universität wien

DISSERTATION / DOCTORAL THESIS

Titel der Dissertation / Title of the Doctoral Thesis

„The Euroscience Open Forum: An experiment in constructing and performing European knowledge societies“

verfasst von / submitted by

Effrosyni Chelioti

angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of

Doktorin der Philosophie (Dr.phil.)

Wien, 2017 / Vienna 2017

Studienkennzahl lt. Studienblatt / degree programme code as it appears on the student record sheet:	A 092 301
Dissertationsgebiet lt. Studienblatt / field of study as it appears on the student record sheet:	Publizistik- und Kommunikationswissenschaft
Betreut von / Supervisor:	Univ.-Prof. Dr. Ulrike Felt

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

A number of individuals generously contributed their knowledge and expertise to this thesis and helped me to find the right way to tell the story of this unique phenomenon.

My particular gratitude and deep appreciation goes to Ulrike Felt, my supervisor and mentor, not just for her outstanding academic guidance, but also for teaching me to see beyond the obvious and helping me to keep my objectivity throughout this challenging endeavour.

Furthermore, I would specifically like to thank Carl Johan Sundberg and Ingrid Wünning Tschol as well as Philipp Campbell, Rainer Gerold, Patrice Laget, Rémy Lestienne, Raymond Seltz, Al Teich, Ekkehard Winter and the late Françoise Praderie and Claude Kordon for their trust and the valuable time they all devoted to my work. Also, for sharing a lot of important information on different aspects of the Euroscience Open Forum, without which a large portion of this thesis would not have been possible to produce.

A special mention goes to my employer, the Helmholtz Association, for making this part-time project possible as well as to my colleagues at the Head Office for their support and encouragement during the period this PhD thesis was written.

Last but not least, my love and gratitude goes to my family and especially to my husband Matthias.

This thesis is dedicated to my grandfather George, who throughout his long life prised education above all, even though he was deprived of it in his youth. In 2016 he celebrated his 100th birthday, thus witnessing a century of the wonders and horrors that scientific and technological discovery can produce.

Berlin, spring 2017

Αυτή η διδακτορική εργασία είναι αφιερωμένη στον παππού μου το Γιώργο, ο οποίος κατά τη διάρκεια της μακράς ζωής του εκτιμούσε τη μόρφωση και τη γνώση περισσότερο από κάθε άλλο, αν και τη στερήθηκε στη νιότη του. Το 2016 γιόρτασε τα 100α του γενέθλεια, έτσι γίνοντας μάρτυρας των θαυμάτων και των τρόμων στους οποίους μπορούν να οδηγήσουν η επιστήμη και η τεχνολογία.

Βερολίνο, Άνοιξη 2017

1 SCIENCE IN EUROPE, EUROPEAN SCIENCE, SCIENTIFIC EUROPE?

An issue that has featured prominently in the European discourse for quite some time is the role of science in the making of Europe as a community. Equally, Europe's stance towards science and technology as well as the goals EU policies in this field should pursue represent topics of higher interest for policy makers and scientists alike. How far have the two realms – science in Europe and Europe as a community – come in terms of mutual shaping? What characterises their relationship today? Is the focus in many of the science policy efforts to be observed one of promoting science in Europe, of producing a distinctly European science, i.e. a specific way of thinking, fostering and organising science, or of building a scientific Europe, i.e. a shared European space that is supported and stabilised through its knowledge and technology related activities?

These questions amongst many others resurfaced during recent events in the context of the Greek financial crisis and the EU referendum in the UK. In the summer of 2016 a former Greek minister and dean of the University of Athens argued in a newspaper article that the future of his country lay not in cheap manufacturing and low-cost services, but rather in a long-term commitment by government to make scientific research and technological innovation the foundation of the country's economic model and consequently the 'driver' for its development (Maraveyas/Chryssomallides 2016). His expectation was that a policy supporting the "exploitation of the output of scientific research in high-tech fields by a well-trained workforce as well as the simultaneous promotion of entrepreneurship" would stimulate economic growth, contribute to social cohesion and thus reaffirm the country's place within the European knowledge society (Maraveyas/Chryssomallides 2016).[1] Indeed, the debate over Greece's financial recovery and development had been from the very beginning inextricably linked with one focusing on its role and place within the EU[2] and the European knowledge society. During the uncertain days leading up to the Greek referendum in 2015, a major part of

---

[1] The author's thoughts were echoed by the country's intellectual base which, after several years of crisis and stalemate, called for a conscious and palpable turn towards a policy promoting a knowledge-based economy supported by a vigorous and productive research system (Maraveyas 2012).

