French argued that EUREKA was more focused on civilian aims and

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174 **The Europa Publications EU Information Series** 2008. European Union. Encyclopedia and Directory 2009. Routledge 9th Edition. London p.152

175 **Sturm, Roland** 2002. Die Forschungs- und Technologiepolitik der Europäischen Union. [The research and technology policy oft he European Union] In: Weidenfeld, Werner (eds.) *Europahandbuch*. Bertelsmann Stiftung. p.498

176 **The Europa Publications EU Information Series** 2008. p.152

177 **Edler, Jakob / Kuhlmann, Stefan / Behrens, Maria** 2003. *Changing Governance of Research and Technology Policy*. Edward Elgar Publishing Limited, UK p.10

178 **Peterson, John / Sharp, Margret** 2007. p.7

not on military research, like SDI, and would assure European´s researchers not to be "´poached´ by the Pentagon".[179]

When it comes to the funding, a major part was contributed by the national governments and not the European Commission.[180] EUREKA was more of an "umbrella mechanism" for little R&D projects and therefore was more of a "sponsor" to these projects. As a sponsor it covered part of the activities of COST (European Cooperation in the field of Scientific and Technical research).[181]

After the setup of the programs described above, the "First Framework Programme" was installed. It is by no means comparable to the current FP7, because it was solely an umbrella term for the already existing single programs.

3.2.4. The First Framework Programme 1984-1989

Guzzetti described the situation at the end of the 1970s and at the beginning of the 1980s as anything other than ideal: no general strategy in Community STP existed and consequently great disarray in the research activities followed.

This was a result of the national government´s opposition to any extension of the Community´s responsibilities. As already described, every single program had to be unanimously approved in reference to Article 235 EEC or in reference to the EURATOM or ECSC Treaties. This resulted in long negotiations. On top of all that, the existing programs were truly fragmented and did not commonly support a strategic goal.

That situation inspired Commissioner Davignon and Director-General Paolo Fasella in laying the "basis for a real policy" in S&T.[182] As a result, the concept of the "**Research Action Programme**" (RAP, later named "Framework Programme"), comprised all of the distinct research programs, and was to become the cornerstone of the new policy. Davignon had in mind that the "Research Action Programme" would help to select and

179 ibid p.7
180 ibid p.7
181 **The Europa Publications EU Information Series** 2008. p.73
182 **Guzzetti, Luca** 1995. p.83

arrange scientific and technological goals, coordinate and plan the interaction of Community and national programs, and help create a way of financial planning.[183]

The RAP lasted four years and underwent a mid-term check-up. Scientific and technological aims guided actions in different fields.[184]

Three actions were used: [185]

1. **Direct actions**: decisions regarding the research of the Joint Research Center (JRC)
2. **Concentrated actions**: coordination of national activities
3. **Contract research**: financial involvement in public or private research activities

Decision process, objectives and budget

In terms of financing and planning the "FP1" the decision process was to a great extent a "dress rehearsal". The existing legal basis did not provide the funding for research in general. The total budget of 3750 ECU was equivalent to the budgets of the projects approved already by the Council.[186]A detailed chart of the decision-making process in the field of science and technology policy after 1 January 1985 can be found in the publication of the Commission.[187]

On 25 July 1983 the Council approved the "FP1".[188] Seven scientific and technological aims were selected while the "improvement of energy" was awarded the highest financial provision. Further aims were: promotion of competition in agriculture and in industry, improvement of management of raw materials and energy sources, improvement of living and working conditions, improvement of effectiveness of

183 ibid p.83
184 **Kommission der Europäischen Gemeinschaften** 1984. Forschungs- und Technologiepolitik der Europäischen Gemeinschaften: Entwicklungen bis 1984, Luxembourg p.15
185 ibid p.15
186 **Guzzetti, Luca** 1995. p.84
187 **Kommission der Europäischen Gemeinschaften** 1984. p.12
188 ibid p.12

Community´s scientific and technological potential. The following table shows the specified budget:

Aims	*ECU (mil)*	*%*
1. Promotion of agricultural competition - Improvement of agricultural productivity and of the quality of products in agriculture and fishery	130	3,5
2. Advancement of industrial competition - Abolishment and reducing of obstacles - New methods and products for traditional industry - New technologies (ESPRIT, biotechnology, telecommunication)	1060	28,2
3. Improvement of raw materials management	80	2,1
4. Improvement of energy management	1770	47,2
5. Strengthening of development aid	150	4,0
6. Improvement of living and working conditions	385	10,3
7. Improvement of Community´s scientific and technical potential effectiveness - Horizontal actions	85	2,3
Total	**3750**	**100,0**

Table 1 Budget distribution of FP1 [189], [190]

Rationales

In 1985, in the already mentioned report by the Commission the rationales of EU's STP were outlined. Dr. Karl-Heinz Narjes, Vice President of the Commission at that time, spoke in the foreword about the necessity of a European STP on the brink of the third industrial revolution. His major argument was the avoidance of "scientific double work" by intensive cross boarder exchange of personnel and information.[191]

In the report itself, further arguments for the European STP were given: the socio-economic orientation of the EEC where research was stated as crucial for future economic growth, and therefore essential to the well-being of the 300 million inhabitants of the Community and further on, the sharing of costs and risks by

189 **Kommission der Europäischen Gemeinschaften** 1984. p.27 (translated from German into English by the author)

190 **Guzzetti, Luca** 1995. p.83

191 **Kommission der Europäischen Gemeinschaften** 1984. p.III

collaborating. The ultimate argument was the importance of STP for the building of "Europe" in that difficult time of an economic crisis.[192]

Justification for RAP- Reisenhuber criteria

In relation to the national research activities, special criteria had to be considered. If a "European value" was resumed by collaboration, the Community was able to take the overall responsibility in acceptance with the Council. Hereby short-, medium-, or long-term advantages resulted from actions on the Community level rather than actions by single Member States.[193]

The following four original criteria were commonly known as the "**Reisenhuber criteria**" and are named after the German minister of research Heinz Reisenhuber, who was in charge of the composition. Community involvement in research was justified if:[194],[195]

- Single Member States alone could not bear the financial means and personnel for big research projects
- Financial benefits would resolve from cooperation
- Significant research were achieved (e.g. cross-border problems) or
- Cohesion of the common market and unification of European science and technology was promoted.

To these original measures, two more were added after some time and Community involvement in research is further justified if:

- Research contributes to the social cohesion (added in 1987) or
- Mobility of researchers and the coordination of national policies are supported (added in 1994).

All of these criteria are to influence the principle of subsidiarity, which would become a cornerstone of the Maastricht Treaty. This is discussed in detail in Chapter 3.4.

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192 ibid pp.34
193 ibid p.26
194 ibid p.26
195 **Guzzetti, Luca** 1995. p.84

The importance of the RAP is what Guzzetti compared with a "multi-dimensional matrix": First, the different programs aimed at a common STP by being approved at the same time. Secondly, the programs interacted with other Community policies like agriculture, industry, and communications and so on.[196] Since the legal basis was not strong enough, further actions had to be taken:

3.3. S&T as a policy field of the EC

In this chapter, the following issues are described: first, the general development toward the Single European Act (SEA), secondly the impact on STP, and thirdly the SEA in relevance to the EU-USA relation.

3.3.1. Need for legitimation of European STP

With the extension of the EC´s actions in S&T, the use of the "general (elastic) clause" (Article 235 EEC Treaty) for Europe´s STP was once more highly discussed. This legal justification was no longer sufficient. The Commission and the European Parliament (EP) urgently needed a strong legal basis. Both were motivated to "break out of the stop - start cycle of ad hoc decision-taking and wrangling over funding of research proposals", according to Stubbs.[197] The discussions over the formulation were stopped, by including STP in the Single European Act in 1987. This was about to change the basis for STP entirely.

3.3.2. Developments leading to SEA

In the beginning and the middle of the 1980s the situation of the Community, which by then had twelve Member States, was far from solid. It was a time of a „tiredness of

196 ibid p.83
197 **Stubbs, Peter** 1997. p.158

Europe“ as Weindl/Woyke[198] discussed it or a time of „Europessimism or Eurosclerosis“, according to Guzzetti.[199] In the focus of the dissatisfaction were three issues: First, the common agricultural policy (CAP) and the industrial policy. The CAP was criticized because of its high costs and low results. Second, the inflexibility of the Treaties establishing the Communities along with the „lack of economic resources at the Community´s autonomous disposal“.[200] The establishment of new common policies was not an easy task, because of the strong interference of national interests.[201] All of these were major obstacles for a further integration and the situation was not satisfying at all.

The first response came from the EP in 1984 with the “**Spinelli Report**” and had a great impact. The EP had been directly elected for the first time only five years earlier. The official name of the report by the member of European Parliament (MEP), Italian Antonio Spinelli, was: „Draft Treaty Establishing the European Union“. It was „Pre-federal in nature“, and not only urged for an institutional balancing within the Community but suggested a significant extension of the Community´s powers and involvement in diverse policy fields.[202] Science and education are also mentioned in the report.

Therefore, the “Spinelli Report” was significant to STP and to education policy. It could even be said that it was the first time that STP and education were officially mentioned as a policy field of the Community. In part IV of the report, several policy fields were outlined: economic policy, policy for society, and international relations. In Title II, the policy for society, Article 60 was dedicated to research and education:

> *„In order to create a context which will help inculcate in the public an awareness of the Union's own identity and to ensure a minimum standard of training creating the opportunity for free choice of career, job or training*

198 **Weindl, Josef / Woyke, Wichard** 1999. *Europäische Union [European Union]*. Oldenbourg Verlag, Munich, Vienna. 4th edition. p.8
199 **Guzzetti, Luca** 1995. p.110
200 ibid p.110
201 **Weindl, Josef / Woyke, Wichard** 1999. p.8
202 **Guzzetti, Luca** 1995. p.110-111

establishment anywhere in the Union, the Union shall take measures concerning:

- *the definition of objectives for common or comparable training Programmes,*
- *the Union-wide validity and equivalence of diplomas and school, study and training periods,*
- *the promotion of scientific research."* [203]

To highlight Spinelli´s argument: Scientific research and education were important to the „Union´s own identity" and for the „minimum standard of training". In other words, research and education were not intended by Spintelli to improve competition or economic competitiveness. Although the Spinelli report was not one–to–one adopted by the governments of the Member States, it was vital to the SEA and later to the Maastricht Treaty.[204]

Not even six months later, in January 1985, the new President of the Commission, Jacques Delors, informed the Parliament about the Commission´s major task of eliminating „all of Europe´s internal borders by 1992": the creation of a single European market. On the way to achieve this goal, three types of barriers were identified, which hindered the freedom of movement within the boarders: physical, fiscal, and technical. The most „pervasive" were the technical barriers, according to Guzzetti.[205] The barriers resulted from each country´s technical regulations and standards aiming at quality and safety- especially in high-technology sector. These regulations and standards were incompatible between the countries and subsequently intra - European trade was highly uneconomic.[206]

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203 **Spinelli´s Footsteps**. http://www.spinellisfootsteps.info/treaty/60.html [07 May 2010]

204 **Bulletin of the European Communities** 1984. *Draft Treaty establishing the European Union* No 2. Office for official publications of the European Communities. Luxembourg. 14 February 1984 online: http://www.cvce.eu/obj/european_navigator-en-0c1f92e8-db44-4408-b569-c464cc1e73c9 [17 January 2012]

205 **Guzzetti, Luca** 1995. p.111

206 ibid p.111

In the same year at the Council meeting in June 1985 in Milan, another advancement toward a European STP was made: The Commission proposed the Memorandum "**Towards a European Technology Community**". The reasons for this Technology Community were the challenges Europe had to face in the mid-1980s. These were expressed by statements like:

> *"It (technology) is increasingly becoming a strategic factor (…) the Community must turn to account in order to regain its competitiveness"* and further on it *"plays a central role in our societies because of its impact on economic growth and job creation, social and cultural progress, environment and security".*[207]

In conclusion, the "Community will ensure that the technology effort is closely linked to common policies and in particular with trade and competition policies"[208] in order "to strengthen the technological base of European industry and to develop its international competitiveness."[209]

This Memorandum became later the basis for Article 130 f-q EEC Treaty and was included in the SEA.[210]

3.3.3. The Single European Act 1986

The SEA reformed the three Treaties of the European Communities.[211] It was approved in February 1986 and was enforced in July 1987. Consequently it represented a new dynamic and dimension of the European political integration. Observing the preamble, Europe will

> *"aim at speaking ever increasingly with one voice and (to) act with consistency and solidarity in order more effectively (to) protect its common interests and independence".*[212]

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207 **Commission of the European Communities** 1985. *Memorandum. Towards a European Technology Community.* COM (1985) 350final. Brussels. 25 June 1985 p.1

208 ibid p.2

209 ibid p.4

210 **Sturm, Roland** 2002. Die Forschungs- und Technologiepolitik der Europäischen Union. [The research and technology policy oft he European Union] In: Weidenfeld, Werner (eds.) *Europahandbuch*. Bertelsmann Stiftung. p.497

211 **Guzzetti, Luca** 1995. p.111

212 **Single European Act** 29 June 1987. Preamble

In the preamble the extension of the Community´s competencies was also written in order to "improve the economic and social situation (…) and to ensure a smoother functioning of the Communities."[213] Hereby "economic and social cohesion" should ensure a homogenous development of the different regions of Europe[214] and a technical basis for the international competitiveness of European industry was built.[215]

Pfetsch[216] described the importance of the SEA to the overall European integration process on three levels: economy policy, institution, and foreign policy. Guzzetti and Weindl/Woyke also contributed to this analysis:

First, a new **economic dynamic** was achieved. The SEA represented the commitment of the Member States to the Single Market[217] and it was to be finished in 1992. Guzzetti even described the objectives of the SEA as "primarily economic".[218]
Secondly, **higher institutional efficiency** was pursued. The Council became the "highest political body", according to Guzzetti.[219] In order to ensure the Single Market project, the Council could act by a qualified majority rather than on unanimity, according to Weindl/Woyke. In the field of STP, unanimity was still obliged.[220]
Thirdly, further steps in a **common foreign policy** were taken. Guzzetti described the foreign policy as standing "on a rather uncertain footing".[221] Regarding to foreign policy, questions of defense were for the first time officially mentioned, according to Pfetsch.[222]

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213 ibid Preamble
214 **Guzzetti, Luca** 1995. p.112
215 **Weindl, Josef / Woyke, Wichard** 1999. p.10
216 **Pfetsch, Frank R.** 2005. *Die Europäische Union [The European Union]*.3rd edition. Wilhelm Fink GmbH&Co. p.57
217 ibid p.57
218 **Guzzetti, Luca** 1995. p.112
219 ibid p.111
220 **Weindl, Josef / Woyke, Wichard** 1999. p.10
221 **Guzzetti, Luca** 1995. p.111
222 **Pfetsch, Frank R.** 2005. p.57

3.3.3.1. SEA and the USA

During that time, the USA indirectly played a significant role in the realization of the European project:

Pfetsch[223] discussed the "cost of non-Europe" as relevant to the new dynamic European development. The fear of lagging behind the USA and Japan gave stimulus to a closer Community. The Ceccini-Report of 1988, authorized by the Commission influenced that development. The essence was that the costs of not taking steps toward the Single European Market would be on a broad scale: low economic growth, high unemployment and an even higher inflation.

Weindl/Woyke[224] argued that with the development of the SEA, the USA became more of a competitor than a driving source for European integration and that the EC had to find its place in foreign policy and in the global economy. The SEA is an international treaty,[225] therefore laying the basis for the economic treaties between the EU and the USA in the 1990s.

These treaties will be discussed in detail in Chapter 4 of the thesis.

3.3.3.2. Science and Technology in the SEA

The SEA is significantly important, because "for the first time, the Community was given competence in research and technology."[226] S&T was covered by Article 130f-q by the newly established Title VI [227] . It was added to part three of the EEC Treaty.

The **main objectives** of this legal step were evident, according to Peterson/Sharp[228]:

- First, the strengthening of Europe´s S&T competence and
- Second, the promotion of Europe´s competitiveness on an international level.

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223 ibid.57
224 **Weindl, Josef / Woyke, Wichard** 1999. p.8
225 ibid p.8
226 **Peterson, John / Sharp, Margret** 2007. p.8
227 **Guzzetti, Luca** 1995. p.112
228 **Peterson, John / Sharp, Margret** 2007. p.8

Jones even argued that "the need to address the Union´s technology gap was reflected" in the SEA.[229]

Kneucker[230], an Austrian legal expert, compared the Articles 130f-q EEC to a "business plan". Those Articles were somehow a "business plan" on a macroeconomic and political level. (Although he referred in his comparison to the later Articles of the Maastricht Treaty of 1992, the analogy can also be drawn to the Artices EEC.) The ultimate goal was a competitive European S&T in the global arena.
Kneucker described the uniqueness of this approach in the common planning, execution, and funding of the FP by exploiting the resources efficiently. This was especially seen in contrast to other RTD Programs (e.g. CERN or EUREKA), which did not have the legal basis or the broadness of areas eligible to be funded such as the FP.[231]

The changes with the Maastricht Treaty, the Amsterdam Treaty and the Lisbon Treaty are discussed later in the thesis. As already mentioned, on page 167 synopsis of the S&T Articles is given.
At this point, the relevant Articles for the thesis are discussed:

In this part of the thesis the referred Articles are presented in its original wording published on 29 June 1987 in the Official Journal of the European Communities.[232]

229 **Jones, Robert A.** 1996. p.197
230 **Kneucker, Raoul** 2005. p.7
231 ibid p.7
232 **Single European Act,** 29 June 1987

ARTICLES FOR SCIENCE AND TECHNOLOGY	
Art EEC	Description
Art 130f	Objectives and visions
Art 130g	Activities for reaching the objectives
Art 130h	Specific activities for coordination of the policies of European and national level
Art 130i, 130k	Common instruments for execution of "indirect" activities / Framework Programme
Art 130l, 130m	Additional multilateral instruments with or without the Community
Art 130n	Cooperation with Third Countries and international Organizations
Art 130o	Joint undertakings or other structures for the efficient execution ("direct" activities)
Art 130p	Financing
Art 130q	Decision making procedures

Table 2 Schematic overview of Title VI[233]

Objectives

In **Article 130f/1**, the close relation between STP on the one hand, industry and competitiveness on the other hand can be identified:

> *"The Community´s aim shall be to strengthen the scientific and technological basis of European industry and to encourage it to become more competitive at international level."*[234]

Jones even suggested looking at investigating technology, industry, and competition policy as a whole. He reasoned that all of them were vital to the "European business environment"[235] and any progress in one of these fields had consequences for the others. Therefore economic growth, competitiveness, and employment depend on scientific and technological progress.[236]

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233 translation and adaption from Kneucker, Dr.Raoul F., Vienna, 2005, section 2, original in German and after Amsterdam numbering

234 **Single European Act** 29 June 1987

235 **Jones, Robert A.** 1996. p.197

236 ibid p.197

But first and foremost, the SEA aimed at the completion of the Single Market**. Article 130f/3** stood in close connection to this overall goal:

> *"(…) special account shall be taken of the connection between the common research and technological development effort, the establishment of the internal market and the implementation of common policies, particularly as regards competition and trade."*[237]

By identifying the objectives of Community research outlined in the Single Act as "primarily economic" Guzzetti[238] pointed out the the linkage between research and completing the Single Market. This is to be done by the Community´s encouragement of cooperation between companies, SMEs, research centers, and universities. By establishing the FP, companies learned to "treat the single market as a `home` market", according to Peterson/Bomberg.[239]

Activities

The types of activities were outlined in **Article 130g (a-d).** The Community was in charge of the implementation of research, development, and demonstration programmes where industry, research centers, and universities shall cooperate.
But also the cooperation with third countries and international organizations was mentioned in **Article 130g(b):**

> *"promotion of co-operation in the field of Community research, technological development, and demonstration with third countries and international organizations"*[240]

The dissemination and usage of results, the training and mobility of researchers were targets.
Although, according to Kneucker, EUREKA had already been open for East European countries and the Russian Federation[241] this Article was mainly used as a means of

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237 **Single European Act,** 29 June 1987
238 **Guzzetti, Luca** 1995. p.112
239 **Peterson, John / Bomberg, Elizabeth** 1999. p.201
240 **Single European Act** 29 June 1987
241 **Kneucker, Raoul** 2005. p.14

integration toward the candidate countries. Most of these countries are by now members of the European Union.[242]

Subsequently, within the association contracts, Articles concerned with S&T established a broad framework for cooperation. In the following years, this cooperation is to be interlinked with the foreign policy of the Union. Kneucker further analyzed that the Commission took only undertakings beneficial to the Union´s objectives until the FP4. In the later programmes, it is divided between interests from the Union or from third countries: "Mutual benefits" were the key concepts for cooperation undertakings.[243]

From the beginning of the European STP, mobility of the human resources was implemented. Education and training are therefore seen as key priorities. **Article 130g(d)** focused at the

"stimulation of the training and mobility of researchers in the Community" [244]

From a historical perspective, Kneucker saw a change from the just training of scientific personnel toward a broader support for promoting scientific careers within a unified Europe.[245]

Coordination

On the basis of **Article 130h**, the Member States and the Commission shall coordinate their policies. For the coordination of the policies, a centralized Community Research and Development Information Service (CORDIS) was installed. The Commission´s task was the improvement of coordination of member state´s research and technological development (RTD) programs, according to Jones.[246]

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242 ibid p.15
243 ibid p.15
244 **Single European Act,** 29 June 1987
245 **Kneucker, Raoul** 2005. p.19
246 **Jones, Robert A.** 1996. p.204

Instruments

In **Article 130i**, the overall instrument of the Community was introduced: the multiannual Framework Programme (FP).

> *"The Community shall adopt a multiannual framework programme setting out all its activities. The framework programme shall lay down the scientific and technical objectives, define their respective priorities, set out the main lines of the activities envisaged and fix the amount deemed necessary"*[247]

The FPs are to become the main instrument of the European STP. Stubbs called them "the key provision" and they were set out for five years.[248] The main lines of activities shall then be "implemented through specific Programmes developed within each activity", so **Article 130k**.

As described previously, within the FP1, the already existing programs were pooled together. After the SEA, from the FP2 onwards a pooling was not necessary, because the FPs were legally justified.

International Cooperation

In accordance with Article 228, **Article 130n** justified Agreements and third - party negotiations:

> *"In implementing the multiannual framework programme, the Community may make provision for co-operation in Community research, technological development and demonstration with third countries or international organizations."*[249]

Guzzetti added that arrangements were made so that not all Member States have to participate in theses specific international organization programs.[250]

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247 **Single European Act,** 29 June 1987
248 **Stubbs, Peter** 1997.p.158
249 **Single European Act,** 29 June 1987
250 **Guzzetti, Luca** 1995. p.112

Decision - making procedure

The decision-making procedure of the FP was laid down in **Article 130q.**[251] In general the Commission had the right to propose. In a further step, the Economic and Social Committee was to be consulted. Then two different procedures had to be considered, depending on the relevant issue: Regarding the FP (activities, objectives, and budget) and the joint undertakings, after consulting the EP, the Council decided on the principle of the unanimous vote.

Articles 130k, 130l, 130m, 130n and 130p(1) were to be decided by the Council in cooperation with the EP and by the qualified majority voting (QMV).

Peterson/Bromberg[252] identified the decision-making process as a "double legislative procedure" and criticized it because of its time and resource consuming nature.

3.3.4. The Second Framework Programme 1987-1991

From January 1985 until January 1989 the German Karl Heinz Narjes was Commissioner for Industrial Affairs, Information Technology, Research and Science, and the Joint Research Center. It fell into his responsibility to consolidate and to possibly increase the Community´s activities in the field of S&T.[253]

With the FP2 two important topics were introduced: economic and social cohesion as well as the forerunner of the principle of subsidiarity.

First, the **principle of economic and social cohesion**: Introduced by the SEA, social cohesion was consequently added to the "Reisenhuber criteria", therefore becoming the fifth criteria, where the Community may become active in the field of STP:

> *"research which contributes to the strengthening of the Community´s economic and social cohesion, as well as to the promotion of its harmonious and*

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251 **Single European Act** 29 June 1987

252 **Peterson, John / Bomberg, Elizabeth** 1999. p.209

253 **Guzzetti, Luca** 1995. p.121

> *widespread development, while maintaining its consistency with the objective of technical and scientific quality."*[254]

Second, the **forerunner** of the **principle of subsidiarity:**

> *"(The Commission) considers that where national or multilateral programmes and activities capable of meeting these objectives already exist, it is not necessary to develop new initiatives at Community level."*[255]

The principle of subsidiarity will become a major topic of the Maastricht Treaty of 1992 and will be discussed later.

Budget

As Commissioner Narjes made his first proposal in 1986 regarding the budget, he suggested ECU 10 billion. This would be equivalent to 5% of the Community´s annual budget. Although it was announced to reserve 6% of the budget for STP at the summit in Milan in 1985, several national governments did not agree in this major budget increase. Germany and especially Great Britain were the major opponents. After a year of proposals by the Commission, finally a budget was agreed upon. The final sum was ECU 5.4. Mil., equivalent to less than 3% of the total Community budget.[256] In comparison, agriculture was the biggest budget item with 70% of the overall EU´s budget.

The following table outlines the distribution of the budget:

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254 **Council Decision** of 28 September 1987 concerning the framework programme 1987-1991", Annex III, Official Journal of the European Communities, 24 October 1987

255 **Commission of the European Communities** 1985 *Implementation of the Commission Memorandum Towards a European Technological Community.* COM (85) 530 final, Brussels. 30 September 1985. p.5

256 **Guzzetti, Luca** 1995. p.122

Activity	*MECU = Million ECU*	*%*
1. Quality of life	375	6,95
2. Towards a single market and an information and communication society	2275	42,16
3. Modernization of industrial sectors	845	15,66
4. Exploitation and optimization of biological resources	280	5,19
5. Energy	1173	21,74
6. Science and technology at the service of development	80	1,48
7. Exploitation of the sea-bed and the optimization of marine resources	80	1,48
8. Improvement of European S&T cooperation: incentives, optimization and utilization of human resources, use of large-scale facilities, forecasting and assessment of other support actions (including statistics), and the dissemination and use of S&T research results.	288	5,34
Total	**5396**	**100**

Table 3 Budget distribution of FP2[257]

The biggest financial resources were allocated to information technology and telecommunication. ESPRIT was carried on in the area of information technology and RACE was then a program within the area of communication.[258]

3.3.5. The Third Framework Programme 1990-1994

Filippo Maria Pandolfi, the new Commissioner (1989-1992) for Science, Research and Technology, Telecommunications, Information and Innovation Industries, and the Joint Research Centre decided to set up the new FP by 1990- a year before the end of the FP2.

This decision was based on several reports of experts and led to the „rolling Programmes mechanism“, meaning the FP would overlap for one or two years. This

257 **Commission of the European Communities**. 1992. *Evaluation of the Second Framework Programme for Research and Technological Development*. Brussels, Communication from the Commission SEC (92) 675 final. 22 April 1992.

258 **Sturm, Roland** 2002. p.498

would provide appropriate financial planning and the continuation of the research activities.

The approval of the FP3 had to undergo several difficulties mostly regarding the budget. The Council, the Parliament, and the Commission disagreed on the funding. The Commission proposed ECU 7.7 billion and the Parliament ECU 8.23, while the Council proposed ECU 5.7 billion. The Council finally approved the FP3 on 23 April 1990 with some changes, for example the specific programs were reduced to 15 and only six action lines were given.[259]

During the approval process, the Council stated six concerns, which influenced the main objectives of the FP3. Guzzetti[260] called the first three objectives as "linked strictly to the project to complete the Single Market". These were:

1. "Improve industrial competitiveness while at the same time maintaining the precompetitive nature of Community actions;
2. Cope with the challenges linked to the competition of the Single Market for standards, thus boosting pre-normative researchers;
3. Modify the attitude of industrial operators, by orienting it towards transnational initiatives"

The remaining goals were, according to Guzzetti, more of a "novel nature, signaling the expansion of the responsibilities of Community research and development policy". These were:

4. "Instill a European dimension in the training of staff engaged in scientific research and technological developments;
5. Increase economic and social cohesion while ensuring the scientific and technical excellence of research projects;
6. Take account of safeguarding the environment and the quality of life."

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259 **Guzzetti, Luca** 1995. p.138

260 ibid pp.140

Clearly, some of these directions or "guidelines" were quite close to the already discussed "Reisenhuber criteria".

The following table outlines the distribution of the budget:

Activity	*MECU = Million ECU*	*%*
Dissemination of technologies		
1. Information and communications technologies	2516	38,1
2. Industrial and material technologies	1007	15,3
Management of natural resources		
3. Environment	587	8,9
4. Life Science and Technologies	840	12,7
5. Energy	1063	16,1
Management of intellectual resources		
6. Human and Capital Mobility	587	8,9
Total	**587**	**100**

Table 4 Budget distribution of FP3[261]

By 1993 the Commission and Parliament had pointed out that the budged was too small, so an additional 900 million ECU were approved. This corresponded to an increase of 30,6% in the field of energy and 13,3% in the other areas.[262]

Although the FP3 was "preponderantly pre-competitive", a progression in technology urges for a "continuum of interlinked activities, ranging from basic research to the demonstration of the applications of new technologies".[263] Sturm identified in this

261 **Cordis Information Service on research. FP3**. http://cordis.europa.eu/search/index.cfm?fuseaction=prog.document&PG_RCN=176721 [17 June 2009]

262 **Guzzetti, Luca** 1995. p.141

263 **Cordis Information Service on research. FP3**. http://cordis.europa.eu/search/index.cfm?fuseaction=prog.document&PG_RCN=176721 [17 June 2009]

context, the trend to a market-oriented research with the FP3. This can be realized especially in the field of environmental research and biotechnology.[264]

3.4. STP application to other policies

In the following sections the developments toward the establishment of the European Union, the Maastricht Treaty, and its relevance to the STP and the USA are described.

3.4.1. The Maastricht Treaty 1992

The Maastricht Treaty - the Treaty establishing the European Union - was a result of internal and external events. Internally, the Member States desired some reforms of the Community. Externally, the end of the communism in Eastern Europe neared the possibility of a united Germany. This event strengthened the necessity of an "international position" of the Community.[265]

As a result, with the Maastricht Treaty the Community became a broader political institution: The European Union (EU). Three "pillars" became the basis for the Union. The first, and oldest, pillar was the European Communities (EC). Here, the co-decision procedure was introduced, thus making "the Parliament a legally and politically equal legislator to the Council of Ministers".[266]

The second pillar was the common foreign and security policy (CFSP). The respective responsibility resided with the Council of Ministers of Foreign Affairs for the national governments, whereas the Commission could make proposals, but the EP was simply informed about the decisions.

The third pillar was absolutely inter-governmental in character: justice and home affairs (JHA)[267] including immigration, asylum, and criminal matters.[268]

The following table demonstrates the three pillars:

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264 **Sturm, Roland** 2002. p.498
265 **Treaty of Maastricht on European Union** 1992
266 **Bomberg, Elizabeth / Stubb, Alexander** 2003. p.34
267 **Guzzetti, Luca** 1995. p.150
268 **Bomberg, Elizabeth / Stubb, Alexander** 2003. p.34

The three pillars of the European Union *Treaty on European Union*		
Common provisions Task: Objectives, Single Institutional Framework, Principles		
2nd pillar	**1st pillar**	**3rd pillar**
Common Foreign and Security Policy (CFSP) *Intergovernmental cooperation method*	• European Community (EC) • European coal and Steel Community (ECSC) • European Atomic energy Community (Euratom) *Community integration method*	Cooperation in the fields of justice and home affairs (JHA) *Intergovernmental cooperation method*
Final provisions		

Table 5 Three Pillars of European Union[269]

The Treaty was ratified in November 1993 after facing "ratification battles", according to Bomberg/Stubb.[270] In Denmark, two referenda had to be held in order to achieve a positive result. The reason for the skepticism was the so-called perceived "democratic deficit" of the EU.

It is important to mention that the EU did not replace the EC. The Community was still the legal entity. The EU rather represented the broadest possible institutional framework by drawing together the competences of the European Council, according to Guzzetti.[271]

From the beginning onward the Community was clearly economic oriented. However, with the appearance of the Maastricht Treaty, the objectives of the Community went doubtlessly "beyond its original economic" origin.[272] The EU became a political

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269 compare http://www.ena.lu/pillars_european_union_maastricht_february_1992-2-21755 11 May 2010

270 **Bomberg, Elizabeth / Stubb, Alexander** 2003. p.35

271 **Guzzetti, Luca** 1995. p.150

272 **Treaty of Maastricht on European Union.** online: http://europa.eu/legislation_summaries/institutional_affairs/treaties/treaties_maastricht_en.htm [23 January 2012]

institution in addition to the economic raison d'être. This was reflected in the following five objectives of the Maastricht Treaty: [273]

1. Strengthening the democratic legitimacy of the institutions;
2. Improving the effectiveness of the institutions;
3. Establishing economic and monetary union;
4. Developing the Community social dimension;
5. Establishing a common foreign and security policy.

As a result, several new policy areas fell into the Community´s competences. Two of these had already been mentioned in the SEA, but were awarded a greater importance: economic and social cohesion and social affairs.

In terms of **cohesion policy,** a specific fund was set up where environmental projects and trans-European transport networks were financed . By the first mentioned policy, the tightening of the wealth gap between the Union´s richest and poorest regions was tackled. Therefore the social needs of the European citizens became an objective.[274] A fund for the **social policy** was created for the improvement of living and working conditions of European citizens.[275] This included education, vocational training, and youth.

Further on, "culture, health and consumer protection" were also included in the Union´s competences. Industry was covered as well, and at last, trans-European transport and telecommunications became a policy field. Energy policy was not involved, because of reluctance of the United Kingdom and the Netherlands and their protection over their natural gas and oil.[276]

One of the major impacts of the Treaty was the introduced principle of "**subsidiarity**". With this principle, the Union does not take action unless a higher effectiveness can be

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273 ibid

274 **Guzzetti, Luca** 1995. p.150

275 ibid p.151

276 **European Navigator**. The authoritative multimedia reference on the history of Europe. Maastricht Treaty. http://www.ena.lu/characteristics_treaty_european_union-2-19175 [12 December 2009]

ensured by it than by the actions taken on national, regional, or local level. This excludes those areas where the Community holds exclusive competences.[277]

3.4.1.1. Science and Technology in the Treaty of Maastricht

S&T application to other policies

With the Maastricht Treaty, the competence in S&T was deepened. Several changes were made with the prominent change of **Article 130f.** In the original Article only the competitiveness of the Community´s industry and the S&T base were the objective, but now

> *"promoting all the research activities deemed necessary by virtue of other Chapters of this Treaty."* [278]

With this addition the original idea was reemphasized, according to Guzzetti[279]:

> *"the Community´s R&TD policy should be, first and foremost, at the service of other Community policies."*

With this addition, more obvious legitimacy was given to those areas of research not directly linked to competitiveness, and previously acknowledged on the basis of Article 235 EEC (general elastic clause). These fields were: environmental and medical research and protection against radiation, but also basic research. For the first time the area of social sciences was becoming part in the Union´s research policy. This will be reflected in the upcoming FP4.

To sum it up, as Pelzer[280] did, the EU could sponsor any scientific undertaking, either basic or applied research or within or outside of universities.

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277 **Europa Glossary**. "Subsidiarity". http://europa.eu/legislation_summaries/glossary/subsidiarity_en.htm [17 July 2011]

278 **Treaty on European Union**. 29 July 1992. Official Journal C191, online: http://eur-lex.europa.eu/en/treaties/dat/11992M/htm/11992M.html [20 March 2009]

279 **Guzzetti, Luca** 1995. p.153

280 **Pelzer, Christina Maria** 2004. p.69

Decision-making

It is widely published, that the topic last discussed at the Maastricht summit was the "Social Chapter". Peterson/Sharp[281] negated this, and identified research as the very last issue debated. The most controversy topic was the funding. The Commission wanted to change the unanimous vote to a QMV for all Council decisions related to EU-funded research. The British Prime Minister John Major was against this and was supported by the German Chancellor Helmut Kohl. In the end, the British and Germans carried through their claim and the decision-making on the budged was not changed. Peterson/Bomberg[282] analyzed in detail the decision-making process after Maastricht and even call them "history-making" decisions, which were "highly politicized" in terms of budgetary issues. For an overview of the co-decision process, the following table is presented, however, not further discussed:

1	Commission agrees proposal for the Framework Programme´s budget and general priorities (for four to five years).
2	Submission of proposal to Council and EP.
3	"First reading" of EP (amendments proposed).
3	Development of Council´s "common position" (in light of EP´s proposed amendments by unanimous vote.
4	"Second reading" by EP on Council common position (with amendments raised and voted upon).
5	Convening of "conciliation committee" (unless Council accepts proposed EP amendments).
6	Council - EP agreement on overall proposal (with Council acting by unanimity).
7	Submission of Commission proposals for individual Programmes (i.e., ESPRIT, RACE).
8	Council adopts individual Programmes (by qualified majority after "consulting" EP).
9	Commission develops "work plans" for individual Programmes
10	Commission submits "calls for tender".
11	Proposed projects scrutinized by independent experts and management committees.
12	Lists of projects to be funded approved by the Commission.

Table 6 The post-Maastricht decision-making process for RTD policy[283]

281 **Peterson, John / Sharp, Margret** 2007. p.116
282 **Peterson, John / Bomberg, Elizabeth** 1999. p.213
283 **Peterson, John / Sharp, Margret** 2007. p.174

This lengthy procedure relied completely on the communication between the three institutions: the Council, Commission, and Parliament, also called the "trialogue". The procedure was not very constructive[284] and urged for changes. With the upcoming FP4, this procedure became highly unpractical, thus resulting in slight changes in the Treaty of Amsterdam in 1992.

Budget

Looking at the financial issue, the FP now covered all of the Community's research and development activities. **Article 130i** included "fix the amount deemed necessary", with the Maastricht Treaty it was changed into *"fix the maximum overall amount".*[285] New as well was that the objectives and budget of the FP were set out for five years.[286]

Further changes

Co-ordination: **Article 130h** was slightly changed to:

> *"The Community and the Member States shall co-ordinate their research and technological development activities so as to ensure that national policies and Community policy are mutually consistent."* [287]

Previously, the co-ordination had been complicated and "largely unfruitful".[288] The co-ordination of national STP has to be seen in combination with the introduced principle of **subsidiarity**: This meant for the Community´s STP that the Commission could take power in coordination of national STPs, if this is beneficial to the whole Union. In terms of **cohesion**, the S&T programs would "become an essential component of the research efforts of poorer Member States."[289]

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284 **Guzzetti, Luca** 1995. p.154
285 **Guzzetti, Luca** 1995. p.154
286 **Peterson, John / Sharp, Margret** 2007. p.173
287 **Treaty on European Union**. 29 July 1992.
288 **Guzzetti, Luca** 1995. p.153
289 **Peterson, John / Bomberg, Elizabeth** 1999. p.207

3.4.1.2. Industrial Policy

With the Maastricht Treaty, a chapter about industrial policy was included under Title XIII. This step reflected the great significance of industry, according to Jones.[290] With regard to the evolvement of the industrial policy the German Martin Bangemann has to be mentioned. He was Commissioner for Industry during the 1990s and for him "competition and industrial policies are not opposites" while "the internal market itself is the best example of an industrial policy."[291]

Traditionally, this policy field covered actions toward the structure of industry, market, and competitiveness. Thus including the "modernization of capital stock", according to Stubbs.[292] In comparison, Peterson/Bomberg[293] cited Johnson and his definition of industrial policy as a "summary term for the activities of governments that are intended to develop or relieve various industries in a national economy" preserving "global competitiveness".

The original text of **Article 130(1)** was:

> *"The Community and the Member States shall ensure that the conditions necessary for the competitiveness of the Community's industry exist. For that purpose, in accordance with a system of open and competitive markets, their action shall be aimed at"*

(shortened): structural changes, small and medium-sized undertakings, cooperation between these undertakings and

> *"fostering better exploitation of the industrial potential of policies of innovation, research and technological development."*

Peterson/Bomberg[294] described the "idea of an EU industrial policy" as "quite novel", because the EU is the only international organization concerned with it and has competence to do so.

Linkage to research and technology policy

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290 **Jones, Robert A.** 1996. p.202
291 **Peterson, John / Bomberg, Elizabeth** 1999. p.202
292 **Stubbs, Peter** 1997. p.165
293 **Peterson, John / Bomberg, Elizabeth** 1999. p.201
294 ibid p.201

When we recapitulate that science, research, and technology policy became linked to other policy areas, written in Article 130f, industry policy is one example. This was described above. Other policies are competition, environment, and energy.[295] Jones argued that this was important since STP and industry policy "share an uncertain border", just as trade policy does.[296] Competitiveness of the EC industry was then supported by research and technological development, according to Sturm.[297]

3.4.1.3. Maastricht and USA

With the inclusion of "social and economic cohesion" in the Maastricht Treaty, the two traditional concerns of the EU, competitiveness against USA and Japan and enhancement of "human and material resources" were less discussed. In the aftermath of the Maastricht Treaty, the positions of the Commission became even more focused on competition. The EU, the USA and Japan are also referred to as the "Triad". Still, the EU shall become a competitive part in the world economy opposing Japan and the USA. The Commission determined two reasons for the poor situation of the EU:

First, there were decreasing patent applications that were partly caused by the low investment in RTD of European countries. European countries spent about 2.1% of the GDP on RTD, while the USA spent 2.8% of their gross domestic product (GDP). While in Europe funding for "academic research" was high, private funding probably resulting in competitiveness of industry, it was less than in the USA.

Second, there was a shortage of educated personnel in key sectors like information technology or electronics.[298]

Guzzetti concluded, that a "comprehensive" innovation policy was missing, which would turn research into inventions and consequently revert inventions into products.

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295 **Jones, Robert A.** 1996. p.207
296 ibid p.207
297 **Sturm, Roland** 2002. p.498
298 **Guzzetti, Luca** 1995. p.153

The Commission appreciated "the market as the regulator and driving force of economic efficiency". According to this conclusion, the business sector had to take the responsibility for the industrial field. [299]

Besides regulating the market and straight lining European norms and regulations, the EU´s tasks in that field were dyadic: [300]

1. Building trans-European networks in energy, telecommunications, and transport.
2. Increasing support of RTD by the Community and also by the governments.

3.4.2. Fourth Framework Programme 1994- 1998

With the new Commission installed in 1993, Jaques Delors was confirmed for another two years as President of the Commission. Martin Bangemann, Commissioner for industry, also became Commissioner for telecommunications, information market, and exploitation of research (as well for ESPRIT). Antonio Ruberti became Commissioner of DG XII for science, research, and development and therefore also responsible for the JRC, human resources, education, training, and youth. Having this position it was Ruberti´s task to formulate the Community's STP and with it the FP4 as the main policy instrument.[301]

First FP under Maastricht Treaty

The FP4 was the first FP negotiated under the Maastricht Treaty, meaning the "co-decision" procedure was applied, thus including not only the Commission and the Council, but also the European Parliament.[302] Therefore, this was the first time the Parliament was entitled to take part in the decision-making process of a FP. The

299 ibid p.153
300 ibid p.153
301 ibid p.157
302

decision was reached on 26 April 1994[303], including the implications of the principle of economic and social cohesion and the principle of subsidiarity.

As already mentioned, from the Maastricht Treaty onwards, science and technology applied to other chapters of the Treaty. This gave FP4 a vital importance for existence and subsequently, it was very strong supported by the Commission, so Peterson/Sharp.[304]

Objectives

The objectives that were stated resulted from the Commission´s Communication "Research after Maastricht: an assessment, a strategy".[305] Three objectives were in focus of the activities of the FP4:

1. "Support to the competitiveness of European industry;
2. Contribution of science and technology to the satisfaction of society´s needs, and,
3. Support to the Community´s common policies"[306]

The activities also had to meet other objectives, for instance the growth of "synergies between international cooperation" in S&T and the external activities of the Community.[307] For this thesis, this point is of importance, because in the duration of the FP4, an important Agreement came into force: the EU - USA Agreement on Cooperation in S&T. This will be discussed in detail, with reference to the evaluation report by Horvat/Harrap in Chapter 5.2.3.

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303 **European Parliament and Council** 1994. Decision No1110/94/EC concerning the Fourth Framework Programme of the European Community activities in the field of research and technological development and demonstration. 26 April 1994, Brussels. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31994D1110:EN:HTML [14 May 2010]

304 **Peterson, John / Sharp, Margret** 2007. p.122

305 **Commission of the European Communities.** 1992. Research After Maastricht: an Assessment, a Strategy, Communication from the Commission to the Council and European Parliament, Bulletin supplement 2/92 (SEC(92) 682(final)

306 **Cordis information Service**. Budget FP4 http://ec.europa.eu/research/fp4.html [09 December 2009]

307 Ibid

Activities and Budget

The four activities of FP4 resulted from the Article 130g EEC Treaty (after Maastricht)[308] and were: research, technological development and demonstration programmes, cooperation with third countries and international organizations, dissemination and optimization of results and training, and mobility of researchers. As previously, pre-competitive projects under "basic research, basic industrial research, applied research, technological development and demonstration projects" were funded.[309]Regarding the budget, 62% of the budget for internal policies was allocated. This decision was based on a suggestion by the European Council of spending between 50 - 66.6% on research and development.[310] This high investment was reasoned in the hope that S&T would help the EU coming out of recession and being competitive internationally, according to Guzzetti.[311]

Activity	*Million ECU*	*%*
Activity 1 Research, technological development and demonstration Programmes Information technologies, industrial and material technologies, standards, measurements and testing, environment, live sciences and technologies, transport, targeted socio-economic research	11496	86,9
Activity 2 Cooperation with third countries and international organizations (INCO)	575	4,4
Activity 3 Dissemination and optimization of results (INNOVATION)	352	2,7
Activity 4 Training and mobility of researchers (TMR)	792	6,0
Total	**13215**	**100**

Table 7 Budget distribution of FP4 [312]

308 **European Parliament and Council** 1994

309 **Cordis information Service**. Budget FP4 http://ec.europa.eu/research/fp4.html [09 December 2009]

310 **Guzzetti, Luca** 1995. p.158

311 ibid p.159

312 **Cordis information Service**. Budget FP4 http://ec.europa.eu/research/fp4.html [09 December 2009]

With the extension of the EU in 1995, (to Austria, Finland and Sweden) the budget for the FP4 was raised by ECU 833 Million. This happened through a common decision from the Council and the Parliament.[313] The budget of the JRC was also included.[314]

3.4.3. Treaty of Amsterdam

Shortly after the Maastricht Treaty was agreed upon a "Reflection Group" started their work in preparation for a further intergovernmental conference where "certain institutional issues" were to be discussed. The group reported a draft to the Madrid European Council in December of 1995. It took one and a half years of discussions to finally result in the Treaty of Amsterdam, signed on 2 October 1997. On 1 May 1999, after the ratification process in the Member States, the changes came into force.[315] The major outcome was the reform of the CFSP of the European Union and further institutional matters due to the enlargement of the Union.[316]

3.4.3.1. Science and Technology in the Treaty of Amsterdam

Two changes were made in STP: First, the Articles regarding STP were renumbered. Article 130f-q was changed into Articles 163-173. Pelzer[317] called this change an "up evaluation" of STP.

The second change concerned the decision-making procedure: the unanimity vote, regarding the budget, was substituted by a qualified majority voting (QMV).[318] This was important after the long lasting and difficult negotiations of the budget of the FP4. Peterson/Bomberg[319] saw in this change the chance of overruling Germany and Great Britain, which were especially skeptical on budgetary issues.