[2] In the summer of 2015, European media urged Greek citizens to "stay with us" (see article in *DIE ZEIT*: "Bleibt bei uns!" 1 July 2015, DIE ZEIT Nr. 27/2015: 1).

the scientific community in the country raised its voice in favour of EU membership and pointed at scientific collaboration as a unifying element, especially at times of political uncertainty and miscommunication (Stokstad 2015a). Similarly, it was among others the scientific community on both sides of the Canal that in the run-up to the British EU referendum in 2016 spoke in favour of EU membership[3], referring not only to its advantages for research[4], but also emphasising the shared history, culture and values of this community of nations, many of which are indispensable for, but also cultivated by science. For Europe in the form of the European Community had long since identified the fostering of economic growth through the means of scientific research and technological innovation as an important part of its mission.[5] Respectively, though not always effective or consistent, efforts towards an 'Europeanisation' of research span several decades. The overarching goal has often been described by EU policy makers and administrators as the achievement of a 'European added value' (Muldur et al. 2006). European Framework Programmes[6] as well as transnational consortia promoting collaboration between national scientific communities represent key instruments through which this goal has been pursued. In addition, these activities

[3] See for instance the "Universities for Europe" campaign run by UK Universities (www.universitiesforeurope.com accessed on 15.05.2016; Cressey 2016).

[4] A 2016 report by the Science and Technology Select Committee emphasised that EU membership has greatly benefited the UK scientific community: "The ease with which talented researchers can move between EU Member States and the UK, the EU's fertile environment for research collaboration, harmonised regulations and access to EU research facilities (...) make EU membership a highly prised feature of the research ecosystem in the UK." (House of Lords Science and Technology Select Committee 2016: 3).

[5] This was initially manifested in the efforts of Member States to harness new energy sources and to rebuild their research systems after the war which most notably led to the creation of the European Atomic Energy Community (EURATOM), the European Coal and Steel Community (ECSC) and the European Organisation for Nuclear Research (CERN) as supranational organisations among others fostering support for scientific and technological development.

[6] First launched in 1984, Framework Programmes have since grown in thematic and financial scope as well as in ambition. Whereas they were initially aimed at fostering cross-border collaboration in research and technology, they are seen by policy actors as having gradually evolved towards "encouraging a truly European co-ordination of activities and policies" (Editorial 2015: 1).

have been accompanied by legislative measures at the level of the European Community and later of the European Union.[7]

However, the efforts of European research policies to promote research collaboration between Member States in order to "leverage additional funding, pool scarce resources, enable the undertaking of 'big science', strengthen research capabilities, foster excellence, enable the tackling of pan-European challenges, encourage multilevel policy co-ordination, and make knowledge available to a much wider constituency" (Muldur et al. 2006: 184) have encountered a number of obstacles. Today, less than 1% of national public spending on scientific research and development is directed towards transnational projects.[8] The average percentage of GDP spent on research and development has furthermore only marginally increased in the course of 12 years (from 1.81% in 2002 to 1.95% in 2014), since the 'Barcelona target' of 3% was defined by the European Council in 2002 (European Commission 2002b). In recent years, critics have also argued that EU research policies and instruments designed to help overcome fragmentation of national efforts have to some extent had an opposite effect by benefiting primarily countries with a traditionally strong research base and thus ultimately fostering inequality among Member States and their scientific communities it terms of participation and engagement in Europe-wide research efforts.

Notwithstanding, by the 1990's the perception that a revised approach was needed for Europe to maintain and further enhance its economic growth, its social prosperity and ultimately its competitiveness on a global scale seemed to gain ground in European policy circles. A particular focus lay on the correlation between research and development and technological innovation on the one hand and the increase in competi-

---

[7] A chapter dedicated to research was included for the first time in the Single European Act (1986). It focused on applied research which was expected to underscore the competitiveness of European industry. The Treaty of Lisbon however, took a step further by "legitimising the objective of co-ordinating national research efforts and the creation of a single market for research…[while] at the same time allowing fundamental research to become an EU competence" (Finnegan 2015: 23). See also 4.3.1.

[8] See https://epthinktank.eu/2017/03/13/eu-research-policy-tackling-the-major-challenges-facing-european-society/ (accessed on 15.04.2017).

tiveness on the other.[9] Both the EU as a whole and each Member State individually – so the expectation – would need to reconsider the importance they attribute and subsequently the financial support they provide to scientific research and technological innovation and undertake efforts to mobilise the existing potential.[10]

The value of science and technology as a "public good" (Callon 1994: 395 ff.) to be fostered on an EU level, as well as a significant (yet insufficiently tapped) resource for achieving "smart growth" and sustainable economic and social prosperity started to gain prominence in the EU political discourse. It was further underlined in the Lisbon Strategy published in 2000 (European Commission 2000b) and thus also attached to overarching political considerations on an EU level, which argued for a more united and coherent approach as well as for the pooling of efforts and capacities on the part of European countries to tackle the challenges of globalisation. Still, the level of financial investment and the respective framework conditions for research and development varied significantly among Member States, as did the will and capacity of their governments to improve them. Perhaps in an effort to 'even out' these discrepancies in critical mass as well as in scientific potential and output, the EU Commission made a proposal to take European integration a step further by attempting to create a more strongly interlinked space, a 'European Research Area', where the scientific enterprise and its practitioners could enjoy freedom of movement and flexibility.