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313 **Sturm, Roland** 2002. p.498

314 **Cordis information Service**. Budget FP4 http://ec.europa.eu/research/fp4.html [09 December 2009]

315 **European Navigator**. The authoritative multimedia reference on the history of Europe. The Treaty of Amsterdam. http://www.ena.lu/treaty_amsterdam-2-16483 [15 May 2009]

316 **Dinan, Desmond** 2003. How did we get here? In: Bomberg, Elizabeth, Stubb, Alexander. *The European Union: How Does It Work?* The new European Union Series Oxford University Press, New York. p.35

317 **Pelzer, Christina Maria** 2004. p.64

318 **Sturm, Roland**. 2002. p.492

319 **Peterson, John / Bomberg, Elizabeth** 1999. p.213

3.4.4. Fifth Framework Programme 1998-2002

In December 1998, the Council and the Parliament decided on FP5 with a budget of Mil. Euro 13000.[320] The two signing parties were the President of the EP, J.M. Gil-Robles, and the President of the Council, Caspar Einem, the Austrian minister for research (Austria held the Council Presidency at that time), while Commissioner for research at that time was the French Edith Cresson.
This FP differed "considerably from its predecessors", according to the Commission.[321]

Objectives

Two objectives were set by the FP5 and the major change was made in the second objective:

- Increasing industrial competitiveness and
- Increasing the quality of life for European citizens.[322]

In comparison to the previous FP, this Programme was to "respond to major socio-economic challenges facing Europe." These challenges were to be met with research areas which combine technology, economy, social, and cultural aspects.[323]

Critique on FP4 shaped FP5

The dialogue about the FP5 opened officially in July 1996 when the Commission presented its first working paper "Inventing Tomorrow – Europe´s research at the

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320 **European Parliament and Council**: 1998 Decision concerning the Fifth Framework Programme of the European Community for research, technological development and demonstration activities (1998 to 2002). 22 December 1998 No.182/1999/EC**.** Official Journal of the European Communities L 26/1 (Article 1)

321 **European Commission DG Research** Fifth Framework Programme (archived) http://ec.europa.eu/research/fp5/fp5-intro_en.html [17 January 2012]

322 ibid

323 ibid

service of its people."[324] In the introduction, a strong announcement was made: "Europe needs research and research needs Europe."[325]

In the following months of the dialogue, every member state and other organizations, commented on the proposal, as well as on the ongoing FP4. The Commission took the comments and improved its proposal. Seven "lines of criticism", where the most critique concerned the "over-bureaucratic and slow" management of the FP.[326],[327] Consequently, the Commission drew the conclusion of the responses and decided on a simpler structure of the FP5: less "thematic programmes", thus reducing the previous 16 lines of action and implementing three "horizontal actions".[328]

Activities and Budget

To reach the objectives four Community activities were outlined in accordance with Article 130g Maastricht Treaty, these were "Thematic Programmes" and "Horizontal Programmes". The "Thematic Programmes" were: implementation of research, technological development and demonstration Programmes. The "Horizontal Programmes" were: promotion of cooperation in the field of Community research, technological development and demonstration with third countries and international organizations, dissemination and optimization of the results of activities of the EC, and stimulation of the training and mobility of researchers in the Union.[329]

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[324] **Commission of the European Communities.** 1996 *Inventing Tomorrow. Europe´s research at the service of its people* Communication from the Commission. Brussels. COM(96) 332final. 10 July 1996

[325] ibid p.3

[326] *Further arguments were: "FP was too diverse and lacked focus", "Procedures were too inflexible", "Too much money was spent on the big Programmemes", "´Pre-competitive´research meant RTD without any obvious use", "Not enough attention (or money) was paid to the SMEs", "The conflict between cohesion and competitiveness remained unresolved", "Poor administration – long decision times, poor management, late payments – deterred many research organisations from even applying for EU funds"*

[327] **Peterson, John / Sharp, Margret** 2007. p.156-157

[328] ibid. p.158

[329] **European Parliament and Council**: 1998 (Article 1)

Activity	*Million euro (current prices)*	*%*
Thematic Programmes		
1. Research, technological development and demonstration Programmes 1.1. Quality of life and management of living resources 1.2. User-friendly information society 1.3. Competitive and sustainable growth 1.4. Energy, environment and sustainable development	10843	83,6
Horizontal Programmes		
2. Promotion of cooperation in the field of Community RTD with third countries and international organizations: Confirming the international role of Community research	475	3,7
3. Dissemination and optimization of the results of activities in Community RTD: Promotion of innovation and encouragement of participation of small and medium- sized enterprises (SMEs)	363	2,8
4. Stimulation of the training and mobility of researchers in the Community: Improving human research potential and the socio-economic knowledge base	1280	9,9
Total	**2118**	**16,4**

Table 8 Budget distribution of FP5[330]

Further changes

With FP5, applicants for project funding had to hand in a "plan for dissemination of results". This resulted from a new idea where research results should benefit the citizens and the society as a whole. It was expected that these research results are to solve problems for economy and society.[331] Another novum has to be mentioned: It was now possible for scientists from EU candidate countries to participate in the EU FP. The condition for doing so, was the respective countries´ contribution to the common budget.[332]

330 **Cordis information Service** FP5 Budget http://cordis.europa.eu/fp5/src/budget.htm [20 March 2009]

331 **Sturm, Roland**. 2002. p.500

332 ibid p.500

3.5. The European Research Area

3.5.1. Towards a European Research Area

In 1999, the Belgian Philippe Busquin followed Edith Cresson as Commissioner for Science and Technology in the Romano Prodi Commission. Busquin, rooted in "left-wing politics",[333] had a dream of creating a "European scientific community" or a "scientific *espace*".[334] The universal goal, according to Busquin, was to create a European Research Area (ERA) "in the research sector what the single market has been for commercial exchanges."[335]

Gago, at that time Portugal´s science minister and President of the European council of research ministers, supported the plan.[336] He was helped by an atmosphere for research which hadn´t been better for some time.[337]

The plan was put into practice at "exactly (the) right moment".[338] In January 2000, the Commission proposed the Communication "Towards a European research area", where S&T were seen in the center of the 21st century and promising a flourishing future.[339]

The weaknesses of the European research system - foremost hindering prosperity - were identified by the Commission: first, insufficient funding, second, a lack of an environment to stimulate research and exploit results and third, a fragmented area of

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333 **Dickson, David** 1999. Bringing a community-based vision to the heart of Europe´s research *Nature* 401 (October) p.837

334 ibid p. 837

335 **Banchoff, Thomas** 2001. p.82

336 **Unknown** 2000. A significant time for Europe. *Nature* 405 (June) p.869

337 ibid p.869

338 ibid p.869

339 **European Commission** 2000b. *Towards a European Research Area- Science, Technology and Innovation- Key Figures 2000*. Luxembourg. Office for Publications of the European Communities p.4

activities.[340] All in all it was a picture, where only 5,4% of the total public spending on STP were within the FPs and therefore subject to the Union.[341]

In a later ERA report of 2008, the "fragmented area of activities" was outlined. All five characteristics addressed a "system-level failure": Including the hindrance of a researcher´s mobility, cross-border academic industrial cooperation is complicated, double funding of research on different levels is existing, reforms on state level lacks of European value, and lastly business is not interested in R&D funding.[342]

Perceiving the problems could not be solved by the FPs alone, a broader STP was urgently needed.[343] Busquin said that the ERA was "the birth of a true internal market for science and technology" and it comprised not only the coordination of national policies, but an area where the attraction of global scientific human resources were to achieve the goals.[344]

Aims

For achieving the European Research Area, three concepts were developed:[345]

- an **"internal market" for research**: intensive cooperation and better allocation of resources through competition,
- an **enhanced coordination** of national research policies and national funding,
- a **European research policy** in charge of funding and all linked features of EU and Member State´s policies.

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340 **European Commission**. Cordis. The concept of ERA http://cordis.europa.eu/era/concept_en.html (accessed March 20, 2009)

341 **European Commission** 2000a. p.7

342 **European Commission** 2008. *Challenging Europe´s Research: Rationales for the European Research Area (ERA*). Report of the ERA Expert Group. Brussels p.13

343 **European Commission**. 2000a. p.7

344 **Busquin, Philippe** 2004. Investing in People *Science* 303 (January) p.145

345 **Cordis Information Service** Concept of the ERA http://cordis.europa.eu/era/concept_en.html [17 January 2012]

For achieving these aims, a multi-policy-level approach became of prime importance: where Member States, European Union level (with the FPs), and intergovernmental cooperation organizations cooperate on their activities.[346] The Commission suggested taking diverse actions, such as practical instruments, exchange of information and experience, financial, legal and policy coordination instruments.[347]

Change of the organization of European research

Caswill called the rapid timetable of the establishment of the ERA "extraordinary" especially since the ERA gave "several radical proposals for the funding and organization of European research".[348]

In organizational terms, a new partnership between the European Commission and the Member States was stated: European STP would be a long-term multi-layered process where the Directorate General for research would only contribute partially. Whereas in the past the European Commission was seen as the "guardian" and the "only effective European actor" within the EU´s science policy, from this point onwards, the partnership between the Member States and the European level became important.[349] This organization became known as a policy "operating at different levels of governance".[350]

With two new large-scale instruments, which are described in the next chapter, the FP was not only reformed but it also was to go beyond the existing structures. The aim was the creation of an "European Added value".[351]

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346 **European Commission**. 2000a. p.7

347 **European Commission**. 2000a. p.22

348 **Caswill, Chris** 2001. Old Games, Old Players- New Rules, New Results. Influence and Agency in the European Research ERA (ERA) In: Edler, Jakob, Kuhlmann, Stefan, Behrens, Maria 2001 *Changing Governance of Research and Technology Policy.* p.65

349 ibid pp.66

350 ibid pp.66

351 **Banchoff, Thomas** 2001. "Political Dynamics of the ERA" In: Edler, Jakob, Kuhlmann, Stefan, Behrens, Maria eds.*Changing Governance of Research and Technology Policy.* Cheltenham: Elgar p.82

Only two months later, in March 2000, at the European Council in Lisbon, the Heads of State and Government of the Member States recognized the ERA as one essential part of a greater vision: turning the EU into the "most competitive economy in the world and achieving full employment by 2010".[352] This aim became known as the Lisbon Strategy or Lisbon Process.

The ERA has to be seen in the setting of the Lisbon Strategy. Therefore it shall be shortly discussed described shortly at this point of the thesis:

3.5.1.1. ERA in context of the Lisbon Strategy

In general, the Lisbon Strategy was to have a great impact on research at national and European level. Caswill identified the role of some of the national governments in the process of which many were social democrats. Therefore, topics like "social cohesion" were brought on the European agenda.[353]

The goals of the Lisbon Strategy were clearly outlined: The EU shall be competitive by 2010 and meet the goal of full employment in order to sustain the quality of life in Europe. In that picture competitiveness of European industry played a major role. The phrase that is often cited is that the EU shall become "the world´s most competitive and dynamic knowledge economy" by 2010.[354]

The EU must "outperform" in policy areas connected to industrial competitiveness such as "research and innovation, information and communication technologies, entrepreneurship, competition, education and training".[355]

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352 ibid p.82

353 Caswill, Chris 2001 p.65

354 **European Parliament and Council**. 2002 Decision concerning the Sixth Framework Programme of the European Community for research, technological development and demonstration activities, contributing to the creation of the European Research Area and to innovation (2002 to 2006) Decision NO. 1513/2002/EC of 27 June 2002

355 **European Commission- DG Enterprise and Industry** Glossary http://ec.europa.eu/enterprise/policies/innovation/glossary/index_en.htm [28 August 2009]

Three pillars

The Lisbon Strategy was built of an economic, social, and environmental pillar: [356]

1. The **economic** pillar provided the basis for the "transition to a competitive, dynamic, knowledge-based economy". Research and development shall be given a boost.
2. The **social** pillar shall push the modernization of a European social model. Important was the combat against social exclusion and investment in human resources. Subsequently, investment in education and training as well as an "active policy for employment" were necessary.
3. The **environmental** pillar (added in June 2001 at the Council meeting in Gothenburg, Sweden) shall assure economic growth while having the environment in mind.

A critical view on the Lisbon Strategy

In 2010, ten years after the Lisbon summit, conclusions were drawn by Fritz-Vannahme et al.[357] They stated that events externally and internally caused the failure of the Strategy. Becoming the "most competitive knowledge-based economy in the world" was an ambitious goal in an era of the "IT bubble" and the "New Economy".

One of the external causes was the economy slowing down, caused by the burst of that IT bubble and coinciding with the end of the New Economy and the events of 9/11. Another event was the EU enlargement in 2004 and 2007, as the new Member State had to hold up with a strategy originally only designed for the EU-15. Finally, in 2008 the "global economic and financial crisis" hit the European Union.[358] Fritz-Vannahme et al. criticized that the Union was more concerned with the enlargement

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356 **European Glossary**. Updated with the Lisbon Treaty http://europa.eu/scadplus/glossary/lisbon_strategy_en.htm [12 January 2009]

357 **Fritz-Vannahme, Joachim / García Schmidt, Armando / Hierlemann, Dominik / Vehrkamp, Robert** 2010. *Lisbon – A Second Shot*. Spotlight Europe 2010/02. Bertelsmann Stiftung. http://www.ceeol.com/aspx/issuedetails.aspx?issueid=f0a8f8d2-6b1b-495d-a5cb-cb7944e8c704&articleId=61015370-3c91-4090-b00c-ad6c212be83a [31 May 2010]

358 ibid p.1

procedure and the discussions around the constitution than focused on reaching the Lisbon goals.

Internal causes were that the Strategy itself was totally overburdened. Already in 2004, as a result by the half-time report (the so called "Kok report" named after Willem "Wim" Kok, a former Dutch prime minister), the creation of jobs and growth became the priorities and the social dimension was left behind. "Jobs and Growth" was then praised. On top of all, the implementation method of the Strategy- the Open Method of Coordination (OMC) - was not clear and the support or even knowledge of it among the citizens was almost non - existent. For the follow-up policy, the so called "Europe 2020", the authors suggested keeping the OMC but leaving the "shaming" out and rather suggested a "naming and praising" mechanism.

The most important facts about the ten years of the Strategy were summarized in the following table:

Figure 5 Ten years of Lisbon Strategy[359]

[359] ibid p.2

3.5.1.2. ERA and Lisbon Strategy to compete with the USA

Raising funding in research

The importance of S&T in the Lisbon Strategy became obvious in the 2002 Barcelona conclusions[360] where the so called "frontier technologies" were emphasized. 3% of the GDP should be forth on invested in S&T so "the gap between the EU and its major competitors" (USA and Japan) is to be closed. The financing should be distributed between the private sector (two - thirds) and the public sector. Busquin stood fully behind this proposal of 3%.[361]

Organizing research and critique

Busquin held the view that European research was disadvantaged by contrast with the USA and Japan. The underlying idea was that the political structures were unfavorable:[362] The fragmented European research system should be turned into a "single innovative system comparable to that in America or Japan".[363] As a solution, regional and national funding elements should therefore be integrated into the broader European policy. [364]

This comparison with the USA can be also found in almost each "high level European policy document".[365] For example "Towards an European Research Area"[366], made 18 times a comparison with the USA. A daring thesis could be that without the comparison to the USA, the ERA would not have been born.

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360 **European Council** 2002. Presidency Conclusions, Barcelona 15-16 March, 10562/08 (Presse 168)
361 **Busquin, Philippe** 2004. p.145
362 **Unknown** 2000. A significant time for Europe. *Nature* 405 (June) p.869
363 **Archibugie, Daniele / Coco, Alberto** 2005. "Is Europe Becoming the Most Dynamic Knowledge Economy in the World?" *Journal of Common Market Studies* 43 (September) p.438
364 ibid p.438
365 **European Commission** 2008b. p.13
366 **European Commission** 2000a. Towards a European Research Area.

In 2008, the **ERA Expert Group**[367] raised a critical view on the ongoing comparison to the USA. The group laid down the often discussed hypothesis that the USA did not have the negative effects of research fragmentation as the European Union had: The USA could use the resources effectively, sidestep doubling of research, had no barriers for personal in S&T, and a freely and prosperous academic- industrial partnership was in favor of a "common and legal framework at national level".

But the Expert Group countered that the USA would be proud of the diversity of their funding possibilities. This is because of the diversity of funding possibilities, more projects were selected for funding, and second the competition between researchers would be stimulating participation. Further on, in contrast to the FPs, the funding was provided by "mission-oriented agencies" as for example for security, health, energy, defense, and so on.

As a final conclusion, the Expert Group recognized the advantages of the USA funding system and admitted the example-status in some areas, but suggested caution when it comes to copying other systems.[368]

3.5.2. Sixth Framework Programme 2002-2006

The Sixth Framework Programme was the first FP launched within the above described ERA. The objectives of the FP6 were clearly outlined: It shall contribute to the "creation of the European Research Area and to innovation".[369] Till then, so Archibugie/Alberto, European integration was "not (…) driven by a science and technology policy."[370]

The shaping of a European STP, innovation and competitiveness, were fundamental targets in the FP6:

ERA for a European science and technology identity

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367 ibid p.13
368 ibid p.14
369 **European Parliament and Council**.2002
370 **Archibugie, Daniele/ Coco, Alberto** 2005. p.438

The FP6 represented the aims of the ERA and it was indeed a significant move forward toward a Community research policy, so it was commonly perceived.[371],[372] The activities should contribute to the structuring of research and technology in Europe[373] by linking programs and supporting partnerships between different institutions and levels of governance.[374] Some authors argued that those activities were to produce a "European Research Identity"[375], whereas Sturm described the activities mentioned above as a "catalyzer" effect.[376]

Innovation for Competitiveness

Through that coherent research policy and the newly discussed innovation policy, industrial competitiveness shall be reached[377], with legal basis of the FPs. A reference to the Lisbon Strategy was also made[378] according to which the EU was to become "the world´s most competitive and dynamic knowledge economy" by 2010. Although competitiveness was important to assure "Europe´s economic independence", social cohesion was perceived essential for the well being of the citizens.[379] The attitude of the citizens toward the FP was to become more positive, since science is considered a necessity for advancement of the whole society, according to Busquin.[380]

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371 **European Parliament.** 2006 Policy for Research and Technological Development EN 4.14.0 edited by M. Györffi

372 **Stampfer, Michael** 2001. European Research Area: New Roles for National and European RTDI Funding Programmes? In: Edler, Jakob, Kuhlmann, Stefan, Behrens, Maria 2001 *Changing Governance of Research and Technology Policy* p.155

373 **European Parliament and Council** 2002

374 **Turek, Jürgen** 2007. Forschungs- und Technologiepolitik [Research and technology policy]. In: Weidenfeld, Werner; Wessels, Wolfgang (eds.): *Europa von A bis Z. Taschenbuch der europäischen Integration*. 10th edition, Nomos p.263

375 **Caracostas, Paraskevas** 2001. Shared Governance through Mutual Policy Learning In: Edler, Jakob, Kuhlmann, Stefan, Behrens, Maria *Changing Governance of Research and Technology Policy.* p.41

376 **Sturm, Roland** 2002. p.500

377 **Bieber, Roland / Epiney, Astrid / Haag, Marcel** 2005. §28. Forschung und Technologie [Research and Technology]. In: *Die Europäische Union. Europarecht und Politik*. 6. Auflage. Nomos. Baden-Baden. p.555

378 **European Parliament and Council** 2002

379 **European Parliament online** 2006

380 **Dickson, David** 1999. p.837

Activities and budget

The concentration on few key priorities was to enhance the attractiveness of the ERA:[381]

1. **Integrating community** research and strengthening of basic research: Actions toward excellence initiatives were integrated. Seven thematic areas were chosen.
2. **Structuring the ERA**: A connection between theoretic research and entrepreneurial practice shall be established as well as enlargement of the scientific workforce in Europe.
3. **Governance** and concentration on few areas like genome and health, nanotechnology and space.[382]

Activity	*Million Euro*	*%*
1. Focusing and integrating Community research		
Thematic priorities Life sciences, genomics and biotechnology for health, Information society technologies, nanotechnologies and nanosciences, knowledge-based multifunctional materials and new production processes and devices, Aeronautics and space, food quality and safety, sustainable development, global change and ecosystems, citizens and governance in a knowledge-based society	12438	69,6
Specific activities covering a wider field of research Policy support and anticipating scientific and technological needs, horizontal research activities involving SMEs, specific measures in support of international cooperation (developing countries, Mediterranean countries and western Balkan, Russia and NIS)	1409	7,9
Non- nuclear activities of the Joint Research Centre	835	4,6
2. Structuring the European Research Area Research and Innovation, Human resources, Research infrastructures, science and society	2854	16
3. Strengthening the foundation of the European Research Area Support for the coordination of activities, support for the coherent development of policies	347	1,9
Total	**17883**	**100**

Table 9 Budget distribution of FP6[383], [384]

381 **Caracostas, Paraskevas** 2001. p.41

382 **Turek, Jürgen** 2007. p.263

383 **Cordis Information Service on research**. FP6 Budget http://cordis.europa.eu/fp6/budget.htm [20 March 2009]

384 **European Parliament and Council** 2002

In the design of the new FP the ERA clearly had some visible impact: For example financial support for projects, studies, mobility, infrastructure co-ordination activities.[385] Some of the new elements will be discussed:

New elements in FP6

Regarding the funding, new possibilities were provided: So-called "Networks of Excellence and Integrated Projects" were installed. Though previously three or more countries took part in "shared-cost" research projects, now those integrated projects were to include more research teams in more countries. These projects might differ from subject to subject, but they certainly were bigger in ambition and scale than previous projects, according to Caswill. [386]

With the network of excellence, public and private sector centers with corporate work programs may receive provision. This could be for exchange of staff and usage of advanced electronic methods of work.

Caswill also outlined the "radical break with the past": a long-term funding of eventually five years is now possible as well as annual payments and mostly budget management by the network.[387]

Caswill raised some criticism[388]: While bringing benefits to some actors, those new large-scale instruments might as well be disadvantageous for others. Scientists in large centers with high prestige research might be able to move between centers and countries and therefore improving knowledge transfer. But with the shift toward the larger-scale activities, small research groups in small countries relying on cost-shared projects might be the losers of this game. This could apply for social sciences.[389]

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385 **Stampfer, Michael** 2001. European Research Area: New Roles for National and European RTDI Funding Programmes? In: Edler, Jakob, Kuhlmann, Stefan, Behrens, Maria 2001 *Changing Governance of Research and Technology Policy* p.155

386 **Caswill, Chris** 2001. Old Games, Old Players- New Rules, New Results. Influence and Agency in the European Research ERA (ERA) In: Edler, Jakob, Kuhlmann, Stefan, Behrens, Maria 2001 *Changing Governance of Research and Technology Policy* p.70

387 ibid p.70

388 ibid pp.70

389 ibid p.70

3.5.3. Seventh Framework Programme 2007-2013

On 6 April 2006 the Commission accepted the proposal from the Parliament and the Council for the FP7. The Programme will be running from 2007 until 2013. Janez Potocnic[390], Commissioner for Research 2004-2009, spoke about the FP7 as a "new type": First, it has a higher budget than previous Programmes with an amount of 50 billion Euros. Second, the duration of the FP7 was extended from four to seven years. This seven year period has to be seen in the context of the Lisbon Strategy and because of this longer period and the possibility of research continuity better results may be possible. Third, it might lead to real innovation by a greater business and risk-friendly approach. And last, the introduction of major new instruments, like the European Research Council (ERC).

Activities

The largest activity "**Cooperation**" is aimed for transnational cooperation in S&T and inherits ten strategic areas. These areas, according to Potocnik, "have been decided in close collaboration with the private sector" and "shall maintain EU leadership in these areas."[391] More research breakthroughs are expected by this pooling of competences and resources.

The second area is "**Ideas**". This activity is managed by the European Research Council (ERC), which will, without the EC, define the emphasis.[392]

As Potocnik mentioned, this activity "will allow researchers to focus on riskier projects" and the elected projects will be supported by "starter grants".

In the Activity "**People**", the conditions for researchers shall be improved: Career development, mobility, improvement of working conditions, and opportunities for knowledge sharing. The Marie Curie Actions is the main instrument. Potocnik said that

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390 **Potocnik, Janez** 2009. Speech in Nicosia, Cyprus „FP7- a new approach to European research" 30 May 2007 [13 January 2009] http://ec.europa.eu/commission_barroso/potocnik/news/docs/20070530_speech_Cyprus_en.pdf

391 ibid

392 **Turek, Jürgen** 2008. Forschungs-, Technologie- und Telekommunikationspolitik. [Research, technology and telecommunication policy]. In: Weidenfeld, Werner/ Wessels, Wolfgang (eds.): Jahrbuch der Europäischen Integration 2007. Nomos. p.165

"Research is a people business and if we don't treat researchers with respect, they will leave for other countries or jobs."[393]

"**Capacities**" as the fourth activity supports the research infrastructures as well as small and medium sized enterprises.

Budget

This FP has an overall budget of 50 billion Euro. This means 60% more than the previous one and meets the goal of the Lisbon Strategy where it was proposed of increasing the 2% of the GDP to 3% of the GDP.[394]

Activity	*Million Euro*	*%*
Cooperation	32413	64,1
Health, Food, Agriculture and Fisheries and Biotechnology, Nanosciences, Nanotechnologies, Materials and new Production Technologies, Energy, Environment (including climate change), transport (including aeronautics), socio-economic sciences and the humanities, security and space		
Ideas	7510	14,9
European Research Council		
People	4750	9,4
Marie Curie Actions		
Capacities	4097	8,1
Research Infrastructures, research for the benefit of SMEs, Regions of Knowledge, Research Potential, Science in Society, Coherent development of research policies, activities of international Co-operation.		
Non- nuclear actions of the Joint Research Centre	1751	3,5
Total	**50521**	**100**

Table 10 Budget distribution of FP7[395]

393 ibid p.165

394 **European Parliament and Council** 2006. Decision NO1982/2006/EC concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013) Official Journal of the European Union L412/5 30 December 2006

395 **European Parliament and Council** 2006

EU in the offensive

Turek[396] argued that with the FP7 and some other activities in the research area, the Commission followed the aims of the Lisbon Strategy. These aims shall be reached by not only increasing the budget, but also concentration to cross-sectional technology (information-, bio-, nanotechnology, and health research). He also argued, that in view of the still existing technology-gap between the EU and the USA and the increasing global high technology challenge, knowledge - based innovation plays a major role for the EU.

European Research Council and European Institute of Technology

These are two newly established institutions that, according to Turek, can be seen as a structural innovation. The ERC will focus on basic research and the European Institute of Technology (EIT) shall become a "magnet for the best brains, ideas and enterprises of the world" (translation by the author).[397]
The ERC will manage the "ideas" part of the FP7 on its own. The EIT with the American "Massachusetts Institute of Technology" (MIT) as a model has the same intentions. The best brains and actors in the knowledge triangle "higher education", "research", and "industrial innovation" shall be mingled. This idea, according to Turek, origins from José Manuel Barroso and aims to close the "innovation gap".[398]

Praising the FP7

In the European context, it is still very important to entangle basic research, applied research and industrial innovation, according to Turek.[399] Furtheron, Turek pointed out, that the main objective of all of those actions is to boost scientific excellence and then technological innovation in order to strengthen the European position. The concentration to main problems and specific programs may lead to breakthroughs in

396 **Turek, Jürgen** 2008. p.141
397 ibid p.141
398 ibid p.143
399 ibid p.144

important scientific questions like energy, climate, environment protection, migration or nuclear proliferation.

The international dimension

A further improvement in the FP7 is in the section of international cooperation.[400] Two types of cooperation are outlined: EU and associated states as well as EU and third countries. The big difference to the FP6 is that now in each section of FP7 international cooperation is included. While the "Cooperation" Programme is also open to third countries, the "Ideas" Programme is funding individual researchers from third countries. "People" supports international mobility and "Capacities" has a general supportive role.

FP7 and the USA

As described above, the FP7 is designed more openly toward international cooperation than earlier Programmes.[401] Since two main new research fields were added in the FP7 (space and security research) these will also be included in the second extension of the Science and Technology Agreement (STA) between the EC and the USA. This was a result of the March 2009 review of the EU-USA cooperation.[402] This Agreement is the core of the EU-USA scientific cooperation and will be discussed in Chapter 5.2.

400 **European Commission DG Research** 2008. *Opening to the world: International cooperation in Science and Technology*. Report of the ERA Expert Group. Group 6 chaired by Daniele Archibugi Brussels. Brussels p.38-39

401 **European Commission** 2007. *EC-U.S. Scientific and Technological Cooperation*: Reaching New Frontiers p.1

402 **Horvat, Manfred** 2009. Across the Atlantic: A Review of US-EU Cooperation in Science & Technology. Article based on the S&T Agreement Review of 2009. *Bridges* vol. 21, April 2009 online: http://www.ostina.org [14 April 2009] p. 9

3.5.4. The Treaty of Lisbon

The discussions over the new Treaty lasted eight years, putting the EU in a considerable struggle over institutional changes and power. It was signed on 13 December 2007 in Lisbon/Portugal, but underwent a certain consolidation period. In December 2009 it came into force and merges the two existing treaties (Treaty on European Union and Treaty establishing the European Community). The key issues were:[403] institutional innovations as well as some policy changes.

The major institutional innovation included the reduction of the number of members of Parliament, a "double majority rule for Council decisions", a "permanent Council president" and a "High Representative of the EU for Foreign Affairs and Security Policy". In the position of the High Representative a lot of hope was provided enabling the EU to "speak with one voice". In addition, an "exit clause" was introduced, thus giving the possibility of leaving the EU. From now on the EU shall have a "single legal personality".

The relevant Articles for this thesis are to be found from page 170 onwards.

3.5.4.1. Science and Technology in Treaty of Lisbon[404]

With regard to STP, one of the most important changes is, that the ERA became an objective. Earlier, referring to international competitiveness, now the first paragraph of **Article 163 Lisbon Treaty** points this out:

> *"The Union shall have the objective of strengthening its scientific and technological bases by achieving a European research area"*

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403 **Euractive**. The Treaty of Lisbon http://www.euractiv.com/en/future-eu/treaty-lisbon-linksdossier-188421 [11 February 2011]

404 **Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community** 13 December 2007. Lisbon online: http://eur-lex.europa.eu/JOHtml.do?uri=OJ:C:2007:306:SOM:EN:HTML [17 January 2012]

Further on it says that science and technology policy shall ensure that:

> *"researchers, scientific knowledge and technology circulate freely, and encouraging it to become more competitive, including in its industry, while promoting all the research activities deemed necessary by virtue of other Chapters of the Treaties."*

One should pay attention to the other "freedom", as it is now scientific knowledge and technology.

Some amendments were made: In **Article 182 Lisbon Treaty** (ex Article 166 TEC), the decision-making process was slightly changed.[405] And the newly established **Article 189 Lisbon Treaty** considers space as a policy field of the Union: an extensive EU´s role in space, and the Commission has to set up a "specific policy for the EU´s activities in space." [406]

The following table gives a comprehensive overview of the development of the Framework Programmes: [407]

405 ibid

406 **Abbott, Alison** 2009. "Lisbon Treaty could give research a boost" *Nature online*. http://www.nature.com/news/2009/091105/full/news.2009.1064.html [11 February 2011]

407 **Evaluation of the Sixth Framework Programmes for Research and Technological Development 2002-2006** 2009. Report of the Expert Group. Chairman: Ernst Th. Rietschel http://ec.europa.eu/research/reports/2009/pdf/fp6_evaluation_final_report_en.pdf [17 January 2012] NOTE: The very right column does not refer to FP6 but to FP7 instead.

PRIORITY-SETTING IN THE EUROPEAN RESEARCH FRAMEWORK PROGRAMMES

Table from the FP6 evaluation, Report of the Expert Group, February 2009.

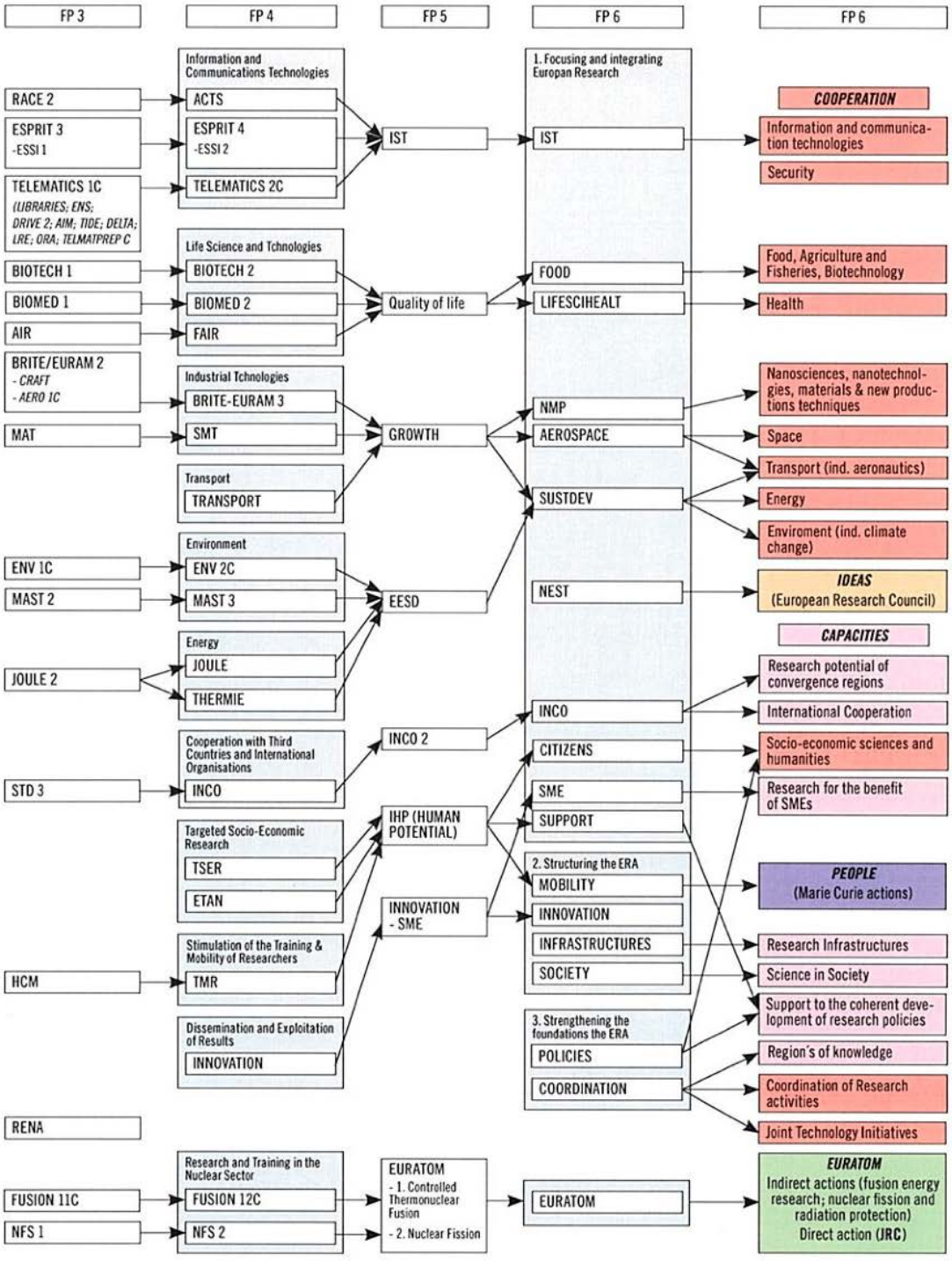

Figure 6 Concordance between Framework Programmes and Thematic Areas *(citation see prev.page)*

4. TRANSATLANTIC AGREEMENTS AND THEIR RELEVANCE TO SCIENCE, RESEARCH AND TECHNOLOGY

4.1. Overview

As described in the previous chapter, the EU's research policy is highly interlinked with economic competition. Competition and competitiveness are also the goal of the so-called "cooperation agreements", which "aim to promote intensive economic cooperation".[408] The EU has concluded such agreements with countries outside of Europe since the early 1970s and since 1990 also with the USA.

The legal basis for concluding the following transatlantic agreements is Article 207 Lisbon Treaty (ex Article 133 TEC). The Common Commercial Policy is part of "The Union's External Action":

> *"1. The common commercial policy shall be based on uniform principles, particularly with regard to changes in tariff rates, the conclusion of tariff and trade agreements relating to trade in goods and services, and the commercial aspects of intellectual property, foreign direct investment, the achievement of uniformity in measures of liberalisation, export policy and measures to protect trade such as those to be taken in the event of dumping or subsidies (…)."*[409]

In accordance with Article 218 Lisbon Treaty (ex Article 300 TEC), the agreements with third countries are therefore signed by the President of the Council, the President of the European Commission and in this specific case, the President of the United States of America.

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408 **The Europa Publications EU Information Series** 2008. p.42

409 **Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union**. Official Journal C83. 2010/C 83/01 Vol.53. 30 March 2010
online: http://www.ena.lu/treaty_establishing_european_economic_community_rome_25_march_1957-2-18771 [17 January 2012]

In this part of the thesis, first, the context and actual data of the EU-USA economic relation will be outlined and strong interaction between the two powers will be identified. Secondly, the economic agreements between the EU and the USA since the first one in 1990 will be examined. The main question is, whether science and technology played a role in these agreements.

4.1.1. Transatlantic economy and actual data

"No other commercial artery in the world is as integrated and fused together as the transatlantic economy", so Hamilton/Quinlan[410] in the 2010 survey of the current status of the transatlantic economy. This picture can even be drawn against the background of the economic slowdown.

This economic interdependence/ interconnectedness has always been "at the core of the EU-US relationship"[411] and probably will last in the future. Thomas L. Ilgen even called it the "most manageable and most consistent" relationship, which is highly fruitful to both partners.[412] The officials also recognized this as they stated at the EU-USA summit of 2010: "Our shared values and political experience and our deep economic interdependence constitute an extraordinary resource."[413] In the set of cooperation between the EU and the USA, the external trade policy has been the most important of the EU's external relations.[414]

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410 **Hamilton, Daniel S. / Quinlan, Joseph P.** 2011. *The Transatlantic Economy. Annual Survey of Jobs, Trade and Investment between the United States and Europe.* The Johns Hopkins University. Center for Transatlantic Relations, EU Center of Excellence Washington DC. p.v

411 **Smith, Michael / Steffenson, Rebecca** 2005. The EU and the United States. In Hill, Christopher; Smith, Michael: *International Relations and the European Union*. The new European Union Series. Oxford University Press. Oxford. p.344

412 **Ilgen, Thomas L.** 2006. The Atlantic Alliance and the Integration of Europe. In: Thomas L.Ilgen.: *Hard power, soft power and the future of transatlantic relations*. Ashgate Publishing Limited. Hampshire. England p.16

413 **Council of the European Union** 2010 EU-US summit. Joint Statement. 20 December 2010 http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/foraff/117897.pdf [5 November 2011]

414 **Monar, Jörg** 2007. Außenwirtschaftsbeziehungen [Foreign trade relations]. In: Wessels, Wolfgang; Weidenfeld, Werner (eds). *Europa von A-Z Taschenbuch der europäischen Integration*.10th edition. Nomos. Berlin p.81

Actual Data

The EU and the USA are the largest trade partners in the world, since "no other economic relationship in the world is as integrated as the transatlantic economy".[415] To measure the transatlantic economy and its competitiveness, traditionally, trade flow data is used.[416] According to the European Commission Directorate General Trade[417], the total amount of traded goods in 2010 was € 242,1 billion and the amount of services was € 125,2 billion. The USA is the number one export country of the EU (while China is the number one import country). The USA is also the largest investment partner, reaching around € 2,1 trillion of mutual investment, which is the "real driver" behind the EU-USA economic partnership. Consequently, this high trade flow and the strong economic ties influence the economies in both countries, as around 15 million jobs are created. This data reflects the highly interlinked economies, which create jobs, enhance new technologies and "provide healthy competition that fosters innovation, productivity gains, lower prices, and greater variety for consumers."[418]

Seen from the USA standpoint, the data on the transatlantic economic partnership is more differentiated. Hamilton/Quinlan[419] from the Center for Transatlantic Relations in Washington D.C. annually analyze U.S – European relations in terms of jobs, trade as well as investment. In their most recent analysis, the transatlantic economy constituted around 54% of the world's GDP in terms of value. Further on, the bond in "mutual R&D investment, patent cooperation, technology flows and sales of knowledge-intense services" [420] was especially strong.

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415 **European Commission. DG Trade**. Global Partners: EU-USATrade and Investment. http://ec.europa.eu/trade/creating-opportunities/bilateral-relations/countries/united-states/#_links [18 October 2011]

416 **Peterson, John / Margret Sharp**. 2007. p.13

417 **European Commission. DG Trade**: Global Partners: EU-USATrade and Investment. Online.

418 ibid

419 **Hamilton, Daniel S. / Quinlan, Joseph P.** 2011

420 ibid p.5

Hamilton/Quinlan came to the conclusion, that although the recession had a great impact, the USA and Europe are still the strongest and most important economic partners in the world.

The economic relations between the transatlantic partners are quite institutionalized, for example in the Transatlantic Economic Council (TEC). Its mission is outlined as follows: "We seek to strengthen transatlantic economic integration, with the goal of improving competitiveness and the lives of our people."[421]

4.1.2. Disputes in economic relations

With such a high amount of trade flow, it is not surprising that disputes emerge.[422] In fact, the transatlantic economic relations have always been torn between cooperation and rivalry.[423] S. Linn Williams even described them as a "paradox": even though trade disputes emerge, the transatlantic market is more than steady - it even is growing.[424]

In total, only 2% of the EU-USA trade is actually seen as disputed.[425] Taking into consideration the vastness of the transatlantic economy, this is a rather small piece of the cake. Nevertheless, with the breakdown of the Soviet Union, the *raison d'être* (alliance against the Soviet Union) of the partnership became increasingly less important and disputes in economic issues gained more attention.

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421 **Transatlantic Economic Council** http://www.state.gov/p/eur/rt/eu/tec/index.htm [20 October 2011]

422 **Williams, S. Linn** 2006. Trade Relations Between the US and the EU. In: Thomas L.Ilgen.: *Hard power, soft power and the future of transatlantic relations.* Ashgate Publishing Limited. Hampshire. England p.91

423 **Bücherl, Wolfgang** 2007. Europäisch- amerikanische Beziehungen [European-american relations]. In: Weidenfeld, Werner; Wessels, Wolfgang (edts.): *Europa von A bis Z. Taschenbuch der europäischen Integration*. 10th edition. Nomos. Berlin.p. 142

424 **Williams, S. Linn** 2006. p.99

425 **European Commission. DG Trade**: Global Partners: EU-USATrade and Investment.

Bierling[426] identified two reasons: first, with the highly interwoven markets problems emerged, which touched the cultural identity on both sides. The growing integration of the EC economy gave impetus to conflicts, which became very evident during the Uruguay Round of the WTO.[427]
Secondly, the long period of working together when security cooperation had the higher priority and economic disputes were at second importance, slowly came to an end. Thus, economic disputes became more evident.

Bierling[428] also stated that disputes in trade were part of the game since the 1970s. While most of the ongoing trade flow functions without any problems, some issues have a deep impact. The core of the disputes is the agricultural sector. The import of bananas and poultry into the EU and the high agriculture subventions of the EU were the main disputes in the last years. Furthermore, the protection of personal data is stricter in the EU than in the USA, which has led to disagreements especially in the flight sector. The conflict over poultry treated with hormones and the import of bananas were brought in front of the WTO, where in both cases the USA was granted the right to install high customs as a punishment.

A further area of disagreement, so Bierling, [429] is cartels. With the fear of a dominance of American firms on European markets and consequently the possible negative influence on competition, the EU is very skeptical about company fusions. Fusions must be presented to the Commission and several proposals have already been denied. (WorldCom&Sprint, Microsoft&Telewest, AOL&TimeWarner)

Williams[430] examined the bilateral disagreements concerning steel, aircraft, Genetically Modified Organisms, Microsoft and others. But why is it then, that these trade disputes

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426 **Bierling, Stephan** 2002. Die Europäische Union und die USA [The European Union and the US]. In: Weidenfeld, Werner (eds.): *Europa- Handbuch*. Bertelsmann. p.649
427 **The Europa Publications EU Information Series** 2010. p.194
428 **Bierling, Stephan** 2002. p.649
429 ibid p.649
430 **Williams, S. Linn** 2006. pp.91

do not seriously endanger EU-USA trade relations? He suggested three reasons: "the globalization of business, the WTO and, most importantly, effective diplomacy."
He furthermore explained the reasons in detail: firms often work on both sides of the Atlantic, thus are highly interested in solving any disputes. The WTO was successful in managing trade disputes by its "expertise and credibility". The most important tool, however, was diplomacy, which contributed to the resolution of most trade disputes.

Even though, the transatlantic collaboration in security issues is still difficult, economic relations remain stable, because security and economic relations "have different histories and different drivers."[431]

4.1.3. Beginning of cooperation

With the end of the Cold War, the preconditions for world politics changed. Varwick[432] identified several aspects of the new situation: economic competition grew as other world regions, such as Asia and the Pacific, appeared more prominently on the scene. Additionally, a so-called "generational change" took place, as on both sides the "pro Atlantic" leaders left the political arena. In order to prevent the two powers from drifting apart, political initiatives were undertaken in 1990. From that time on, several political and economic oriented agreements between the EU and the USA were signed. These agreements are the subject of the following chapters, in which they are discussed in detail if relevant to transatlantic cooperation in science and technology. On page 169 of the thesis an overview is provided.

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431 ibid p.101

432 **Varwick, Johannes** 2006. Transatlantische Beziehungen [Transatlantic relations]. In: Woyke, Wichard (eds.). *Handwörterbuch Internationale Politik*. Budrich. Bonn. Lizenzausgabe für die Bundeszentrale für politische Bildung. p.517

4.2. Transatlantic Declaration 1990

The end of the Cold War and consequently the end of the east-west conflict in 1989 was the beginning of an intensive EU-USA relationship: the political cooperation began with the Transatlantic Declaration (TD). The principles for greater cooperation and consultation were laid down when the officials of both sides agreed to work together not only in economic but also political and security issues. EU Commission President Jacques Delors and USA President H.W. Bush signed the Declaration on 27 February 1990, pursuant to which the USA and EC agreed to establish an institutional framework for "regular and intensive consultation".[433]

To facilitate such cooperation, biannual EU-USA summit meetings (since 2001 held annually) were installed. Since then, the Presidents of the USA, the European Commission, and the European Council meet. In addition, regular meetings between the USA Secretary of State, the European Commission and the U.S. Cabinet were established. Both meetings lead to consultation between the parties "on issues of mutual concern and common interests".[434]

Mark A. Pollack pointed out the hope, which was put into these meetings: that they "would open lines of communication, create networks, facilitate information sharing, and reduce the impact of disputes in transatlantic relations".[435]

Objectives

The preamble contained a reference to the common heritage, the close historical, political, economic and cultural ties as well as to human dignity, intellectual freedom and civil liberties. The new political context, with the fall of the Berlin Wall and the

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433 **Pollack, Mark A**.2003. *The Political Economy of the Transatlantic Partnership*, Robert Schuman Centre for Advanced Studies. Italy.p.7

434 **The Europa Publications EU Information Series** 2008. p.175

435 **Pollack, Mark A**. 2003. p.7

future unity of Germany and Europe, was regarded as a window of opportunity for transatlantic solidarity. This was essential for the preservation of peace and freedom and for development of free and prosperous economies.[436]

The three major goals of the TD were:

- Economic liberalization
- cooperation in trans-national challenges for example fighting international crime, terrorism and environmental degradation
- educational, scientific and cultural affairs

The paragraph "economic cooperation" emphasized the

> *"support (of) further steps towards liberalization, transparency, and the implementation of GATT and OECD principles concerning both trade in goods and services and investment".*[437]

Hence, it is supposed to lead to advanced economic growth.

Furthermore, transnational challenges such as terrorism, illegal production, trafficking and money laundering as well as proliferation of nuclear armaments, chemical and biological weapons, and missile technology were mentioned. It is also stated that the two legislative bodies, the EP and the U.S. Congress, are "welcome"[438] to participate in this progress, thereby bringing the peoples on both sides of the Atlantic closer together.

Science and technology

The paragraph "Education, scientific and cultural cooperation" of the TD was of mayor significance for the establishment of transatlantic relations in this area. The "mutual cooperation" in many fields should lead to the "well-being" of the inhabitants on both sides of the Atlantic. The following actions shall contribute to this:

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436 **Transatlantic Declaration** 27 February 1990, Washington p.2
437 ibid p.2
438 ibid p.3

> *"exchanges and joint projects in science and technology, including **inter alia** research in medicine, environment protection, pollution prevention, energy, space, high-energy physics, and the safety of nuclear and other installations, as well as in education and culture, including academic and youth exchanges."*[439]

Hence, two methods namely exchange and projects were mentioned and the key fields for cooperation were already defined. Most of the cooperation fields were, what would later be called, "global challenges".

Aftermath and critics

As ambitious as the declaration was, no major steps followed and it was described as "cosmetic, minimalist and lacking in substantive innovation"[440] and would soon be supplemented. While the policy areas were identified, according to Pollack the agreement lacked a more detailed agenda.[441]

Five years later the New Transatlantic Agenda would extend the TD. Having experienced the low impact of the TD, possibly as a result of an absent working plan, this time a detailed Joint Action Plan was negotiated.