[9] Research performed in the context of this thesis especially points to four documents produced by the EU Commission in 1990, 1993, 1994 and 1995 respectively, which drew particular attention to the need for a more focused approach to growth, competitiveness and employment and explicitly referred to the key role of research, technological development and innovation in this endeavour.

[10] The Commission's Communication "Industrial policy in an open and competitive environment – Guidelines for a Community approach" published in 1990 stated among others that "the capacity to master efficiently the diffusion of technological innovation will offer a crucial competitive advantage. In this respect the capacity of EC industry to make best use of the potential and the results from technological research and development undertaken in Europe will be, more than ever, of great importance for its industrial competitiveness" (European Commission 1990: 4). The 1993 White Paper stated that "investment in training, research, the promotion of innovation and, generally speaking, the non-physical components of value-added must be treated at least as favourably as traditional forms of investment" (European Commission 1993: 63). Indeed "research and technological development (RTD) can contribute to renewing growth, strengthening competitiveness and boosting employment in the Community. However, in order to achieve this, a series of conditions must be satisfied: an adequate level of funding; an appropriate range of research activities; and effective mechanisms for transferring the results" (European Commission 1993: 86).

This idea[11] was driven by the hope that creating such conditions would lead to higher levels of efficiency and effectiveness for research and development on the European Continent (European Commission 2000a).[12]

Hence, EU institutions and most Member States – not without critical voices who saw too much co-ordination, steering and relevance discourse as a danger to diversity and openness in research – seemed to agree on the "urgent need to make Europe work as a single territory for scientists, rather than separate bordered countries…with their own languages and habits" (Editorial 2010b) and that it was up to the EU to provide what Anderson (1992: 458) has called "the catalytic effect of transnationality" while developing adequate practices to govern technology. This mind-set was also reflected in the Innovation Union Flagship Initiative[13] which formed part of the Europe 2020 Strategy, the Lisbon Strategy's successor published in 2010 (European Commission 2010b). Achieving the vision formulated therein would most probably require more than the mere 'accumulation' of 27[14] innovation policies, ecosystems and the corresponding human capital. The political hope was rather to create an innovation space and a joint innovation culture that transcends geographical and administrative boundaries and multiplies the potential, resources and subsequent output of techno-

---

[11] Though first expressed in 1973 by then Commissioner for Research Ralf Dahrendorf, who proposed a 'European scientific area' within which member governments would co-ordinate their national research policies and efforts, this idea did not achieve political consensus until almost 30 years later, when it was put forward in the Communication "Towards a European Research Area".

[12] Supranational organisations containing specific forms of support for scientific and technical development, such as the European Atomic Energy Community (EURATOM), the European Coal and Steel Community (ECSC) and the European Organisation for Nuclear Research (CERN) are considered to be significant first steps towards co-operation, co-ordination and even integration taken already in the 1950s.

[13] "The Innovation Union is one of the seven flagship initiatives of the Europe 2020 strategy for smart, sustainable and inclusive growth. It contains over thirty actions points, with the aim to do three things: make Europe into a world-class science performer; remove obstacles to innovation – like expensive patenting, market fragmentation, slow standard-setting and skills shortages – which currently prevent ideas getting quickly to market; and revolutionise the way public and private sectors work together, notably through Innovation Partnerships between the European institutions, national and regional authorities and business." http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=intro (accessed on 11.08.2016)

[14] Croatia joined the EU in 2013 as its 28th member.

logical research and development. The EU would ideally have to become a single, "unified technological zone" (Barry 2001: 48), a space connecting, co-ordinating and harmonising the infrastructural and regulatory realms as well as human resources necessary for and contributing to scientifically induced knowledge and innovation. In turn, the formation of such a space could perhaps lead to "new alignments and divisions and new relations between scientific and technical expertise and political action and, as a result, may demand new ways of thinking about politics" (Osborne 1998: 70, as cited in Barry 2006: 244). In this sense, technology and technical practices could be seen as a key element of the "European political imagination".[15]

Notwithstanding, scientific research and technological innovation are and always have been also inherently social endeavours. In this thesis I will argue that the research system has undergone significant changes, not only in Europe, but also globally. More than ever we see today calls for research and innovation needing to be more responsive to societal values, expectations and fears, more permeable and more diverse in terms of the people involved in and contributing to it, as well as more responsive to and engaged with societal actors of diverse kinds. Developments in the European science policy scene in recent decades thus featured as an intriguing, yet as one particular facet of a broader and more comprehensive transformation of the research system, its fabric, structure and output. Now, as the different examples briefly portrayed before reveal, work on the relationship between science and Europe and consequently on the question of whether we can speak of science in Europe, European science or a scientific Europe, is being negotiated in a number of contexts. Consequently, one could look at any one of these different sites, be they European Framework Programmes, European Council decisions, European Treaties, or EU innovation strategies and their visions of "technological zones" (Barry 2006) and reflect on the

[15] Barry comments further: "To understand the political make-up of Europe one must attend not just to the study of formal political institutions and their interrelations, although these are important. One must also address the multitude of devices and instruments which populate the continent, and which figure in European political discourse. The politics of Europe today is, in many respects, a politics of technology. Europe itself is a technological arrangement. The effects that the European Union has in Europe and beyond are an emergent consequence of this arrangement" (Barry 2001: 12). In their work, Latour and Callon have also argued that "the 'macro' political order of the state is built up from a complex network of localised technical practices and devices" (Callon/Latour 1992, as cited in Barry 2001: 12).

way this relation between research and societal developments is addressed and shaped there.

In this thesis, I have chosen to examine this relationship through the lens of a series of large-scale European science meetings that was launched in 2004. The Euroscience Open Forum (ESOF), as this initiative was called, was established with the intention to create not only a new but also an innovative platform for communication and mutual engagement which is meant to be both interdisciplinary – thus connecting different research fields in Europe – and directed towards diverse societal actors (from stakeholders to wider publics). I will study the emergence and analyse the characteristics of this distinct space against the backdrop of a changing research system and investigate how it affects and potentially performs the relationship between Europe and science. More concretely, I will explore how such a space for communication and engagement between those contributing to the science endeavour in Europe today – be they researchers, policy makers or stakeholders – tries to contribute to building and further advancing the relationship between science and Europe. I will reflect on how the exchange is designed to foster further integration, ultimately hoping to create part of the basis for the circulating ideal of a scientific Europe. I understand the Euroscience Open Forum as an excellent 'biotope' for studying these questions and have therefore chosen it as the 'object' at the core of my study.

1.1 Introducing the Euroscience Open Forum

The new policy initiatives on the EU and national level pointing towards a better coordinated research implicitly or explicitly affected those groups that are expected to contribute – directly or indirectly – to the scientific endeavour. It had become increasingly clear that creating a European science or even a scientific Europe would demand closer considerations of which stakeholders or – more broadly speaking – societal groups to engage or at least to communicate with. At the same time, representatives of the scientific community and the political sphere felt that platforms for reflection and open debate on developments set into motion by science policy decisions on a European level as well as by changes at the core of the scientific enterprise were needed.

In this thesis I will argue that the Euroscience Open Forum, a biannual European general science meeting introduced in 2004 and established as a space open to "everyone interested and involved in the sciences" (ESOF Presentation 2002), attempted to fill this perceived gap and to 'accommodate' the voices and interests of a diverse set of stakeholders and actors. The concept for the Forum was as follows: ESOF would attempt to become a neutral arena for thought and exchange and potentially an 'incubator' for new ideas aiming to develop science and technology in Europe, as well as its related policies, further. Planned as a "pan-European" (ESOF2004 Programme Book) meeting both in terms of participation and themes, it would nonetheless be organised every two years by a local institution and in many ways carry the distinct 'flavour' of the city where it took place. The European and the national or local element would therefore exist alongside each other in the context of ESOF and their respective characteristics permeate and shape the event. Consequently, ESOF would on the one hand attempt to showcase the assets of the respective local scientific community and the national research system it was temporarily embedded in. On the other hand, it would make a considerable effort to pay tribute to the richness and diversity of scientific research and technological innovation in Europe as a whole, while at the same time addressing overarching European issues. ESOF would therefore explicitly or implicitly underline the notion that techno-scientific activity nowadays seldom is the product of solely local or national actors and institutions; rather, it transcends national borders and often requires a combination of different types of expertise and methods. With its long history of scientific collaboration and the new efforts to achieve a stronger coordination and perhaps even integration of scientific activities in a European Research Area, Europe thus provided a fruitful ground for establishing a meeting such as ESOF. Consequently, it may not have been a coincidence that the first registered mention of establishing such a Forum in Europe most probably stems from a report compiled by a scientist-turned-diplomat.[16] For there is also a more or less explicit political dimension to the ESOF undertaking, which was gradually embraced not only by the scientific