4.3. The New Transatlantic Agenda 1995

On 3 December 1995, during the EU-USA summit in Madrid, the New Transatlantic Agenda (NTA) was signed by the European Commission's President Jaques Santer, the Spanish Prime Minister Felipe González (at the time President of the European Council), and USA President Bill Clinton. As already mentioned, this document can be seen as the extension of the TD. With cooperation in a quantitatively high amount of activities it's aim was to "provide a framework for European Union (EU)-US partnership."[442]

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439 ibid p.2

440 **Pollack, Mark A**. 2003. p.7 cited Featherstone and Ginsburg 1996, Peterson 1996

441 ibid p.7

442 **The Europa Publications EU Information** Series 2008. p.175

In the first paragraphs of the NTA, the signing parties pointed out the unity of EC-USA, which "for over fifty years […] has been the leading force for peace and prosperity for ourselves and for the world." Past accomplishments were considered as "epic achievements".[443]

Objectives

Four target points of cooperation were outlined. Subsequently, the Joint Action Plan (JAP) described later in more detail, corresponded to the following points:

- **"Peace and stability"**: promoting democracy, development and humanitarian assistance around the world.
- Global challenges: responding to global challenges such as to combat international crime and communicable diseases by setting up an early warning system.
- **"World trade"**: contributing to the expansion of world trade and closer economic relations. This has to be seen in relation to the WTO, a New Transatlantic Marketplace and a further liberalization of the global market.
- **"Building bridges across the Atlantic"**: several actions shall bring the people across the Atlantic together. S&T is one of these actions.

Science and technology

The fourth point, "Building bridges across the Atlantic", was of major significance for S&T. The exact wording was as follows (highlighted by the author):

> *"the Agenda **seeks to expand** commercial, **cultural, educational and scientific exchanges** to ensure public understanding of and support for the transatlantic relationship."*[444]

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443 **New Transatlantic Agenda**, signed in Madrid 3 December 1995
online: http://www.eurunion.org/partner/agenda.htm [28 July 2008]

444 ibid

S&T was therefore supposed to bring the people of the EU and the USA closer together and thus to enhance cooperation.

Establishment of new institutions

On the institutional level, through the NTA, new transatlantic governance mechanisms were established for a productive working environment and to ensure steady progress.[445] These mechanisms were:

- Senior Level Group (SLG),
- Reports of SLG,
- Lower-level NTA Task Force, and
- EU-USA summits.

The SLG had to "oversee work on this Agenda and particularly the priority actions we have identified"[446], while the lower-level NTA Task Force was in charge of coordinating and implementing the NTA's conclusions in-between regular EU-USA summits.

For a better understanding of the working procedures, Horvat/Karrap provided the following graph:

445 **Pollack, Mark A**. 2003. p.8
446 **New Transatlantic Agenda**. 1995 p.5

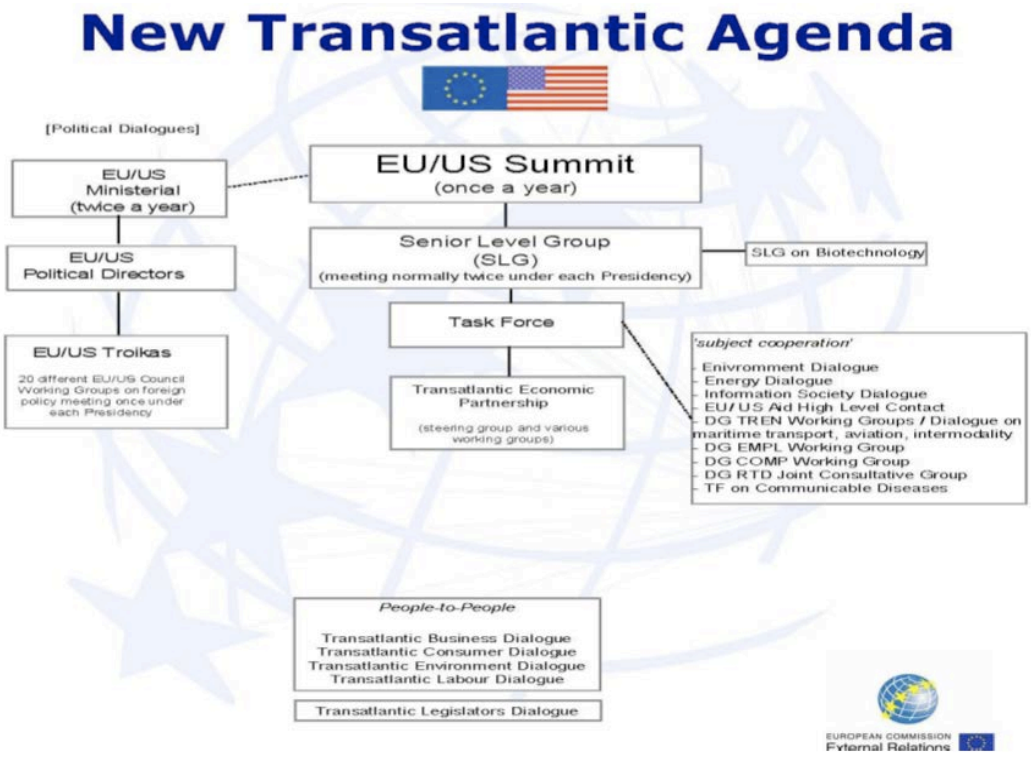

Figure 7 Working Procedures: Transatlantic Agenda[447]

For the realization of the agreement, a joint EU-USA Action Plan was supposed to help achieving the four goals. The 150 points long working plan should enhance the commitment of the parties. It is described in the next Chapter.

Critics

For coordination of EU and USA responses to economic and security issues, the NTA's institutional framework has proven useful, although critics have called it bureaucratic and focused on summit driven "deliverables". Nevertheless, it has been an overarching framework for transatlantic relations ever since.[448]

447 **Horvat, Manfred / Harrap, A. Keith** 2009**.** *Review of the Science and Technology Cooperation between the European Community and the United States of America*. Final report to the European Commission. p.11

448 **Pollack, Mark A**. 2003. p.8

4.3.1. The joint EU-USA Action Plan 1995

As a result fo the criticism in the aftermath of the TD, saying that only few major actions were actually implemented, a detailed JAP was planned during the NTA. It outlined specific policy areas, in which deeper cooperation could be pursued. Pollack said that "the economic chapter of the JAP was arguably the most ambitious of the four" since the aim was the creation of a liberal marketplace as well as the strengthening of the multilateral trading system.[449]

Although the NTA was mainly tailored to an economic partnership, additionally it had major significance for the policy areas research, science and education.

Science and technology

In the fourth chapter of the JAP the goal was outlined:

> *"We are committed to fostering an active and vibrant transatlantic community by deepening and broadening the commercial, social, cultural, scientific, and educational ties that bind us."*[450]

In the section "Building bridges across the Atlantic" actions in the following areas were outlined:[451]

1) "Broadeninge Science and technology cooperation,
2) "People to people links",
3) "Information and Culture", and the
4) "Transatlantic Business Dialogue"

1) **Science and technology:** a clear commitment towards establishing a formal basis was made. This ambition should bear fruit within the following two years:

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449 ibid p.8

450 **Joint Action Plan** 1995 online (Austrian presidency) http://www.eu2006.at/en/The_Council_Presidency/EU-USSummit/ImportantDocuments/ActionPlan.pdf [28 July 2008]

451 ibid

> *"We will actively work to reach a new comprehensive **EC-U.S. science and technology cooperation agreement** by 1997."*[452]

And indeed, after two years of rather complicated negotiations, the Science and Technology Agreement was concluded. It became the core of the EU-USA cooperation in S&T and was strongly interlinked with the EU's FPs. In 2009, it once more was extended until 2013; for an in-depth discussion of this Agreement, see Chapter 5.2.

In addition, in order to meet the global challenges and foster economic growth, the STA provided for cooperative S&T projects. Therefore, the parties were supposed to "identify collaborative projects and exchange information to address crossborder issues" in the areas transportation, health and global climate change.[453]

2) **People to people links:** in order to "strengthen and broaden public support for our partnership" the EU-USA want to strengthen the commercial, social, cultural, scientific and educational ties among their citizens.[454]
For this purpose, the EC-USA Agreement on Cooperation in Education and Vocational Training was meant to be a "catalyst". Students and teachers were supposed to benefit, as the ground for cooperative activities was laid and ways towards the increase of private financial support for educational exchanges such as scholarships or internships were found. Furthermore, the teaching of each other's history, languages and culture was fostered. Direct people to people links in diverse fora such as youth groups or think tanks were meant to enhance solutions for common problems on ground the basis of the "flow of ideas".[455]

3) **Information and culture**: ways of cooperative cultural projects were to be examined, for example in the fields of visual arts, theatre, ballet or co-productions of

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452 **New Transatlantic Agenda** 1995. P.5
453 ibid p.14
454 ibid p.5
455 ibid p.5

films. Information about the NTA and the JAP was to be published on the Internet and therefore made accessible for the broader public on both sides of the Atlantic.

4) **Transatlantic Business Dialogue**: it was recognized as a major part of the transatlantic business relationship: "since a transatlantic business relationship is an integral part of our wider efforts to strengthen our bilateral dialogue".[456] This civil society dialogue has been an important forum also for the "flow of trade, investment capital and technology" in the transatlantic relation.[457]

4.3.2. Transatlantic Business Dialogue

The Transatlantic Business Dialogue (TABD) is one of "the oldest, best organized, and most influential dialogues in the transatlantic economic relationship".[458] It could be regarded as the basis for "a transnational civil society", so Cowles.[459] However, contrary to other civil society groups, she argued, it would cooperate with

> *"government officials to provide them with information to craft creative solutions to potential regulatory disputes and to shape the US-EU (as well as global) regulatory agenda."* [460]

The main objective, as stated on the TABD website, [461] "is to help establish a Barrier-Free Transatlantic Market which will serve as a catalyst for global trade liberalisation and prosperity." This free market is to enhance "innovation and economic growth, increase investment and further create new jobs".

The TABD has redefined itself in the last couple of years. At the beginning, it was based on an "informal process" for discussing regulatory issues between firms on both sides,

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456 **Joint Action Plan**. p.4

457 **New Transatlantic Agenda** 1995

458 **Pollack, Mark A**. 2003. p.13

459 **Cowles, Maria Green** 2001. The Transatlantic Business Dialogue, in: Pollack, Mark A./Shaffer, Gregory C. (eds.) *Transatlantic Governance in the Global Economy*, Rowman& Littlefield Publishers, In. Lanham. p.214

460 ibid p.214

461 **Transatlantic Business Dialogue** http://www.tabd.com/index.php?option=com_content&task=view&id=26&Itemid=55 [30 September 2008]

then it was transformed into an institution with full-time administrative directors and offices with sufficient financial means on both sides of the Atlantic.[462]

Cowles argued, that the TABD played a crucial role in the NTA in different ways, for example through the collaboration of private and public or business and government in matters the officials previously have not taken notice of.[463] The TABD has been different than other groups, as it helped setting the agenda by recommending policies.[464]

The TABD has been criticized by USA and EU officials, because some proposals were regarded as "unacceptable given existing government practices" and because it focused on areas where no disputes occurred rather than "seeking to tackle and find consensus on more contentious issues that continue to hinder transatlantic trade and regulatory discussion".[465]

Furthermore, the TABD became a forerunner for other transatlantic dialogues such as the Transatlantic Labor Dialogue (TALD), the Transatlantic Consumers Dialogue (TACD), the Transatlantic Environmental Dialogue (TAED) and the Transatlantic Legislator Dialogue (TALD). With these dialogues more people to people links could be established.[466]

4.3.3. Transatlantic Legislator Dialogue

The Transatlantic Legislator Dialogue (TALD) originated from the NTA "building bridges" chapter and is interesting for the purpose of this thesis. It brings together members of the U.S. Congress and the EP.[467] Although parliamentary relations date back to 1972, it was not until 1999 when the TALD was established by the 50th interparliamentary meeting, held in Strasbourg. A joint statement announced the

462 **Cowles, Maria Green** 2001 p.224
463 ibid p.216
464 ibid p.221
465 ibid p.214
466 ibid p.229
467 **Pollack, Mark A**. 2003. p.12

"scope and resources for the development" of the TALD. Two annual meetings are planned and in addition teleconferences, appointments of committee liaison persons, a website was supposed to be created and twice a year, contacts on each side with members of the SLG were meant to enhance a positive outcome of the annual meeting.[468]

Looking ahead in time, the TALD was to be included in the consultations of the Transatlantic Economic Council, which was set up in 2007. According to Mildner/Ziegler, this inclusion was an important step[469] and could indeed function as "an early warning system" for legislation on the effects of new laws concerning the EU-USA relationship. Pollack however, criticized the "insufficient contact between the TALD and other parts of the transatlantic dialogue, for example the SLG."[470]

The NTA has not been able to solve all of the ongoing disputes between the transatlantic powers. Disagreement over environmental issues, the structure of labor markets and the economic protection of the U.S. steel industry persisted.
In order to have an arena for solving those ongoing trade issues, the Transatlantic Economic Partnership was brought to life. It stressed that the EU-USA relationship was highly strategic.[471]

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468 **European Parliament. Transatlantic Legislator's Dialogue** http://www.europarl.europa.eu/intcoop/tld/default_en.htm [17 January 2012]

469 **Mildner, Stormy-Annika / Ziegler, Oliver** 2008. Einbeziehung des Transatlantic Legislators Dialogue in die Beratergruppe des TEC war ein wichtiger Schritt [Including the Transatlantic Legislators Dialoge in the advisory body oft he TEC was an important step] p.8

470 **Pollack, Mark A**. 2003. p.12

471 **The Europa Publications EU Information Series** 2008. P.140

4.4. Transatlantic Economic Partnership 1998

A new agreement was launched at the London summit in May 2008: the Transatlantic Economic Partnership (TEP). Pollack described it as "a somewhat less ambitious" agreement, "which aimed to tackle bilateral regulatory barriers to trade and to identify common positions within multilateral trade negotiations".[472]

Science and technology

The pertinent Action Plan was to focus on regulatory cooperation and the possible harmonization of standards as a means of removing technical barriers to trade. With regard to cooperation in S&T, the second paragraph of the agreement is relevant. Cooperation was persuaded in areas such as:

> *"improved regulatory cooperation, cooperation among scientists, identification of priority sectors for the removal of obstacles, coordination of EU and US positions in international organizations".*[473]

Moreover, food safety, biotechnology and labor were part of the newly negotiated agreement.[474] In addition, intellectual property rights were strengthened as they were seen in the context of the TRIPs agreement worked out by the WTO[475]. To fight all optical media piracy, the two most recent World Intellectual Property Organization treaties were to be implemented.[476]

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472 **Pollack, Mark A**. 2003. p.8

473 **European Commission. DG Enterprise.** Transatlantic Economic Partnership http://ec.europa.eu/enterprise/enterprise_policy/inter_rel/eu_us/index_en.htm [25 July 2008] p.1

474 ibid p.1

475 **TRIPs-Agreement on Trade Related Aspects of Intellectual Property** as part of the Annex 1C of the Marrakesh Agreement (establishing the WTO) in Morocco on 15 April 1994 online: http://www.wto.org/english/tratop_e/trips_e/t_agm0_e.htm [3 August 2008]

476 **Transatlantic Economic Partnership** 1998 online: http://www.eeas.europa.eu/us/docs/trans_econ_partner_11_98_en.pdf [17 January 2012] p.4

4.5. Transatlantic Economic Council 2007

The latest deepening of the transatlantic economic cooperation was the establishment of the Transatlantic Economic Council (TEC). It was defined as

> *"a political body to oversee and accelerate government-to-government cooperation with the aim of advancing economic integration between the European Union and the United States of America."*[477]

This step was taken under the EU presidency of Germany and signed at the EU-USA summit in April 2007 in Washington D.C. by Angela Merkel as President of the European Council, George W. Bush as President of the USA and José Manuel Barroso as President of the European Commission.

A work program was elaborated. This so called "Framework for Advancing Transatlantic Economic Integration" was primarily supposed to "benefit the citizens and the competitiveness of our economies"[478], as declared in the paper's preamble.

Objectives

In the preamble of the TEC, the following objective was stated: to deepen "transatlantic economic integration and growth". This should then lead to "global benefits". Furthermore, the TEC

> *"will facilitate market access for third countries and will encourage other countries to adopt the transatlantic economic model of respect for property rights, openness to investment, transparency and predictability in regulation, and the value of free markets."*[479]

In addition, the effectiveness of existing economic cooperation should be improved and accelerated. The transatlantic economy should be recognized as at the "forefront of globalization, and the EU and the USA as each other's most important economic

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477 **European Commission. DG Enterprise and Industry.** Transatlantic Economic Council http://ec.europa.eu/enterprise/policies/international/cooperating-governments/usa/transatlantic-economic-council/index_en.htm#h2-6 [4 November 2011]

478 **Framework of advancing transatlantic economic integration between the European Union and the United States of America.** (Transatlantic Economic Council) 2007. Washington. p.1

479 ibid. p.1

partners". It is a partnership, which reflects "historical ties as well as a wide range of common fundamental values".[480] These values were mentioned as: importance of free enterprise, rule of law, property rights, free trade and competition, and the protection of health, safety and the environment for citizens and workers.

Tasks and working procedures

Through the TEC, those members of the European Commission and U.S. Cabinet are brought together, which are in charge of the policy areas covered by the framework. Permanent members of the TEC are: the European Commissioner for External Relations, for Trade and Internal Market and Services and for the USA the Trade Representative and the Secretaries of the Treasury and Commerce.[481]
The TEC also has the task of reaching out to the broader stakeholder community. This is done through a group of advisers, consisting of the co-chairs of the three existing transatlantic dialogues. In this way, the group is provided with a public voice.[482]

At the Summit Declaration of June 2008 in Brdo, the tasks of the TEC were further defined as: "to oversee the efforts outlined in the Framework, with the goal of acceleration progress and guiding work between EU-US Summits."[483]

Science and Technology

No less than eight bodies of the European Commission are involved. Therefore, a broad range of topics was covered by this agreement.

As for the area of "Intellectual Property Rights", the DG for Internal Market and Services (Copyright Enforcement, Patents), the DG for Trade (Intellectual Property) and

480 ibid. p.1
481 **Working Arrangements for the Transatlantic Economic Council**. 2007
482 **European Commission. DG Enterprise and Industry.** Transatlantic Economic Council http://ec.europa.eu/enterprise/policies/international/cooperating-governments/usa/transatlantic-economic-council/index_en.htm#h2-6 [4 November 2011]
483 **Transatlantic Economic Council** 2008**.** Report to the EU-USA Summit. In: EU-USA summit declaration 10 June 2008. p.16

the DG for Taxation and Customs (Counter fight and Piracy) are the coordinating bodies.

In the area "Innovation and Technology" two DG were involved: the DG for Information Society and Media (eHealth, Radio Frequency Identification) and the DG for Research (Biotechnology Research).

Some "Lighthouse Priority Projects"[484] were identified in order to enhance transatlantic economic integration in the short term (by the end of 2008). These were the areas of intellectual property rights, secure trade, financial markets, innovation and technology and investments.

The road to TEC

In 2007 the TEC was established but its origins date back to the 2005 EU-USA Summit. During the summit, it was decided to foster "enhancing transatlantic economic integration and growth"[485].

Mildner/Ziegler argued, that the political engagement of Angela Merkel and her role as Chancellor of Germany were crucial to the establishment of the TEC. In her first speech as President of the EU Council she said:

> *"At the EU-US Summit we want to discuss the intensification of the transatlantic economic partnership. The United States is the European Union's most important trading partner. We are each other's key investment partner. In the interests of our global competitiveness we have to continue removing trade barriers (...). I am firmly convinced that a common transatlantic market is in Europe's own best interests."*[486]

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484 **Framework of advancing transatlantic economic integration between the European Union and the United States of America.** (Transatlantic Economic Council) 2007. Washington. p.6

485 **Council of the European Union 2005 EU—USA Summit Declaration.** Initiative to Enhance Transatlantic Economic Integration and Growth. Washington DC. 20 June 2005

486 **Merkl, Angela.** 2007. Speech to the European Parliament in Strasbourg on 17 January 2007 http://www.eu2007.de/en/News/Speeches_Interviews/January/Rede_Bundeskanzlerin2.html [28 September 2008]

Furthermore, Merkel suggested using "patent law, industrial standards" and the "access to stock markets" for abolishing the barriers in trade. [487]

The future of TEC

Although it is stated, that the USA and EU

> *"affirm their strong commitment to ensure the continuity of the TEC process as the key joint governance mechanism for the transatlantic economy into the future",*

changing political leaderships might not put such an emphasis on this project. Mildner/Ziegler argued, that the rotating EU Council presidency and the U.S. presidential elections in November 2008 had the potential of not finding an extension.[488]

All of the above-discussed agreements are somehow linked to the regular EU-USA summits. With the TD in 1990, the EU-USA summit was created. Formerly held twice a year, since 2001 annually, it serves as an arena for consultations on transatlantic issues:

4.6. EU-USA Summits

To enhance transatlantic (economic) cooperation, the TD, NTA and TEP in stages introduced annual EU-USA summits as an intergovernmental platform for exchange.
In these summits, the highest officials meet, namely the EU Presidency, EU Commission and the President of the United States.[489] According to Pollack, "the transatlantic policy cycle begins and ends with these biannual summits," in which the policy leaders make decisions related to the general range of cooperation and in which

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487 ibid

488 **Mildner Stormy-Annika / Ziegler Oliver** 2008. Transatlantischer Wirtschaftsrat unter Erfolgsdruck [Transatlantic Economic Council under pressure to succeed] SPW-Aktuell 31, Mai. p.7

489 **European Parliament**. 2008. Factsheets European Union online: Transatlantic Relations: The USA and Canada edited by Stefan Schulz http://www.europarl.europa.eu/ftu/pdf/en/FTU_6.4.7.pdf [17 Janurary 2012]

new bilateral agreements are proclaimed. These summits enhance the coordination of policies, as guidelines are generated, which force officials in lower positions to produce results.[490]

In 2008, the regular and close contact between the EC and the USA were declared as being fruitful and to "have allowed both sides to deepen their political dialogue". The EU-USA summits became a platform for informal discussions of strategic issues and common interest.[491]

Within these summits and the resulting written outcomes, The coverage of science and technology cooperation in these meetings as well as the resulting documents, could be also investigated, however, this would exceed the limits of this thesis. A detailed coverage of the summits between 2004 and 2008 can be found in Horvat/Harrap.[492]

Innovation and technology

Until mid-2011, the last EU-USA summit took place in Lisbon, Portugal, on 20 November 2010. The three major issues discussed were: sustainable economic growth, global challenges and security of the citizens. In order to boost the economy and generate new job opportunities, it was agreed, that the best ways were to foster

> *"innovation, streamline regulation, and eliminate barriers to trade and investment". Due to this resolution, the TEC was assigned to work on ways to create new jobs especially in "key emerging sectors and technologies".*[493]

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490 **Pollack, Mark A**. 2003. p.10

491 **Council of the European** Union 2008. p.16

492 **Horvat, Manfred / Harrap, A. Keith** 2009**.** *Review of the Science and Technology Cooperation between the European Community and the United States of America*. Final report to the European Commission. p 13-18

493 **Council of the European Union** 2010 EU-US summit. Joint Statement. 20 December 2010 http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/foraff/117897.pdf [5 November 2011]

5. International Cooperation in Science and Technology

5.1. Overview

In the last chapter of this thesis, three different aspects of international STP will be presented. First, the existing Science and Technology Agreement between the EU and USA is described. This agreement can be seen as the core of transatlantic scientific cooperation. Secondly, there will be a focus on the EU's policy of opening its Research Area to third countries. Finally, the rationales of scientific and technological international cooperation will be presented according to the views of several authors, who analyzed them.