[16] Neuroscientist Rémy Lestienne, scientific attaché at the French Embassy in Washington D.C. from 1990 to 1994, compiled a report in which he called for an overarching organisation on the sciences in Europe and a general science meeting modelled after the American Association for the Advancement of Science and its Annual Meeting respectively (see also 4.2).

community[17], but also by representatives of governments and administrations on a national and EU level[18]. ESOF indeed aims to be an institutionalised space, where an exchange and cross-fertilisation can take place on multiple levels. It can be perceived as being closely linked to the workings of the scientific enterprise on a European level while at the same time being responsive to societal, political and economic trends and preoccupations on the level of European nations to which science can contribute insights and perhaps also solutions. When closely observing ESOF one therefore witnesses a parallel, yet inextricably linked process of construction: that of building science and of building Europe. Just as Europe and everything this term stands for – such as, for instance, closely knit geography, shared history and culture, political, economic and regulatory union – has profited from the outcomes of scientific endeavour, so has research performed on the European Continent and in recent history within the European Union – though predominantly nationally steered and supported – multiplied its potential through the unobstructed access to a cluster of 'neighbour' research communities and systems, their infrastructure and workforce. Can the result of this 'mutual fertilisation' be seen as science in Europe, as the formation of a European science or as the process for creating a scientific Europe? This question can be analysed from a number of different perspectives and focus on different elements constituting the relationship between science and Europe. I have chosen to observe what I call the 'publics' that constitute and contribute to these three states. By calling the different actor groups 'publics', I want to draw on a huge body of writing in the field of science and technology studies (STS) and beyond on the complex relations between scientific communities, science policy makers and other societal groups regarded as not belonging to the scientific realm. The image of Levy-Leblond (1992: 17) is helpful here: "Science is not a large island separated from the mainland of culture, but a vast and scattered archipelago of islets, often farther apart from one another than from the conti-

[17] This support was expressed, among others, in high-impact science journals such as *Nature*. See for instance and editorial titled "A meeting for Europe's scientists and publics" (Editorial 2003) which clearly endorses the first ESOF meeting in Stockholm and urges scientific organisations in Europe to do the same.

[18] This was manifested among others in the involvement of the EU Commission's Directorate General Research, of national research ministries and of local political representatives in the bidding process to host ESOF as well as in the actual funding and organisation of the meeting.

nent. An expert in one field is a non-expert in almost all others and, as such, very close to the absolute layperson as far as scientific culture in general is concerned." Accordingly, in the space of ESOF, all involved groups (researchers, policy makers, funders, stakeholders and many more) become each other's 'publics' in the sense of outsiders in relation to the respective epistemic field or specific realm, but important and relevant addressees. In this effort, the Euroscience Open Forum will serve as my case study. Still, ESOF was not necessarily the first meeting aimed at bringing representatives from different European research communities or from EU institutions together. There were and still are countless science conferences, symposia and festivals taking place across Europe seeking the time and attention of professionals or laypersons. What then makes ESOF special or adequate as a case study?

In an editorial in March 2010 entitled "The bigger picture" the journal *Nature,* while expressing its support for the Euroscience Open Forum, made a point of much broader consequence: that the future of science depends on the interestedness, contribution and exchange between actors from a number of fields; and that both the scientific and the social realms need [opportunities] to "broaden their horizons" (Editorial 2010: 8). Barriers existing between them must be overturned. Venues such as ESOF and its US counterpart, the AAAS Annual Meeting, which will also feature in this thesis, are seen as employing a good approach by bringing those with stakes in the scientific endeavour together. ESOF thus differs from other conferences and meetings in that it aims to provide a space where all those directly or indirectly involved in the process of scientific research and technological innovation can meet and engage in extensive exchange. This thesis will study the emergence of this space with regard to the publics that take shape and become active within it, hence focusing on one particular aspect of the diversification of the research system: its membership. Yet, how exactly does ESOF 'perform' this shift of the research system and how is it itself a product of it?

ESOF invites to thinking about the different publics that today constitute and shape the scientific endeavour. It does so by attempting to create a communication platform, which is both interdisciplinary as well as oriented towards and open to diverse sets of policy and societal actors. Therefore, those attending ESOF in a sense embody this 'extended' research system, which today encompasses not only researchers, but also science managers, communicators, journalists, policy makers and a group I will

define as ‘knowledge brokers’. These professionals’ involvement in the process of scientific research also affects its output. For scientifically induced knowledge, as numerous theorists have argued, has become strongly ‘infiltrated’ by societal elements (Jasanoff 2004). Respectively, ESOF makes an effort to build a relationship between science and society, which leads to the emergence of publics expected to fulfil the role of multiplicators. Moreover, ESOF can be viewed as contributing to the construction of European knowledge societies by fostering exchange among those actors constituting new and extended research ecosystems. Consequently, ESOF also, directly or indirectly, shapes the relationship between science and Europe.

I thus argue that ESOF is a space where both articulation and assemblage work takes place: articulation on current or ‘evergreen’ issues revolving around science and assemblage of constellations of publics interacting in selected arenas. These characteristics, while making ESOF a unique phenomenon worthy of extensive observation and analysis on its own account, also render it a perfect vehicle to study the social dynamics of research systems today. This thesis will mainly focus on the first three ESOF editions – 2004 in Stockholm, 2006 in Munich and 2008 in Barcelona – yet hopefully also provide an entry point as well as a solid foundation for further exploration.

1.2 Research goal and research questions

Wanting to contribute to the wider efforts of understanding the complex and multi-sited processes of co-producing European science and European society, this thesis will analyse the ways in which the newly founded Euroscience Open Forum manages to create a space in which the relations between science and society in Europe can be shaped and negotiated in innovative ways. In doing so I will

- *investigate how such a new space creates or allows for admitting new actor constellations;*
- *reflect on whether or not ESOF reconfigures classical boundaries between and within science and society;*
- *analyse how it contributes to re-thinking of key actors needed to realise a specific vision of a better integration of science and society in Europe; and finally,*

- *reflect on whether or not and to what degree ESOF can be understood as an effort to develop science in Europe, contribute to the emergence of a distinctly European science or rather help build a scientific Europe.*

Indeed, it is this last wider question which is of interest beyond the case study at the core of this thesis.

What are "we" – European and national policy makers and partly also researchers – busy doing? Is the focus one of promoting science in Europe, of producing a distinctly European science or of building a scientific Europe? Actually, science in Europe could be seen as representing the starting point, from which a European science sometimes emerges e.g. by means of long-standing multilateral collaboration. But what about the idea of the role of science in creating the vision of a scientific Europe, a Europe strongly defined by its power to collectively produce knowledge and innovations? Will science remain one among many activities taking place within individual European countries or can it constitute a common effort among these and their respective research institutions? Can science assume characteristics intrinsically linked to the European ideal and to which extent is the European endeavour inspired by scientific methods and principles? In other words, can science emerging in European countries evolve into a European science, in the sense of a specific way of fostering and approaching research, or even participate in constructing a scientific Europe?

I will argue that this question cannot be addressed if we do not consider wider changes in the research system, one which is among others becoming more open to societal elements, methods and actors. Such a shift in the research system's membership and output however also implies a respective diversification of Europe. I have specifically chosen to view the development of the research system within the European context, to which I attribute an influential, forming role. In turn, science has increasingly occupied itself with the notion of Europe and the elements that potentially constitute it. By drawing on STS literature that supports this argument, this thesis will therefore also investigate how the changes that the research system has experienced reflect the changing (political and societal) nature of Europe and vice versa. The thesis will thus see the changes manifest through the creation and development of a space like ESOF

as a moment of co-production of the social and the knowledge order (Jasanoff 2004) in the shifting relationship between Europe and science.

These questions are overarching and can be studied within a number of different contexts. Here, I select one particular field of analysis, which will feature as my case study: the Euroscience Open Forum. This represents an experimental space, where work is being done on the relationship between Europe and science from a political and societal point of view as well as on a changing research system. At the same time, I consider it intriguing to explore how ESOF performs this shift in the research system and how it also is a product of this shift. The meeting furthermore provides a platform for communication on the present and future of science and Europe and consequently forms or co-constructs the relationship between the two. ESOF also represents a showcase, where the constant interchange between science in Europe, European science and a scientific Europe is made visible. It therefore opens up a very interesting perspective from which to reflect on these three states of integration and what they imply for society and the research system in Europe alike. Hence, it features as a laboratory where imaginations on science and Europe, such as the idea of a European knowledge society, emerge and are formed.