5.2. EU-USA Agreement for Scientific and Technological Cooperation 1997

5.2.1. Introduction

The EU has bi-lateral Science and Technology Agreements (STA) with several countries.[494] A STA can be seen as framework for opening a dialogue on policy, aims, concerns and common activities.[495] In that sense, these agreements

> *"represent the most appropriate instruments to create a political, legal and administrative framework for the visible and transparent organization of science and technology cooperation"*[496]

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494 *A comprehensive List can be found under: http://ec.europa.eu/research/iscp/pdf/st_agreement_ec_euratom_11_october_2011.pdf#view=fit&pagemode=none [11 November 2011]*

495 **European Commission**. **DG Research** International Cooperation. Policy Frameworks with countries http://ec.europa.eu/research/iscp/index.cfm?pg=countries [27 November 2011]

496 **Kettunen, Jyrki / Harrap, Keith A. / Wolff, Claude** 2003. *An impact assessment of the science and technology agreement concluded between the European Community and the United States of America*. Independente Expert Report to the European Commission. p.27

between the parties. The signatories mutually open their research programs and institutions. However, this does not include the access to financial support.[497] Since the STA only functions as an "umbrella" for "implementing arrangements", which are meant to "better organize collaboration in specific areas of research."[498] Although several Member States of the EU also signed a STA with the USA, which makes the picture more complex, in this thesis, the focus is on the EU level. For a detailed overview of the agreements by the Member States, see the project Bilat-USA.[499]

The legal basis for the STA is Article 186 Lisbon Treaty (ex Article 170 TEC). According to it, the following competences are crucial:

> *"In implementing the multiannual framework programme the Community may make provision for cooperation in Community research, technological development and demonstration with third countries or international organizations."*[500]

Furthermore, the details for the collaborative activities should be discussed in relation to Article 300 Lisbon Treaty, which defines the decision-making procedure of the advisory bodies.

5.2.2. Initial Agreement

On 5 December 1997, the EC and the USA signed the "Agreement for Scientific and Technological Cooperation"[501], which came into force on 14 October 1998. It

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497 **Bieber, Roland / Epiney, Astrid / Haag, Marcel** 2005.p.556

498 **Horvat, Manfred** 2009. Across the Atlantic: A Review of US-EU Cooperation in Science & Technology. Article based on the S&T Agreement Review of 2009. *Bridges* vol. 21, April 2009 online: http://www.ostina.org [14 April 2009]

499 **Bilat USA and LINK 2 Us**. Project homepage http://www.euussciencetechnology.eu/home/st_agreement.html [26 November 2011]

500 **Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union**. Official Journal C83. 2010/C 83/01 Vol.53. 30 March 2010 online: http://www.ena.lu/treaty_establishing_european_economic_community_rome_25_march_1957-2-18771 [17 January 2012]

501 **AGREEMENT for scientific and technological cooperation between the European Community and the Government of the United States of America**. Official Journal, published 20 October 1998 (L 284/37) online: http://eur-lex.europa.eu/LexUriServ/site/en/oj/1998/l_284/l_28419981022en00370044.pdf [17 January 2012]

represents the core of the S&T collaboration between the USA and the EU. It is unique, as it has been concluded with "one of the most successful S&T-based economies that the world has seen". [502] Its importance has been recognized as a door opener for joint undertakings in "ground-breaking high caliber science".[503] The specific agreements were made between the European Commission and the USA government departments and funding agencies; for instance between the European Commission and the National Institutes of Health in the USA (NIH).[504]

Difficulties in the two year negotiations

Nevertheless, the negotiations toward the signing were by no means easy, as Kettunen/Harrap/Wolff retrospectively reflected in the first assessment report of 2003; a view which was also held by Rainer Gerold, at the time Director General for Science, Research and Development, and thus a major actor of the negotiations.

Kettunen/Harrap/Wolff[505] called the two-year negotiations "laborious" since the research endeavors on both sides of the Atlantic differed substantially. Whereas in the EU the FP under the single authority of the European Commission are based on open competitive calls for proposals, in the USA the RTD System is highly de-centralized and based on various authorities.

Gerold[506] also stated that significant differences between the USA and EU management, funding and policy development system existed in the RDT sector. Moreover, Gerold reported three further difficulties: first, intellectual property rights (IPR), which finally found their way into the two-page annex of the Agreement. These IPR were especially important for the USA, as according to Kimble they were "an

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502 **Kettunen, Jyrki / Harrap, Keith A. / Wolff, Claude** 2003. p.22

503 ibid p.22

504 **Horvat, Manfred** 2009.

505 **Kettunen, Jyrki / Harrap, Keith A. / Wolff, Claude** 2003. p.5

506 **Gerold, Rainer** 1998. The European Union Vista in Transatlantic Science and Technology Cooperation In: Wessner, Charles (Edt) N*ew Vistas in Transatlantic Science and Technology Cooperation*. Book based on conference held 8-9 June 1998 in Washington D.C., National Academy Press. Washington D.C. p.36

essential means of encouraging research and technological innovation."[507] Secondly, according to Gerold, it was discussed whether the participation of foreign institutions and scientists was an asset or rather a liability for the EU RTD system. And thirdly, even the wording "foreign" was a matter of dispute and later solved by a side letter.[508]

With regard to the big difference in the system, meaning centralized calls in the EU versus de-centralized activities in the USA, the STA gave impetus for a new era of cooperation across the Atlantic by "creating a bridge" between the two systems.[509]

Principles, topics and cooperative forms[510]

In detail the Agreement was established with the principles, covered in Article 3:

a) "Mutual benefit based on an overall balance of advantages
b) reciprocal opportunities to engage in cooperative activities
c) equitable and fair treatment
d) timely exchange of information which may affect cooperative activities."

The list of topics ("cooperative activities") outlined in the STA broadly corresponded with the thematic programs of FP5. These were described in Article 4 of the STA. The range of topics was not only limited to natural sciences, but also broadened to include information and communication technologies, social science research, science and technology policy, management, and training and mobility of scientists.

Several areas were excluded, such as military research as well as research related to plant and animal varieties.[511] Nuclear research was also left aside, as the cooperation

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507 **Kimble, Melinda** 1998. The U.S. Approach to the U.S.-EU S&T Agreement In: Wessner, Charles (Edt) *New Vistas in Transatlantic Science and Technology Cooperation* Book based on conference held 8-9 June 1998 in Washington D.C., National Academy Press. Washington D.C. p.29

508 **Gerold, Rainer** 1998. p.36

509 **Kettunen, Jyrki / Harrap, Keith A. / Wolff, Claude** 2003. p.5

510 **AGREEMENT for scientific and technological cooperation between the European Community and the Government of the United States of America**.

511 **Gerold, Rainer** 1998. p.35

in this area was dealt with in a separate agreement (1996) between EURATOM and the USA.[512]

The form of cooperative activities, described in Article 5 of the STA, was two-fold:
on the one hand, they referred to the intergovernmental level, which was to provide the basis for research cooperation (laws, regulations, policy). On the other hand, "joint research projects" were envisaged. Here, "training of scientists and technical experts" as well as "visits and exchanges of scientists, engineers or other appropriate personnel" were cited. Both were regarded as an important asset in the education and career planning of the scientific workforce.[513]

Promotion and discussion on impact

When the STA was concluded, its implementation was questioned: how should it be publicized and become effective and efficient?

Officials on both sides therefore contacted the National Research Council's Board on Science, Technology, and Economic Policy in Washington D.C. (STEP) to organize a conference. The conference was the first action under the STA, but served also as a promotion. The STA was presented to the "scientific community" in order to raise interest in the new possibilities.[514]

At this conference, a review of the existing projects in the diverse research areas, as well as their progress was reviewed. Subsequently, a conference book titled "New Vistas in Transatlantic Science and Technology Cooperation"[515] was published.

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512 **Horvat, Manfred / Harrap, A. Keith** 2009**.** *Review of the Science and Technology Cooperation between the European Community and the United States of America*. Final report to the European Commission. p.108

513 **AGREEMENT for scientific and technological cooperation between the European Community and the Government of the United States of America**.

514 **Kettunen, Jyrki / Harrap, Keith A. / Wolff, Claude** 2003. p.5

515 **Wessner, Charles** 1998. *New Vistas in Transatlantic Science and Technology Cooperation*. Book based on conference held 8-9 June 1998 in Washington D.C., National Academy Press. Washington D.C.

Government officials and the private sector contributed to the book, which secured the Agreement wider and stronger support:

Some of the most relevant speakers are presented in the following section in order to discuss the possible impact of the STA.

Charles W. Wessner, Programme Director, Technology, Innovation, and Entrepreneurship at the USA National Academies, praised the S&T Agreement as a "significant achievement", which was "creating a bridge between the research and development (R&D) on both sides of the Atlantic". He believed it would have "immediate and positive effect on transatlantic cooperation".[516] One effect might have been that tasks, which were too expensive or too big, could be solved jointly. Wessner rejected the picture of the EU as a fortress and pointed to cooperation with third countries, even if the USA was the EU's major competitor:

> *"We are convinced that such openness to cooperation, which may have been a choice in the past, has become a must in today's global society (…) because in the long run such cooperation is in everyone's interest."*[517]

Rainer Gerold, put the Agreement in relation to the FP: both were "addressing the strategic questions" [518] the society was facing, such as disease control, aging society, and global climate change. Those questions should be solved by "common effort". In addition, in his opinion, the "challenges of the information society or of mobility" [519] could be successfully addressed by a transatlantic cooperation. In conclusion, Gerold pointed out that mutual confidence was important as there had to be an "overall balance and both partners must be convinced that cooperation is in their interest".[520] Despite his positive outlook, he stated that this process might take some time.[521]

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516 **Wessner, Charles** 1998. Introduction In: Wessner, Charles (Edt). *New Vistas in Transatlantic Science and Technology Cooperation*. Book based on conference held 8-9 June 1998 in Washington D.C., National Academy Press. Washington D.C. p.2

517 ibid p.35

518 **Gerold, Rainer** 1998. p.32

519 ibid p.33

520 ibid p.37

521 ibid p.35

Melinda Kimble, at that time Acting Assistant Secretary for Oceans and International Environmental and Scientific Affairs at the USA Department of State, saw a clear benefit for science. She pictured a great future for the S&T Agreement as it would prevent "duplicative efforts".[522]

The above-mentioned statements on the original STA were published in the conference book, all of them predominantly praising and little to none bringing forward critical thoughts on the Agreement. Some criticism was then addressed in the first assessment and impact report of 2003.

5.2.3. Assessments and extensions

In Article 12b of the initial STA[523], the possibility of extending the STA for a further five-year-period was provided. This Article also offered the possibility of changes and amendments to the Agreement. In order to extend the STA, an assessment report had to review the activities and impact of the existing Agreement. The STA has been extended twice: in 2004 with a simple extension agreement and in 2009[524] with some amendments.

At this point of the thesis, the discussion of the policy level will stop and the emphasis will be put on the STA's practical effects:

The first extension was made on 8 October 2004[525], based on the 2003 assessment report by Jyrki Kettunen, Keith A. Harrap and Claude Wolff.[526] The major outcomes,

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522 **Kimble, Melinda** 1998. p.29

523 **AGREEMENT for scientific and technological cooperation between the European Community and the Government of the United States of America**

524 **Council Decision** of 30 March 2009 concerning the extension and amendment of the Agreement for scientific and technological cooperation between the European Community and the Government of the United States of America (2009/306/EC). Published in Official Journal of the European Union 2 April 2009 L90/20

525 **Council of the European Union** 2004 Brussels, 8 October 2004 12893/04 (Presse 279)

526 **Kettunen, Jyrki / Harrap, Keith A. / Wolff, Claude** 2003. p.14

concerns and recommendations of this assessment report were then presented to the policy leaders. Although the STA in general was regarded as useful and indeed enhanced the EU-USA S&T collaboration, disappointingly, both in the EU and the USA awareness about the Agreement was low. In the context of the FP5 projects (a total of 140 projects), only 1% was executed between the USA and the EU. Therefore, one major recommendation for the future was to develop a strategy to raise awareness in science, industry and governments in order to "better exploit the potential."[527]

Another outcome was that there was confusion about the EU-USA STA on both sides of the Atlantic. Next to the STA, various bilateral agreements with individual European Member States existed. The recommendation was therefore to establish more effective communication, preferably from the EU Delegation in Washington D.C. jointly with the embassies of the Member States. Both suggestions were supposed to clarify the essential differentiation.[528]

The second extension of the STA was on 30 March 2009.[529] In general, the content remained the same and only some amendments were made. Two new areas of cooperation were included, thus paying tribute to the changed context: the Lisbon Treaty and the FP7. Joint "research on security and space" was included into the STA.

The basis for the extension was the assessment report for the period from 2003-2008[530], written by Manfred Horvat and Keith A. Horrap. This review was based on interviews with EU science counselors in Washington D.C. as well as U.S. officials and an online survey of FP6 and FP7 participants.

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527 ibid p.14

528 ibid p.23

529 **Council Decision** of 30 March 2009 concerning the extension and amendment of the Agreement for scientific and technological cooperation between the European Community and the Government of the United States of America (2009/306/EC). Published in Official Journal of the European Union 2 April 2009 L90/20

530 **Horvat, Manfred / Harrap, A. Keith** 2009**.**

In general, the participation rate of EU partners in U.S. research projects and vice versa was again low, but the authors saw the huge potential of the STA. Some relevant outcomes and suggestions of the review were: a staff exchange between USA agencies and the research directorates of the European Commission. A reduction of the deficits in the implementation of the Marie Curie action, which was the most important specific action for the EU-USA collaboration. Furthermore a discussion of an appropriate strategy in order to balance the number of incoming and outgoing researchers would be of great importance. A "House of European S&T" in the USA could increase the visibility of European S&T in the USA; hence this was to be discussed with the Member States.[531]

5.3. EU S&T cooperation policy - Opening the European Research Area

The EU's international S&T cooperation policy is rather young. It was in 2000, when the Commission published the Communication on "A strategic European Framework for International Science and Technology Cooperation".[532] Since then, an explicit policy has been formed. However, the Communication did not arise out of nothing. Some of the steps that led to its creation are presented in the following sections.

The earliest study discussing international S&T cooperation goes back to 2004, when De Miranda/Okubo/Senker finished the final report of the project "GLOSPERA".[533] The study "Global Systems and Policy Design for the European Research Area" started in 2001 and was funded under the FP5. The objectives were to find best practices of international S&T cooperation and to investigate the possibilities of participating in global knowledge and innovation production. In addition, ways of creating a new

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531 **Horvat, Manfred / Harrap, A. Keith** 2009**.** pp.5

532 **European Commission** 2008a. *A Strategic European Framework for International Science and Technology Cooperation.* Communication from the Commission to the Council and the European Parliament COM(2008)588 final of 24 September 2008 http://ec.europa.eu/research/iscp/pdf/com_2008_588_en.pdf [17 January 2012]

533 **De Miranda, Alvaro / Okubo, Yoshiko / Senker, Peter** 2004. GLOSPERA- Global Systems and Policy Design for the European Research Area. Project under the FP5. SEITE

dialogue were suggested, in which researchers would give a strong impetus to the design of policies regarding international S&T cooperation. The study was done by analyzing the origins, implementations and major evaluations of four programs of international research cooperation: the Human Frontiers Science Programme (HFSP), the Intelligent Manufacturing Systems (IMS), the Human Genome Project (HGP) and the Intergovernmental Panel on Climate Change (IPCC). As a result, several practical recommendations for future international scientific cooperation were submitted to the policy makers.

The study identified three rationaleswhy the EU should become active in international S&T cooperation: [534]

- To "benefit the international competitiveness of European industry",
- To "help European access to advanced scientific knowledge",
- Or to "contribute to European foreign policy objectives"."

Further on, the report concluded that it might be necessary to become active, since the globalization produces problems for humanity, such as global warming, AIDS and BSE.[535] Probably, it was this study, in which the broad basis for the EU's international S&T cooperation policy was presented.

It took another three years until, in the context of the development of the ERA, the topic "international research cooperation" was discussed. It was suggested that the tie between S&T cooperation policies and "other areas of external relations" should become closer.[536]

534 ibid p.8
535 ibid p.30
536 **European Commission** 2007. *Green Paper. The European Research Area: New Perspectives*. COM (2007) 161final. Brussels. 4 April 2007

Four groups of countries (due to the economic status) rather than thematic partnerships were identified:[537]

- First, the **neighboring** countries. This group should be included in a broader ERA and the respective policy should become part of the European Neighbourhood Policy (ENP).
- Secondly, the **developing** countries. A possible link to development aid should be envisaged.
- Thirdly, the **emerging economies**.
- Thirdly, cooperation with **industrialized countries**. This partnership shall have a mutual benefit. In this regard bilateral STAs play a major role.

In the aftermath of the consultation process on the ERA Green Paper, seven Expert Groups were installed by the DG Research, which worked on the identified seven dimensions of the ERA:

> *"Realising a single labour market for researchers, developing world-class research infrastructures, strenghtening research institutions, sharing knowledge, optimising research programmes and priorities, opening to the world: international cooperation in S&T, and Rationales for ERA."*[538]

Expert Group number six was called "Opening to the world: International cooperation in S&T" and was set up with Daniele Archibugi as the chairperson.[539] Its task was to discuss how to enhance the openness of ERA. The 118 pages long report of the Expert Groupwas presented in 2008. It was divided into three parts: [540]

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537 ibid pp.30

538 **European Commission DG Research** 2008c. *Opening to the world: International cooperation in Science and Technology*. Report of the ERA Expert Group. Group 6 chaired by Daniele Archibugi Brussels. Brussels. p.3

539 *Further members were: Suma Athreye, Peter Gammeltoft, Knut Blind, Ken Guy, Manfred Horvat, Sandra Lavenex, Gergana Noutcheva, Gilles Saint Martin, Sophei Thoyer, Rainer Walz and Ngaire Woods.*

540 **European Commission DG Research** 2008c.

In part one, the globalization of knowledge was stated as the reason why "international cooperation is vital for the EU". This challenge was to be met with the Lisbon Strategy. Furthermore, the rationales for international S&T cooperation were explained. These rationales will be discussed in greater detail in the next sections of this thesis.

In part two, the already ongoing "instruments" of cooperation were described, which were embedded in the FP7 and in bilateral agreements between the EC and partners worldwide.

And lastly, in part three, ideas about a potential future "framework" for a more effective EU approach towards international S&T cooperation were presented. Moreover, the principles for cooperative partnerships and priority setting in coordination were outlined.

This report laid the basis for the following 2008 Conclusion by the Commission. The Commission adopted "A strategic European Framework for International Science and Technology Cooperation", in which two main activity lines were identified:[541]

1. **"Strengthening the international dimension of the ERA"[542]:** including the geographic dimension "Europe's neighbours"; stimulating strategic collaboration with key third countries.
2. **"Improving the framework conditions for international S&T cooperation":[543]** including the general conditions for global research infrastructures, enabling mobility of researchers and paying attention to global challenges and intellectual property rights as well as making research programs more open.

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541 **European Commission** 2008a. *A Strategic European Framework for International Science and Technology Cooperation.* Communication from the Commission to the Council and the European Parliament COM(2008)588 final of 24 September 2008 http://ec.europa.eu/research/iscp/pdf/com_2008_588_en.pdf [17 January 2012]

542 ibid p.8

543 ibid p.12

For achieving those goals, six key principles were outlined:

> *"Widening the ERA and making it more open to the world, Ensuring coherence of policies and complementary of programmes, Fostering strategic S&T cooperation with key third countries, Developing the attractiveness of Europe as a research partner, Launching results - oriented partnerships on information society regulation (and) The European Community and Member States working together".*[544]

Thus, a closer collaboration between the European Community and its Member States, in order to contribute "to stability, security and prosperity in the world" was suggested.[545]

In 2009, in the second EU-US STA assessment report – as already discussed - this strategy was judged to be highly adequate and its implementation was recommended. The general importance of the international S&T cooperation was recognized and the authors praised the possibilities within the current FP7 as well as the allocation of higher funding.[546]

5.4. Rationales of international S&T cooperation

In the above described report of the ERA Expert Group on international S&T cooperation, four lines of argumentation were provided, which should form the ground for opening the ERA to the world. These argumentation lines for an international S&T cooperation were:[547]

1. "Economic competitiveness"
2. "Responding to global challenges"
3. "Meeting the demographic and educational challenge of human resources"
4. "Promoting political cooperation, dialogue and trust"

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544 ibid p.6-7
545 ibid p.4
546 **Horvat, Manfred / Harrap, A. Keith** 2009**.** p.64
547 **European Commission** 2008a.p.7

Although it was recognized, that cooperation and competition has to be balanced, this report strongly argued for the advantages resulting from cooperation, namely the welfare of European citizens and the innovative potential. [548]

In 2009 a study commissioned by the EC DG Research was published. In this study the "Drivers of international collaboration in research"[549] were identified. The study was initiated due to the need of a strategic and efficient policy on international S&T cooperation in times of globalization.[550] The authors were Jakob Edler, Paul Cunnigham and Kieron Flanagan from the Manchester Institute of Innovation Research. The study was edited by Patries Boekholt from the Technopolis Group.

The authors took into account an intensive analysis of literature as well as an analysis of the international S&T cooperation policy in ten EU-countries and ten non-EU countries, including the USA, and suggested a set of indicators, which could "measure the progress and success"[551] of international S&T cooperation policy. Moreover, input from the conference on international S&T coopeartion from October 2008 in Brussels was included.

In the report, a graphic overview was presented, which shows the complexity of the drivers, policy domains and policy goals:

548 **European Commission DG Research** 2008c. p.11

549 **Boekholt, Patrice / Edler, Jakob / Cunningham, Paul / Flanagan, Kieron** 2009**.** *Drivers of international collaboration in research*. Final report to European Commission. DG for Research. Brussels

550 ibid p.1

551 ibid p.1

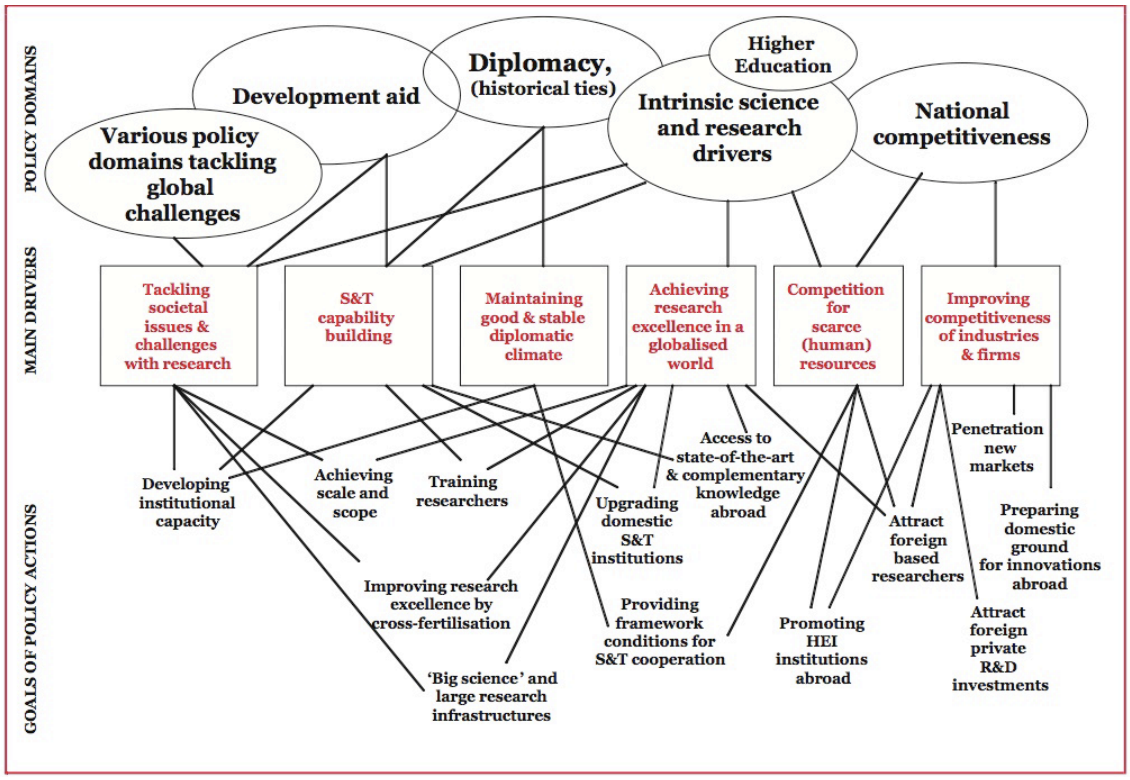

Figure 8 Policy domains, drivers and goals of international collaboration in research [552]

For a better understanding, Boekholt et al.[553] suggested a differentiation between two types of rationales of science, technology and innovation (STI) cooperation:

1) **"The narrow STI cooperation paradigm"**
2) **"The broad STI cooperation paradigm"**

The categorization of these two paradigms serves as the backbone for the following sections of this thesis, enhanced with material by additional authors. As diverse authors use diverse labels for "reasons for cooperation", such as "drivers", "rationales", "direct benefits" or "justification", in this thesis, these terms are used as synonyms.