In order to address the question of the Euroscience Open Forum's contribution to the development of the relationship between science and Europe and show why it constitutes an adequate case study I will re-construct its history and implementation along the following lines:

- *How, under which circumstances and for which purpose did ESOF emerge?*
- *How was it embedded in the European, the national or local context?*
- *What expectations were attached to it? Which actors were involved in its conception and implementation and why?*
- *How did ESOF develop? How did the first three editions of the Forum turn out with regard to their participants?*
- *What was the role of the American Association for the Advancement of Science (AAAS) and its Annual Meeting? How do the two meetings compare, if at all?*

Notwithstanding, the emergence of an arena such as ESOF can be analysed from different perspectives. Here, I have chosen to examine which groups of actors emerge within the context of ESOF and are active within the space it provides. From an STS perspective I will therefore explore how ESOF fosters the emergence of new publics intended to act as multiplicators at the boundaries between science and society, as well as how, by doing so, it implicitly or explicitly fosters a co-production between the social and knowledge order and ultimately performs European knowledge societies. The concept of ESOF involved from the very beginning the element of dissemination of information and 'outreach' towards society. This would occur directly through the so called 'Outreach Activities', a series of events taking place outside the conference venue and open to all, which mostly featured different content than the 'core' of the meeting. However, it would also occur indirectly, through the publics present and involved in the meeting itself. As I will sustain, these groups of people embody what is here perceived as an extended research system. Within the context of ESOF, these publics become visible and engage in a simultaneous, multileveled and multifaceted exchange. We see, for instance, researchers from different fields respectively communicating with each other. Even more interestingly, we also witness intensive exchange among specialists who are engaged in science, yet do not perform research, including science journalists or managers as well as other 'knowledge actors', such as science funders. In this sense, these groups seem to constantly be each other's public and, as such, supporting neighbour, sounding board and 'target group' at the same time. I consider it an intriguing undertaking to explore how all these actors from both the inner and the outer cores of the research system assemble and assume different roles in the space ESOF provides as well as become relevant audiences for each other. To do so, I will interrogate my empirical material by posing the following questions:

- *How does a space for actors emerge at ESOF? How is it structured and why?*
- *Which specific publics are performed in this space? What are their characteristics and which roles do they assume within ESOF and ultimately within the research system in Europe today?*
- *What series of encounters between these publics does ESOF facilitate? How do these publics engage in a mutual exchange within ESOF?*

- *What dynamics emerge through this process? How do they affect science and Europe respectively as well as the relationship between the two?*
- *What imagination of the relationship between science and Europe is performed within ESOF?*

The social groups that gather and become active in the context of ESOF, as well as their broader role within the research system(s) in Europe, thus represent a key interest of this thesis and will feature prominently in the empirical analysis. To describe them, I will coin the term 'inner-scientific publics'. This term serves my purpose in a twofold manner: on the one hand, it is intended to capture the structural and terminological complexity of my main point of interest, namely the groups of people attending ESOF and their affiliations as well as the many different roles and relations they develop among each other; on the other hand, it makes novel claims with regard to the structure and state of the research system today in general and the role and impact of the Euroscience Open Forum on this system. More specifically it points to a process of extending the research system to include different actor groups which are not necessarily scientists, while at the same time underlining how the specialisation of research led to the fact that what is captured by the notion of 'the public' needs to be reconsidered. What I aim to show with this analysis is that science does not merely 'speak' to research specialists. Rather, there is a multitude of 'guilds' engaged in the process of scientific knowledge production, its complex support system and its transformation and use; these are hybrids in the sense that they are both an inherent part of the research system, as it has developed, but also a kind of audience (public) or addressee to this system. They can thus be viewed as being both inside and outside of this realm – or at its borders. This 'hybrid state' and the being located at several sides of the many borders (for instance between scientific disciplines) is exactly what the term 'inner-scientific publics' attempts to capture.

1.3 Outline of the thesis

With these questions in mind, it is important to set the broader frame for the enquiry into the relationship between Europe and science. Chapter 2 will attempt to do exactly that. It will shed light upon some important facets of this relationship, by pointing to a

series of changes and developments both realms have respectively undergone, and argue that Europe and science are co-produced. Here I will draw on a number of strands of debates from the field of STS and its related disciplines which address the changing nature of the research system towards an increasingly social endeavour with strong political, economic and cultural dimensions as well as the evolving role of Europe in the direction of an unified area where scientific knowledge and its practitioners can circulate freely and act as a binding element among European nations. In chapter 3, I prepare the ground for the empirical analysis by presenting discourse analysis and the case study as my methods of choice as well as by specifying the material and data I will largely base my empirical work on. I then move on to chapter 4 where I re-construct the emergence of the Euroscience Open Forum. I approach this phenomenon in a twofold manner. First, I will try to retrace and interpret its conceptualisation and development by illuminating the circumstances and framework conditions which helped create a need for such a platform in the European sphere. I will furthermore portray organisers' efforts to live up to their own initial aims and to the subsequent expectations of the communities addressed by re-constructing the history of the first three ESOF events. An overview of the key participants' statistics from the first three meetings will pave the way for the analysis of the groups of people or publics that inhabit the expanded research system, who they are and how they are constructed and performed within the framework of the Euroscience Open Forum.