552 ibid p.9
553 ibid p.8

5.4.1. The narrow STI cooperation paradigm

The "narrow paradigm" [554] of international STI cooperation aims at raising the "quality, scope and critical mass in science and research".[555] This shall be achieved by connecting national funds and human resources with the respective ones from other nations. According to Boekhalt et al., this paradigm is the strongest for international S&T cooperation. The desire for collaboration often comes from within the scientific community, which is why it can also be referred to as the "intrinsic" paradigm.

Boekhalt[556]et al. identified the following as "intrinsic drivers", whereas Georghiou[557] called them "direct benefits" from global cooperation:

- **Improvement of the quality of science** by access to world-class researchers, facilities and groups, as well as competition or combination of complementary know-how. Georghiou regarded this access to different and excellent research infrastructure for research groups from different countries as vital. Thus, even a small country may gain expertise. This is for example crucial in geosciences.
- **Solving scientific problems** by combining international expertise.
- **Extension of the research range** by pooling funding and human resources, thus sharing the costs and risks of large-scale research. This is especially important for large facilities. Georghiou used the example of the Anglo-Australian telescope, which was set up in 1970.
- **Extension of access to scientists**, **researchers or qualified personnel**. Georghiou considered this to be the most prominent rationale for taking cooperative actions among industrialized countries. In addition, it is easier to find a fitting research partner if the geographical boundaries of the specific program are as wide as possible. The access to knowledge, expertise or skills from outside is especially vital

554 ibid p.8
555 ibid p.8
556 ibid p.13
557 **Georghiou, Luke** 1998. pp.620

to smaller countries since their knowledge base might not be as advanced in each scientific area (e.g. Finland). However, also bigger countries (e.g. Japan) lack certain knowledge in specific areas and may profit from international collaboration. Human resources issues are also taken into account in the rationale "Meeting the demographic challenge".

- **Cost of science:** In addition to these rationales, the cost of large-scale science and research has to be mentioned. Especially infrastructures and costs in hi-tech fields of research justify international collaboration "even for the biggest players".[558]

In the study, the thematic areas for collaboration are regarded as "limited"[559]. Cooperation is undertaken in the areas of nanotechnology, bio-technology (and life sciences), research related to climate change, physics and ICT, as well as oceanography, energy and disease related medical research.

5.4.2. The broad STI cooperation paradigm

The "broad paradigm" of international STI cooperation includes further aims, which were originally not scientific ones. The actions taken are "driven by external goals of a political, economic or cultural nature."[560]

Again, for describing the "broad S&T cooperation paradigm" several studies are relevant. The study of Boekholt et al.[561] serves as a backbone for the following sections of the thesis. Besides, Georgiou's "indirect benefits of global cooperation" [562] are also

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558 **European Commission**. **DG Research** International Cooperation. Why a focus on S&T international cooperation now?http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=faq2 [17 January 2011]

559 **Boekholt, Patrice / Edler, Jakob / Cunningham, Paul / Flanagan, Kieron** 2009**.** p.14

560 **Georghiou, Luke** 1998. p.621

561 **Boekholt, Patrice / Edler, Jakob / Cunningham, Paul / Flanagan, Kieron** 2009**.** p.13

562 **Georghiou, Luke** 1998. p.621

presented. Additionally, reference is made to the report of the ERA Expert Group[563] on S&T cooperation.

The following rationales will be discussed: [564]

- "Competitiveness and innovation"
- "Responding to global challenges"
- "Human Resources"
- "Promoting political cooperation, dialogue and trust"

5.4.2.1. "Competitiveness and innovation"

As discussed earlier, according to Article 130f SEA (Article 179 Lisbon), the European research policy was a supporter of industrial competitiveness. With the Maastricht Treaty, research applies to all of the EU goals. As a consequence, the policy of international S&T cooperation is also supportive of competitiveness. One driver for international S&T actions might be the fear of the migration of nationally based R&D industries to low cost areas in the world.

In order to achieve industrial competitiveness, Boekhalt et al. identified two policy strategies:[565]

- **Outward oriented policy strategies**: where national actors gain access to expertise abroad.
- **Inward oriented policy strategies**: where investment and business is attracted to the own country.

These strategies can be exemplified as follows. While having the overall goal of becoming the most dynamic and competitive knowledge based economy in the world, the EU also has to accomplish becoming the "most open knowledge based economy in

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563 **European Commission DG Research** 2008c. *Opening to the world: International cooperation in Science and Technology*. Report of the ERA Expert Group. Group 6 chaired by Daniele Archibugi Brussels. Brussels. p.26

564 ibid p.26

565 **Boekholt, Patrice / Edler, Jakob / Cunningham, Paul / Flanagan, Kieron** 2009**.** p.14

the world". [566]. To achieve this goal, European companies need an efficient access to knowledge and if this is not available inside of the EU, "they should be able to access it elsewhere." [567].

An example for the inward oriented policy strategy on the EU level is the idea of the "European Innovation Area". By enhancing the attractiveness of the national innovation systems the national industries are meant to perform better. As a result, foreign investment in R&D would follow.[568]

Several policy instruments are concentrated on either outward or inward oriented competitiveness and innovation:[569]

- Programs tailor-made for commercialization of internal technologies.
- Opening of national programs with activities under the FP7 or earlier funding schemes under the special Program INCO.
- Collaboration with trade agencies and information services abroad such as attachés for S&T. These institutions may provide national enterprises with important knowledge, contacts and expertise and may build the ground for market access. Here, the linkage between international S&T cooperation and trade policies is very strong. Or, to put it differently, the division between international S&T cooperation and trade and export policies is rather insignificant.[570] Such information services are for example: the Office of Science and Technology at the Austrian embassy in Washington D.C (OST) or the section Science, Technology and Education at the EU Delegation to the USA.

566 **European Commission DG Research** 2008c. p.13
567 ibid p.13
568 **Boekholt, Patrice / Edler, Jakob / Cunningham, Paul / Flanagan, Kieron** 2009.p.14
569 ibid p.18
570 ibid p.14

Nevertheless, a pre-condition for this openness of the ERA is a coordinated policy of the EU members, as is "speaking with one voice." In this way European STP can become a "label" and can become internationally noticeable.[571]

5.4.2.2. "Responding to global challenges"

Finding answers to global challenges is not a "policy option but a necessity"[572]. This was a provocative statement by the European Commission. However, keeping in mind cross-border issues like climate change, energy production, biodiversity or diseases, it might be realistic. No country alone can tackle these challenges, as they are simply too extensive. Therefore, large multi-lateral institutions or programs emerged in the past and in the future, in order to respond to global challenges worldwide, also less developed countries will have to be be included in the process.[573]

If global challenges are dealt with, the following benefits may result: [574]

- **Cost sharing:** by cooperating with partners, the financial burden to the EU would be limited.
- **Economic advantages**: global challenges and commitments in international agreements need new and appropriate technologies. Therefore, the private sector could find a market for its new innovative technologies.
- **Europe's prosperity**: meeting the global challenges could lead Europe into a prosperous future.
- **Worldwide stability, security and prosperity**: these concerns might be met by STI capacities built abroad. Thus, it has to be linked to external policy as well as developmental aid.
- **International treaties:** The EU already participated in several international agreements related to climate change, helping to safe the environment for future generations.

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571 **European Commission DG Research** 2008c. p.29
572 ibid p.26
573 **Boekholt, Patrice / Edler, Jakob / Cunningham, Paul / Flanagan, Kieron** 2009**.** p.15
574 **European Commission DG Research** 2008c. p.26

Although the EU together with the USA and Japan is one of the largest R&D funders on the globe and can therefore strongly influence the scientific and technological process, its budget is rather restricted. Nevertheless, in diverse fields such as environmental and medical research as well as basic knowledge, the EU already takes action vital to the world.[575]

5.4.2.3. "Human Resources"

Human Resource in Science and Technology (HRST) is essential for an innovative research system, as the best-equipped research facility is worth nothing without people having the appropriate skills for using them. The picture of the future drawn by the Expert Group[576] in the field of HRST was not promising: The European innovation system might experience a lack of qualified workers. Universities and public centers but also the private sector such as industrial laboratories might be affected by this situation.

There are two main reasons[577] for this development: First, because of the demographic change, the labor market lacks specialists. Secondly, in the OECD countries, already today, students' interest in science and engineering is low.

Therefore, several policies have to address the lack of HRST: [578] The priority should be put on European born students. A higher investment in S&T education and training for a large number of people will raise the HRST. Then, the strategy is reaching out over the boarders of the ERA in order to attract more personnel. The intense training in engineering and S&T taking place in some parts of the world can be used to the EU's advantage. A prerequisite is an easier access to the EU STI labor market for non-

575 ibid p.12
576 ibid p.28
577 ibid p.28
578 ibid p.28

Europeans and recruiting talents from other countries has to be accompanied by other actions, such as exchange programs.

Exchange of HRST has two further implicit benefits. First, the so-called "tacit knowledge"[579] can be enhanced by international working teams. This type of knowledge stands in contrast to explicit knowledge. It can be referred to as knowledge, which cannot easily be transferred to others and if, only with trust and personal contact. And secondly, scientists may become "diplomats". This aspect falls under the rationale of international science and technology cooperation discussed in the follwing section of the thesis.

5.4.2.4. "Promoting political cooperation, dialogue and trust"

This rationale seems to become more and more important. Until 2008, different authors put their ideas on this rationale up for discussion. Until in 2010, the American Association for the Advancement of Science's (AAAS) Center of Science Diplomacy then introduced an analytical framework for the relationship between foreign policy and science policy.

Science and technology in context of external relations

Ahmed/Stein[580] argued that by opening the ERA's institutions and infrastructures to the rest of the world international relations could be built. Industrialized countries, developing countries and emerging economies may want to establish relations with Europe due to the attractiveness of the European research system, rather than by force. This way of using S&T as political power puts it in the context of external relations.

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579 **Polanyi**, **Michael** 1966. The Tacit Dimension. Library of Congress. Online: http://www.chaight.com/Wk%208%20E205B%20Polanyi%20-%20Tacit%20Knowing.pdf [23 April 2011]

580 **Stein, Josephine Anne / Ahmed, Allam** 2007. The European Union as a Model of International Co-operation in Science, Technology and Sustainable Development. In: *British Journal of Politics & International Relations*. vol.9, 654-669,

De Miranda/Okubo/Senker even spoke of a "mutual relationship" [581] between EU foreign policy and EU research policy. They mention the goals of following this rationale: globally enhancing the prestige of Europe (thus attracting foreign investment, people, and ideas); contributing to good relations with, and the stability of, countries in the geographic periphery of Europe; and supporting developing countries, particularly in "priority areas for European foreign policy".[582]

Internal and external effects

Earlier, Stein[583] identified internal and external effects of the actions in scientific and technological cooperation. Looking at the internal effect, S&T cooperation is a "component of European integration" itself. On the other hand, looking at external effect, it is a significant feature of the EU's foreign relations. According to Stein, the global challenges urge for the necessity of international S&T cooperation.

Stein mentioned the relation between foreign policy and S&T cooperation policy and regards it as not "explicit and certainly not systematic". Further on, she argued that in the aftermath of 9/11, global cooperation became even more important. Although a colaboration of the science community and the diplomatic community may require a lot of strength, by joining forces, "the quest for a better global future" could be achieved.[584]

As discussed in earlier chapters of this thesis, the situation has changed. Slightly and step by step policies have become more systematic and coordinated. The way the EU manages the integration process in general and especially the integration of the science and research area, could serve as a model for international cooperation.

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581 **De Miranda, Alvaro / Okubo, Yoshiko / Senker, Peter** 2004. GLOSPERA- Global Systems and Policy Design for the European Research Area. Project under the FP5. P.5

582 ibid p.5

583 **Stein, Josephine Anne** 2002. Science, technology and European foreign policy: European integration, global interaction. In: *Science and Public Policy*. volume 29, number 6 December. pp.463

584 ibid p.476

Scientific aspects of foreign policy versus foreign policy aspects of science

Wagner refered to Skolnikoff [585] as she explained his ideas on the relationship between science and diplomacy. He saw the **"scientific aspects of foreign policy".** With treaties on issues such as climate change, collaboration between the foreign policy community and the science community was necessary. An obvious example is the cooperation between the USA and the former Soviet Union in the International Space Station (ISS).

To paint a complete picture of the relationship between science and diplomacy, the "**foreign policy aspects of science**"[586] has to be mentioned. This includes considerations about the connection to foreign scientists. It refers to questions of with whom, when, where and how to cooperate. The aim is to improve the "knowledge creation".

Science and diplomacy: two different communities

Wagner[587] examined the "foreign policy aspect of science". She investigated the relationship between the two acting communities: the science community and the diplomacy community. Her analysis showed, that both systems are equipped with totally different dynamics. The science community works in networks and with peers, while the diplomacy community works in strict hierarchies and traditions. Both communities see each other's agendas increasingly overlapping. She critisized that the budget used for international scientific cooperation is quite limited even in advanced countries. She specifically analyzed the USA policy on S&T cooperation.

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585 **Wagner, Caroline** 2002. The elusive partnership- Science and Foreign Policy. In. *Science and Public Policy*, vol. 29, number 6, p.410 cited Skolnikoff

586 ibid p.410

587 ibid p.410

Raising Prestige

Several authors mentioned the raising of prestige as a rationale of international S&T cooperation. This was the case in the EU studies GLOSPERA[588] as well as by the ERA Expert Group[589]. Already in 1975, Schumacher[590] wrote on Salomon's rationales: one of which is that international cooperation in science raises the prestige of the country.

All of these authors regarded STP as positive for the achievement of diplomatic goals. Thus, to analyze this relationship between science and diplomacy, a more theoretical framework was needed. As already mentioned, in 2010, the Royal Society and AAAS Center for Science Diplomacy assumed this task.

Understanding the relationship between science and foreign policy

In 2008, the AAAS Center for Science Diplomacy in Washington D.C. opened. The center's goal is to assist the international science community to "build and knit together the global science enterprise" [591] and to advance science diplomacy. In the second year of its existence, the Center together with the Royal Society in the UK, defined the term "science diplomacy" as threefold: [592]

- **"Science in diplomacy"**
- **"Diplomacy for science"**
- **"Science for diplomacy"/"science diplomacy"**

588 **De Miranda, Alvaro / Okubo, Yoshiko / Senker, Peter** 2004 p.5

589 **European Commission** 2008b. *Challenging Europe´s Research: Rationales for the European Research Area (ERA*). Report of the ERA Expert Group. Brussels, p.21

590 **Schumacher, Dieter** 1975. *Perspektiven einer internationalen Forschungspolitik*. *Problemskizze am Beispiel der Europäischen Gemeinschaften [Perspectives of an international research policy.The European Union- an analysis]*. Verlag Otto Schwartz&Co. Göttingen. p.12

591 **American Association for Advancement of Science (AAAS). Center for Science Diplomacy** 2009. *2008-2009 Inaugural Year in Review*. Washington D.C.:AAAS p.12

592 ibid p.12

"Science in diplomacy: informing foreign policy objectives with scientific advice"[593]

The predicted global changes in water supply, energy, climate, mass migration or food production, would broaden the tasks of international foreign policy. In tackling those challenges, science can play a major role by putting qualitative input into policy making. One "best practice" in the information cycle between the science community and the diplomacy community is the Intergovernmental Panel on Climate Change (IPCC), which together with Al Gore in 2007 received the Nobel Peace Prize.

In order to firmly establish a deep relationship between the two communities, it is crucial to inform each other, so the AAAS. The science community has to be informed about "realities of policy making" and the diplomacy community needs information on the "role and limits of science in policy".[594]

"Diplomacy for science: facilitating international science cooperation" [595]

Diplomacy under that aspect is in charge of facilitating scientific goals. For this purpose either a top-down approach or a bottom-up approach could become practice.

Top-down approach: diplomacy could enhance the participation of various countries in large projects. By cooperating the high costs and risks would be shared, which no country would be able bear on its own. Such extensive projects are often done in specific areas of science. An example is the European Organization for Nuclear Research (CERN).

The bottom-up approach: diplomacy could assist scientists with visa issues and IPR or even in finding project partners. These supportive measures are important, especially

593 **The Royal Society / AAAS** 2010. *New frontiers in science diplomacy. Navigating the changing balance of power.* London.p.5
594 ibid p.6
595 ibid p.9-10

in cases, in which political relations are weak and "science can be a bridge to communities".[596]

"Science for diplomacy" /" science diplomacy"

Science can support the establishment of contacts or the cooperation between civilians, organizations or entire nations. Therefore, science can play a major role in building a "positive engagement". [597] Several "types" of science diplomacy can be identified: [598]

- **Establishing new institutions:** CERN, the European Organization for Nuclear Research, is a best practice for the creation of institutions. After WWII, former enemies such as Israeli and German scientists had the chance to work with each other.
- **Rewarding educational scholarships**: this is not only useful to the training of young scientists, but also vital for a broader network building.
- **Organizing science festivals and exhibitions**: such events can promote general cultural interests or the "universality of science".
- **Signing science cooperation agreements**: such agreements can be forerunners for initiating political relations. Also Wagner paid attention to science cooperation agreements. She referred to them as "door-opener", because the approval of an STA may initiate a collaboration in a broader set of activities.[599] Usually mutuality lies within.

Even though the framework looks quite reasonable, some criticism has to be made. When looking at the framework, scientists surely will raise the question about the "politization" of science. There certainly is the risk of science losing its freedom by

596 ibid p.9

597 **American Association for Advancement of Science (AAAS). Center for Science Diplomacy** 2009. p.11

598 **The Royal Society / AAAS** 2010. p.11-12

599 **Wagner, Caroline** 2002. Science and foreign policy. In. Science and Public Policy, vol. 29, number 6, p.409ff, p.409

being abused as a means of politics. In this context, the line between science and foreign policy, although often thin, has to be clear.

5.4.3. Rationales differ depending on the technology areas

According to the ERA Expert Group based on geo-political terms, the rationales for cooperation differ.[600] This also occurs in different technology areas. The research areas **nanotechnology, information and communication technologies (ICT), life sciences, energy and environment** are good examples.

First of all, what makes them significant is that they all contribute to economic competitiveness. Usually many countries work together in these fields, since they are cost- and resource-intensive. Cooperation is therefore almost a pre-condition. Secondly, these research areas are significant for the often-cited "global challenges". Nanotechnology could lead to lesser pollution, ICT could help to increase the outcome of other research areas, life sciences could tackle worldwide health issues, and environment and energy technologies could support sustainability.

Therefore, the EU should cooperate as follows: [601]

- In nanotechnologies with the USA and Japan as well as China, India and Russia
- In the information technologies with the USA and Japan
- In the communication sector with the emerging economies
- In energy and environment with Japan

5.4.4. Rationales differ from state to state

When looking at the rationales for international S&T cooperation on the European level, one can easily identify the different rationales based on geo-political divisions.[602]

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600 **European Commission DG Research** 2008c. *Opening to the world: International cooperation in Science and Technology*. Report of the ERA Expert Group. Group 6 chaired by Daniele Archibugi Brussels. Brussels. p.30

601 **European Commission DG Research** 2008c. p.36

As already mentioned before, four groups of countries can be differentiated: **industrialized countries, emerging economies, developing countries and neighboring countries**.

For this thesis, rationales regarding **industrialized countries** are especially relevant. The main target is not to build new relations, but to deepen existing ones. The broadening of market access can also be a rationale. The enlargement of mutual access to knowledge and skills as well as shared risks and costs in large projects can then be a positive outcome of this type of cooperation.

In the special case of the USA, the European Commission published a booklet, in which the drivers were outlined as:[603]

- "The sharing of knowledge towards a common knowledge base in support of other broader policies.
- The promotion of scientist training and mobility in a multicultural context.
- The identification and design of research infrastructures of mutual interest.
- The more effective and rapid development of global public goods through joint research activities.
- The elaboration of common agendas in international arenas."

In the case of **emerging economies**, cooperation is a prerequisite to tackle the big challenges like health, energy and environment protection. The topic of intellectual property rights, too, has to be targeted when cooperation is taking place. One of the famous examples are pharmaceuticals, where the R&D investment is enormous.

When it comes to cooperation with **developing countries**, security, prosperity and stability are of great relevance. Furthermore, capacity building plays a major role in order to foster the advancement in science and in order to take responsibility in tackling the global challenges. The benefits for the developing countries are especially

602 **European Commission DG Research** 2008c.. p.30

603 **European Commission** 2007b. *EC-U.S. Scientific and Technological Cooperation*: Reaching New Frontiers p.2

important in research fields like health, economic advancement and environment. Thus, joint projects in these fields support the countries.

The last category is **neighboring countries**. The exchange of knowledge and skills as well as technology and personnel contributes to the socio-economic advancement of the region. Also business and R&D infrastructures have to be more connected.

All of these measures share the underlying assumption that international and transnational cooperation in S&T is not only beneficial for both partners, both is in fact key to the successful development of the world as such. Nowadays, human civilization to a great degree depends on globalized policies and thus also the global sharing of knowledge and the results of scientific research.

6. CONCLUSION AND OUTLOOK

6.1. Conclusion

1) **How did the European Union's science and technology policy evolve and did the USA play a role in this process?**

Hypothesis: *Similar to the economic and political integration, European science and technology policy (STP) evolved over time and its competence was extended with each EU treaty.*

As discussed earlier in this thesis, the European science and technology policy (STP) has evolved parallel to the overall integration process. Although there were related articles in the ECSC, EURATOM and the EEC, an explicit legal basis for research and technology was provided only later.

Until 1987 (SEA), any actions in the area of research were primarily based on the "general 'elastic' clause" (Article 235 EEC/Article 352 Lisbon Treaty), thus having a rather precarious legal basis. This also applied to the first two Framework Programmes (FPs). However, the "Spinelli report", which is regarded as a draft law for the establishment a European Union, mentioned science and education in its Article 60 as a European responsibility. The changing point came with the SEA, in which science and technology became a policy field of the European Community with the multi-annual FPs as the main policy instrument. Then, in 1992 with the Maastricht Treaty research articles applied to all other policy fields. In 1997, the Treaty of Amsterdam clarified that the Council had to adopt the FP by a qualified majority. In 2000, the creation of a European Research Area (ERA) was announced. Its aim was the enhancement of a common European science and technology identity and it focused on innovation and competitiveness. (Lisbon European Council, 23-24 March 2000, Presidency Conclusions). Finally, in 2009, the Treaty of Lisbon extended the chapter on research to include space policy.

Hypothesis: *The USA played several roles in the history of European integration process as well as in the process of establishing a European STP.*

At the end of WWII it was the U.S. Marshall Plan that helped Western Europe to rebuild its economic as well as technological basis. In this historic period, the USA was perceived as a "midwife" or an "ally" of Western European countries. However, in the mid1970s, the "fear of American dominance" became prevalent. The perceived technology gap entailed actions on the European level. In this development, the USA played an indirect role as a "threat" or a "negative driver". Hence, the evolution of the SEA has been described as an answer to the need to compete with the USA. Consequently, research was to enhance competitiveness and to strengthen European technology in order to face the competition with the USA. U.S. research policy became a role model for the European Union's policies. Compared to the USA, EU Member States invested relatively little into research, which was continuously pointed out in EU documents.

The establishment of the ERA in 2000 had the goal to raise investment in research and to reorganize its structure. This was perceived as an improvement of Europe's position in comparison to the USA. In 2002, the Barcelona European Council once again stipulated to raise R&D spending to 3% of the GDP by 2010. Science, technology and innovation became one of the EU's major hopes concerning economic competitiveness.

2) **When did the EU-USA cooperation start and what was the role of science, research and technology in this cooperation?**

Hypothesis: *The transatlantic relationship had a specific starting point in history and has developed since then. The topics science, research and technology have formed an integrate part from the beginning.*

The starting point for the formal of EU-USA relations was the disintegration of the Soviet Union.

In 1990 the first bi-lateral Agreement, the Transatlantic Declaration, made references to science and technology cooperation and especially to the mobility of researchers. Cooperative research was a goal in the areas of medicine, environment protection, pollution prevention, energy, space, high-energy physics, and the safety of nuclear and other installations. Five years later, in 1995, the New Transatlantic Agenda, in its chapter "Building Bridges across the Atlantic" stated, that exchanges in cultural, educational, commercial and scientific should be expanded with the aim of ensuring "public understanding of and support for the transatlantic relationship". Moreover, the New Transatlantic Agenda and the Joint EU-USA Action Plan scheduled a comprehensive cooperation agreement in science and technology for 1997. In 1998, the Transatlantic Economic Partnership stressed cooperation among scientists, in intellectual property rights, food safety and biotechnology. In 2007, the Transatlantic Economic Council (TEC) emphasized research cooperation in additional areas such as intellectual property rights as well as innovation and technology.

Since 2007, science, technology and innovation have been topics of the TEC meetings, the bi-annual ministerial meetings and the annual EU-USA Summits.

3) **What reasons can be identified for the EU and USA cooperation in science and technology?**

Hypothesis: *Even though competitiveness is a strong rationale for European STP, it is not the only one. There are other relevant rationales, which might not follow the same logic.*

As pointed out in this thesis, competitiveness was a very strong rationale for the creation of a European STP. However, with the Maastricht Treaty and the FPs, competitiveness was no more the prime rationale of the EU STP. Gradually other rationales such as "global challenges, human resources and promoting political cooperation, dialogue and trust" became more and more important. All of these rationales probably had an impact on EU-USA cooperation. In the bulletin published by

the European Commission in 2007 specific key drivers for the EU-USA cooperation were listed:

- “Sharing of knowledge towards a common knowledge base in support of other broader policies.
- Promotion of scientists’ training and mobility in a multicultural context.
- Identification and design of research infrastructures of mutual interest.
- More effective and rapid development of global public goods through joint research activities.
- Elaboration of common agendas in international arenas.”

In the case of the relationship between the EU and the USA, research cooperation cannot be seen as a dooropener for diplomatic relations, as described in the concept of science diplomacy, because strong diplomatic relations already existed long before research cooperation started. Nevertheless, it has been and still is a means of deepening already existing relations. Access to knowledge, skills and infrastructure can be called a good of mutual benefit. Besides, “partnering with the best” and thus raising one’s own prestige also plays a major role.

6.2. Outlook

International S&T cooperation has become increasingly important on the political agendas. The establishment of the AAAS Center for Science Diplomacy in the USA underlines this also institutionally. In the years to come it will be interesting to observe the EU's actions in international S&T cooperation especially towards emerging economies such as China.

The further developments in the ERA will also be of utmost interest. Shortly before this thesis was printed, the European Commission[604] proposed the next FP under the title "Horizon 2020", which is supposed to be a "flagship" under the new policy "innovation Europe". The decision-making process, the people involved as well as the objectives of "Horizon 2020" would certainly be an interesting field of study for political scientists.

Another aspect, which could be further discussed and analyzed by academic researchers are specialized programs such as INCO or Human Resources. In the case of INCO, it would be rewarding to look at the connection between the EU and the USA and to analyze the topics covered. In the case of Human Resources it would be especially interesting how to reconcile the "global competition of talent" with mobility programs such as the Marie Curie Action, again with a special emphasis on EU-USA human mobility. Furthermore, it would be fascinating to describe and evaluate BILAT-USA/Link2Us, a specific program.

This thesis ends with the saying:

"Umwege erweitern die Ortskenntnis"

[604] European Commission 2011. *"Horizon 2020: Commission proposes €80 billion investment in research and innovation, to boost growth and jobs"* Press release http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/1475&format=HTML&aged=0&language=EN&guiLanguage=en [30 November 2011]

7. ANNEX

7.1. Overview S&T Articles

	Single European Act	*Maastricht*	*Amsterdam*	*Lisbon*
Abbreviation and official name	(SEA)	(TEU) Treaty on European Union/ EU Treaty	Treaty amending the Treaty on European Union	(TFEU) Treaty of Lisbon amending the Treaty on European Union
Signing year/ into force	1986/1987	1992/1993	1997/1999	2007/2009
Titel	Titel VI	Titel XV	Titel XVIII	Titel XIX
Objectives	130 f	130 f	163	179
Activities	130 g	130 g	164	180
Coordination	130 h	130 h	165	181
FP	130 i	130 i	166	182
FP-Council	130 k	130 j	167	183
Multilateral programmes	130 l	130 k	168	184
	130 m	130 l	169	185
Third country cooperation	130 n	130 m	170	186
Joint undertakings	130 o	130 n	171	187
Financing	130 p	(cancelled)		
Decision - making process	130q	130 o	172	188
Space				189
Evaluation	-	130 p	173	190

Table 11 Overview of renumbering of S&T Articles in the Treaties. Own work

7.2. Changes S&T Articles

Year	Treaty	Article	Changes	Amendment
1951	ECSC	55		
1957	EURATOM (TEC)	4-11		
1957	EEC (TEC)	35 and 308		
1987	SEA	TITLE VI 130f-130q	New and explicit basis for RTD policy based on mulit-annual Framework Programmes	
1993	TEU	TITLE XV 130f-130p	Co-decision by Council and Parliament for the adoption was introduced, but still unanimity in the Council; Research applies to other policy areas	To Article 163 "while promoting all the research activities deemed necessary by virtue of other Chapters of this Treaty"
1997	TEC	TITLE XVIII 163-173	Council adopts the FP now with a qualified majority	
2007	Lisbon	TITLE XIV 170-190	Article for space policy was added	

Table 12 Changes Science and Technolgy in EU Treaties. Own work.

7.3. Policy Changes in Framework Programmes

FP	Duration	Policy change
FP1	1984-1987	"Community RTD activities were for the first time coordinated as part of a single, structured framework
FP2	1987-1991	"Was to develop technologies for the future, integrating major Community Programmes in the areas of information technology (ESPRIT), materials (EURAM), industrial technologies (BRITE) and advanced communications technologies (RACE).
FP3	1990-1994	"broadly followed the same lines, focusing on fewer lines of action, but also on the dissemination of research results."
FP4	1994-1998	"This Programme built on the previous initiatives, but contained several important innovations, such as a new Programme on targeted socio-economic research"
FP5	1998-2002	"marked a shift from research concentrating largely on technical performance towards research and innovation addressing targeted socio-economic objectives."
FP6	2002-2006	"to promote the establishment of the European Research Area (ERA)" + ERA-NET scheme "aims at stepping up the coordination of national and regional research Programmes"
FP7	2007-2013	(reduction to only four activities)

Table 13 Policy changes of Framework Programmes[605]

[605] **European Parliament.** 2006 Factsheets European Union online: Policy for Research and Technological Development EN 4.14.0 edited by M. Györffi Table own work

7.4. Science, Technology, Education and Culture in Transatlantic Agreements

Agreement	*Year*	*Relevance*	*Fields of science*	*Rationale*
Transatlantic Declaration (TD)	1990	"exchanges and joint projects in science and technology"	Medicine, environment protection, pollution prevention, energy, space, high-energy physics, nuclear and other installations	"strengthen mutual cooperation" which "directly affect the present and future well-being of their citizens"
New Transatlantic Agenda and Joint Action Plan (NTA)	1995	"broadening science and technology cooperation"	Agreement on Intelligent Manufacturing Systems,	"to ensure public understanding of and support for the transatlantic relationship" "to meet global challenges and foster economic growth"
Transatlantic Economic Partnership (TEP)	1998	"co-operation among scientists"	Intellectual property rights, food safety, biotechnology	
Transatlantic Economic Council (TEC)	2007		Intellectual property rights, innovation and technology,	Framework shall "benefit the citizens and the competitiveness of our economies" "global benefits" "market access for third countries"

Table 14 Coverage of science, technology and education in Transatlantic Agreements since 1990. Table own work

7.5. European Commissioners for research

Commission	Duration	Commissioner
Malfatti and Mansholt Commissions	(1970 - 1972)	Altiero Spinelli - IT
Ortoli Commission	(1973 - 1976)	Ralf Dahrendorf - DE
Jenkins Commission	(1977 - 1980)	Guido Brunner - DE
Thorn Commission	(1981 - 1984)	Etienne Davignon - BE
Delors I Commission	(1985 - 1988)	Karl-Heinz Narjes - DE
Delors II Commission	(1989 - 1992)	Filippo Maria Pandolfi - IT
Delors III Commission	(1993 - 1994)	Antonio Ruberti - IT
Santer Commission	(1995 - 1999)	Edith Cresson - FR
Prodi Commission	(1999 - 2004)	Philippe Busquin - BE
Barroso I Commission	(2005 - 2009)	Janez Potočnik – SI
Barroso II Commission	(2010 - 2014)	Máire Geoghegan-Quinn - IR

Table 15 European Commissioners for Research[606]

7.6. Relevant Articles Lisbon Treaty[607]

TITLE XIX

RESEARCH AND TECHNOLOGICAL DEVELOPMENT AND SPACE

Article 179

(ex Article 163 TEC)

1. The Union shall have the objective of strengthening its scientific and technological bases by achieving a European research area in which researchers, scientific knowledge and technology circulate freely, and encouraging it to become more competitive, including in its industry, while promoting all the research activities deemed necessary by virtue of other Chapters of the Treaties.

2. For this purpose the Union shall, throughout the Union, encourage undertakings, including small and medium-sized undertakings, research centres and universities in their research and technological development activities of high quality; it shall support their efforts to cooperate with one another, aiming, notably, at permitting researchers to cooperate freely across borders and at enabling undertakings to exploit the internal market potential to the full, in particular through the opening-up of national public contracts, the definition of common standards and the removal of legal and fiscal obstacles to that cooperation.

606 **European Commission**- DG Research "Architects of European Research" http://ec.europa.eu/research/research-eu/59/article_5934_en.html [8 December 2009] Table own work

607 **Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union**. Official Journal C83. 2010/C 83/01 Vol.53. 30 March 2010

3. All Union activities under the Treaties in the area of research and technological development, including demonstration projects, shall be decided on and implemented in accordance with the provisions of this Title.

Article 180

(ex Article 164 TEC)

In pursuing these objectives, the Union shall carry out the following activities, complementing the activities carried out in the Member States:

(a) implementation of research, technological development and demonstration programmes, by promoting cooperation with and between undertakings, research centres and universities;

(b) promotion of cooperation in the field of Union research, technological development and demonstration with third countries and international organisations;

(c) dissemination and optimisation of the results of activities in Union research, technological development and demonstration;

(d) stimulation of the training and mobility of researchers in the Union.

Article 181

(ex Article 165 TEC)

1. The Union and the Member States shall coordinate their research and technological development activities so as to ensure that national policies and Union policy are mutually consistent.

2. In close cooperation with the Member State, the Commission may take any useful initiative to promote the coordination referred to in paragraph 1, in particular initiatives aiming at the establishment of guidelines and indicators, the organisation of exchange of best practice, and the preparation of the necessary elements for periodic monitoring and evaluation. The European Parliament shall be kept fully informed.

Article 182

(ex Article 166 TEC)

1. A multiannual framework programme, setting out all the activities of the Union, shall be adopted by the European Parliament and the Council, acting in accordance with the ordinary legislative procedure after consulting the Economic and Social Committee.

The framework programme shall:

— establish the scientific and technological objectives to be achieved by the activities provided for in Article 180 and fix the relevant priorities,

— indicate the broad lines of such activities,

— fix the maximum overall amount and the detailed rules for Union financial participation in the framework programme and the respective shares in each of the activities provided for.

2. The framework programme shall be adapted or supplemented as the situation changes.

3. The framework programme shall be implemented through specific programmes developed within each activity. Each specific programme shall define the detailed rules for implementing it, fix its duration and provide for the means deemed necessary. The sum of the amounts deemed necessary, fixed in the specific programmes, may not exceed the overall maximum amount fixed for the framework programme and each activity.

4. The Council, acting in accordance with a special legislative procedure and after consulting the European Parliament and the Economic and Social Committee, shall adopt the specific programmes.

5. As a complement to the activities planned in the multiannual framework programme, the European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee, shall establish the measures necessary for the implementation of the European research area.

Article 183
(ex Article 167 TEC)

For the implementation of the multiannual framework programme the Union shall:

— determine the rules for the participation of undertakings, research centres and universities,

— lay down the rules governing the dissemination of research results.

Article 184
(ex Article 168 TEC)

In implementing the multiannual framework programme, supplementary programmes may be decided on involving the participation of certain Member States only, which shall finance them subject to possible Union participation.

The Union shall adopt the rules applicable to supplementary programmes, particularly as regards the dissemination of knowledge and access by other Member States.

Article 185
(ex Article 169 TEC)

In implementing the multiannual framework programme, the Union may make provision, in agreement with the Member States concerned, for participation in research and development programmes undertaken by several Member States, including participation in the structures created for the execution of those programmes.

Article 186
(ex Article 170 TEC)

In implementing the multiannual framework programme the Union may make provision for cooperation in Union research, technological development and demonstration with third countries or international organisations.

The detailed arrangements for such cooperation may be the subject of agreements between the Union and the third parties concerned.

Article 187
(ex Article 171 TEC)

The Union may set up joint undertakings or any other structure necessary for the efficient execution of Union research, technological development and demonstration programmes.

Article 188
(ex Article 172 TEC)

The Council, on a proposal from the Commission and after consulting the European Parliament and the Economic and Social Committee, shall adopt the provisions referred to in Article 187.

The European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee, shall adopt the provisions referred to in Articles 183, 184 and 185. Adoption of the supplementary programmes shall require the agreement of the Member States concerned.

Article 189

1. To promote scientific and technical progress, industrial competitiveness and the implementation of its policies, the Union shall draw up a European space policy. To this end, it may promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space.

2. To contribute to attaining the objectives referred to in paragraph 1, the European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall establish the necessary measures, which may take the form of a European space programme, excluding any harmonisation of the laws and regulations of the Member States.

3. The Union shall establish any appropriate relations with the European Space Agency.

4. This Article shall be without prejudice to the other provisions of this Title.

Article 190

(ex Article 173 TEC)

At the beginning of each year the Commission shall send a report to the European Parliament and to the Council. The report shall include information on research and technological development activities and the dissemination of results during the previous year, and the work programme for the current year.

Article 207

(ex Article 133 TEC)

1. The common commercial policy shall be based on uniform principles, particularly with regard to changes in tariff rates, the conclusion of tariff and trade agreements relating to trade in goods and services, and the commercial aspects of intellectual property, foreign direct investment, the achievement of uniformity in measures of liberalisation, export policy and measures to protect trade such as those to be taken in the event of dumping or subsidies. The common commercial policy shall be conducted in the context of the principles and objectives of the Union's external action.

2. The European Parliament and the Council, acting by means of regulations in accordance with the ordinary legislative procedure, shall adopt the measures defining the framework for implementing the common commercial policy.

3. Where agreements with one or more third countries or international organisations need to be negotiated and concluded, Article 218 shall apply, subject to the special provisions of this Article.

The Commission shall make recommendations to the Council, which shall authorise it to open the necessary negotiations. The Council and the Commission shall be responsible for ensuring that the agreements negotiated are compatible with internal Union policies and rules.

The Commission shall conduct these negotiations in consultation with a special committee appointed by the Council to assist the Commission in this task and within the framework of such directives as the Council may issue to it. The Commission shall report regularly to the special committee and to the European Parliament on the progress of negotiations.

4. For the negotiation and conclusion of the agreements referred to in paragraph 3, the Council shall act by a qualified majority.

For the negotiation and conclusion of agreements in the fields of trade in services and the commercial aspects of intellectual property, as well as foreign direct investment, the Council shall act unanimously where such agreements include provisions for which unanimity is required for the adoption of internal rules.

The Council shall also act unanimously for the negotiation and conclusion of agreements:

(a) in the field of trade in cultural and audiovisual services, where these agreements risk prejudicing the Union's cultural and linguistic diversity;

(b) in the field of trade in social, education and health services, where these agreements risk seriously disturbing the national organisation of such services and prejudicing the responsibility of Member States to deliver them.

5. The negotiation and conclusion of international agreements in the field of transport shall be subject to Title VI of Part Three and to Article 218.

6. The exercise of the competences conferred by this Article in the field of the common commercial policy shall not affect the delimitation of competences between the Union and the Member States, and shall not lead to harmonisation of legislative or regulatory provisions of the Member States in so far as the Treaties exclude such harmonisation.

TITLE V

INTERNATIONAL AGREEMENTS

Article 216

1. The Union may conclude an agreement with one or more third countries or international organisations where the Treaties so provide or where the conclusion of an agreement is necessary in order to achieve, within the framework of the Union's policies, one of the objectives referred to in the Treaties, or is provided for in a legally binding Union act or is likely to affect common rules or alter their scope.

2. Agreements concluded by the Union are binding upon the institutions of the Union and on its Member States.

Article 217

(ex Article 310 TEC)

The Union may conclude with one or more third countries or international organisations agreements establishing an association involving reciprocal rights and obligations, common action and special procedure.

Article 218

(ex Article 300 TEC)

1. Without prejudice to the specific provisions laid down in Article 207, agreements between the Union and third countries or international organisations shall be negotiated and concluded in accordance with the following procedure.

2. The Council shall authorise the opening of negotiations, adopt negotiating directives, authorise the signing of agreements and conclude them.

3. The Commission, or the High Representative of the Union for Foreign Affairs and Security Policy where the agreement envisaged relates exclusively or principally to the common foreign and security policy, shall submit recommendations to the Council, which shall adopt a decision authorising the opening of negotiations and, depending on the subject of the agreement envisaged, nominating the Union negotiator or the head of the Union's negotiating team.

4. The Council may address directives to the negotiator and designate a special committee in consultation with which the negotiations must be conducted.

5. The Council, on a proposal by the negotiator, shall adopt a decision authorising the signing of the agreement and, if necessary, its provisional application before entry into force.

6. The Council, on a proposal by the negotiator, shall adopt a decision concluding the agreement.

Except where agreements relate exclusively to the common foreign and security policy, the Council shall adopt the decision concluding the agreement:

(a) after obtaining the consent of the European Parliament in the following cases:

(i) association agreements;

(ii) agreement on Union accession to the European Convention for the Protection of Human Rights and Fundamental Freedoms;

(iii) agreements establishing a specific institutional framework by organising cooperation procedures;

(iv) agreements with important budgetary implications for the Union;

(v) agreements covering fields to which either the ordinary legislative procedure applies, or the special legislative procedure where consent by the European Parliament is required.

The European Parliament and the Council may, in an urgent situation, agree upon a time-limit for consent.

(b) after consulting the European Parliament in other cases. The European Parliament shall deliver its opinion within a time-limit which the Council may set depending on the urgency of the matter. In the absence of an opinion within that time-limit, the Council may act.

7. When concluding an agreement, the Council may, by way of derogation from paragraphs 5, 6 and 9, authorise the negotiator to approve on the Union's behalf modifications to the agreement where it provides for them to be adopted by a simplified procedure or by a body set up by the agreement. The Council may attach specific conditions to such authorisation.

8. The Council shall act by a qualified majority throughout the procedure.

However, it shall act unanimously when the agreement covers a field for which unanimity is required for the adoption of a Union act as well as for association agreements and the agreements referred to in Article 212 with the States which are candidates for accession. The Council shall also act unanimously for the agreement on accession of the Union to the European Convention for the Protection of Human Rights and Fundamental Freedoms; the decision concluding this agreement shall enter into force after it has been approved by the Member States in accordance with their respective constitutional requirements.

9. The Council, on a proposal from the Commission or the High Representative of the Union for Foreign Affairs and Security Policy, shall adopt a decision suspending application of an agreement and establishing the positions to be adopted on the Union's behalf in a body set up by an agreement, when that body is called upon to adopt acts having legal effects, with the exception of acts supplementing or amending the institutional framework of the agreement.

10. The European Parliament shall be immediately and fully informed at all stages of the procedure.

11. A Member State, the European Parliament, the Council or the Commission may obtain the opinion of the Court of Justice as to whether an agreement envisaged is compatible with the Treaties. Where the opinion of the Court is adverse, the agreement envisaged may not enter into force unless it is amended or the Treaties are revised.

CHAPTER 3

THE UNION'S ADVISORY BODIES

Article 300

1. The European Parliament, the Council and the Commission shall be assisted by an Economic and Social Committee and a Committee of the Regions, exercising advisory functions.

2. The Economic and Social Committee shall consist of representatives of organisations of employers, of the employed, and of other parties representative of civil society, notably in socio-economic, civic, professional and cultural areas.

3. The Committee of the Regions shall consist of representatives of regional and local bodies who either hold a regional or local authority electoral mandate or are politically accountable to an elected assembly.

4. The members of the Economic and Social Committee and of the Committee of the Regions shall not be bound by any mandatory instructions. They shall be completely independent in the performance of their duties, in the Union's general interest.

5. The rules referred to in paragraphs 2 and 3 governing the nature of the composition of the Committees shall be reviewed at regular intervals by the Council to take account of economic, social and demographic developments within the Union. The Council, on a proposal from the Commission, shall adopt decisions to that end.

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ABSTRAKT

Das Erkenntnisinteresse dieser Diplomarbeit liegt in der Analyse der Entstehung und Begründungen der Policyebene der transatlantischen Forschungszusammenarbeit. Dabei wird das Spannungsfeld von Zusamenarbeit und Wettbewerb dargestellt.

Nach einer allgemeinen Einleitung zu Wissenschafts- und Forschungspolitik sowie den transatlantischen Beziehungen werden im nächsten Kapitel grundlegende Begriffe der Arbeit definiert sowie relevante analytische Zugänge präsentiert. “Soft Power” von Joseph Nye spielt dabei eine relevante Rolle. Die Darstellung der nächsten zwei Kapitel erfolgt aus historischer Perspektive. Dazu werden Rechtstexte und weitere offizielle Dokumente, wissenschaftliche Literatur und Politikstudien herangezogen. Zunächst wird die Entwicklung der europäischen Wissenschafts- und Forschungspolitik ab 1951 dargestellt und nach dem Einfluss der USA gefragt. Im nächsten Teil wird in den transatlantischen Verträgen ab 1990 nach der Relevanz und Einbettung von Kooperation in Forschung gesucht. Nach dieser historischen Abhandlung werden im letzten Kapitel verschiedene Aspekte von internationaler Forschungskooperation dargestellt. Einerseits das Herz der EU-USA Kooperation- das “Abkommen über wissenschaftlich-technische Zusammenarbeit zwischen der Europäischen Gemeinschaft und der Regierung der Vereinigten Staaten von Amerika” von 1997, und die Öffnung des europäischen Forschungsraumes. Die Begründungen von internationaler Forschungskooperation im allgemeinen und der transatlantischen Forschungskooperation im Speziellen werden zum Abschluss dargestellt. Man unterscheidet zwischen dem „engen“ und dem „breiten Paradigma“ in internationaler Forschungskooperation. Aktionen unter dem „engen Paradigma“ zielen auf die Qualität und Größe von Wissenschaft und Forschung ab und wird als das stärkste Paradigma gesehen. Auch andere Ziele verfolgt welche das „breite Paradigma“ darstellen: Wettbewerbsfähigkeit und Innovation, globale Herausforderungen, Humanressourcen und die Herstellung von politischer Zusammenarbeit, Dialog und Vertrauen. Dieser letzte Aspekt gewinnt zunehmend an Aufmerksamkeit und ist bekannt als “sience diplomacy”. Er kann im Zusammenhang mit “Soft Power” gesehen werden. Im Falle von den EU-USA Beziehungen ist die Forschungszusammenarbeit nicht als Türöffner zu sehen, sondern als Vertiefung der bestehenden Beziehungen.

ABSTRACT

The topic of this thesis is an analysis of the development and justification of transatlantic research cooperation. Within this policy field cooperation and competition are investigated.

At first, an introduction to science and technology policy and to transatlantic relations in general is given. Then follows a definition of essential terms and an outline of relevant theoretical approaches. In this regard, "Soft Power" by Joseph Nye plays a relevant role. In the next two chapters, a historical point of view is chosen with legal and official documents, scientific literature as well as diverse policy reports as sources. The development of the European research and technology policy since 1951 is presented with a focus on the USA's role in it. The next chapter describes the transatlantic agreements since 1990. The chapter focuses on the role and pertinence of cooperative actions in science and technology. The "Agreement for scientific and technological cooperation between the European Community and the Government of the United States of America" of 1997 and the opening of the ERA to 3rd countries are especially significant in this respect. Finally, the general rationales of international science and technology cooperation are presented: the "narrow paradigm" as well as the "broad paradigm". In addition, the specific rationales of the transatlantic S&T cooperation are presented. The "narrow paradigm" includes intrinsic reasons such as the quality and scope of science and research. The "broad paradigm" includes reasons outside of science and research such as competitiveness and innovation, global challenges, human resources and the building of dialogue and trust. This last aspect seems to gain an increasing amount of attention and is known as "science diplomacy". This can be linked to "soft power". In the case of the EU-USA relations, science and technology cooperation is not a door opener for diplomatic relations, but rather a means of deepening the already existing relationship.

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