As previously mentioned, the question which will be at the heart of my analysis will be what imagination of the research system and of Europe is constructed and becomes visible through ESOF. To find this out, I focus on how, in this space that ESOF creates, different sets of actors are performed. In chapter 5 I will consequently spell out what I have defined as 'inner-scientific publics' as well as portray these publics within the Euroscience Open Forum. Here, I will focus on five specific categories: senior scientists, young scientists, science journalists and communicators, science policy makers and administrators as well as introduce a new type of public referred to as knowledge brokers. The attributes and roles of these actors in the context of ESOF meetings as well as within the research system today will be presented and discussed.

I will offer four conclusions, which touch upon a number of ESOF 'leitmotifs' extensively addressed in this thesis. First, I will reflect on what I have defined as 'inner-scientific

publics' and the claim I have formulated with regard to their construction and performance at ESOF. Second, I will explain how the notions of 'boundary' and 'boundary crossing' with all their different facets, are crucial to understanding ESOF and the research system today. Third, I will draw on one particular element of the Euroscience Open Forum, where it will probably have an important role to play in the future: engaging aspiring and early-stage researchers. Finally, I will go back to my initial starting point and reflect on whether or not we can see ESOF as contributing to constructing a scientific Europe.

2 SETTING THE FRAME: BROADER DEBATES RELEVANT TO THE ANALYSIS OF THE DYNAMICS SURROUNDING THE ESTABLISHMENT OF ESOF

> *Science has spoken, with growing urgency and conviction, to society for more than half a millennium. Not only has it determined technical processes, economic systems and social structures, it has also shaped our everyday experience of the world, our conscious thoughts and even our unconscious feelings. Science and modernity have become inseparable. In the past half-century society has begun to speak back to science, with equal urgency and conviction. Science has become so pervasive, seemingly so central to the generation of wealth and wellbeing, that the production of knowledge has become, even more than in the past, a social activity, both highly distributed and radically reflexive. Science has had to come to terms with the consequences of its own success, both potentialities and limitations. (Nowotny et al. 2001: 1)*

The overarching notion of the relationship between science and society that Nowotny et al. so elegantly sum up in their 2001 book "Re-thinking science: Knowledge and the public in an age of uncertainty" has occupied scholars' minds for over a century. Its many facets have been addressed in academic studies and publications (for instance in the field of STS, in social and economic sciences), but also found their way into policy papers and formed political decisions and practices. Some were set within the European context and dealt with the question of how science and Europe have developed and become more strongly intertwined. In order to reflect on these issues in more breadth, I will draw on a number of strands of debates which have dealt with different facets of the relationship between science and society – and to some extent also science and Europe – and are considered to having contributed to understanding and perhaps also shaping this relationship. The overarching argument I will attempt to make is that the presumable separation between science and society is, in a sense, artificial and that science and society have always been closely intertwined. One could perhaps even argue that the overall awareness of this relationship never was as strong as it is today. Yet, how can these two spheres be described? What are their characteristics and how have they developed? What do we learn from this analysis with regard to the relationship between science and Europe?

The idea of the co-production (Jasanoff 2004) of science and society or the knowledge and social order, which will be defined in detail later on, in my view, represents a key point of reference in order to answer these questions. It forms the conceptual framework for examining the transformation of the research system into a realm more

strongly permeated by society as well as for appreciating how science and technology have changed the way we see the world and live in it. A number of perceived articulations of the process of co-production of the social and knowledge order will feature here, emphasising the different aspects and states of their resulting mutual influence and impact. These are the knowledge society, 'Mode 2' knowledge production, the increasing specialisation and fragmentation of scientific research, the science and society movement as well as the medialisation of science. I expect these articulations to deliver the explanatory framework within which my case study, the Euroscience Open Forum, can be viewed and analysed. For it will be argued that ESOF was created among others to capture the tensions emerging out of this transformation of the scientific and social realm and allow them to be discussed and 'ventilated'. The Euroscience Open Forum in turn represents a multifaceted construct which offers a number of interesting angles to study. In this thesis, I have chosen to focus on the actor constellations emerging out of this process of transformation of the research system which assemble and are performed at ESOF and for which the Forum provides a platform for communication and exchange. In the following chapters I will therefore also refer to the role these different 'publics' pertaining to the realm of science and society assume in the context of the debates I have chosen to portray, thus laying the ground for the analysis in chapter 5. Finally, Europe as a geographical, cultural and political space, as well as its relationship to science will feature as the 'golden thread' that runs through the debates and as a 'sounding board' for the shifts they imply. For, as I will argue, a transformation of the research system implies a transformation of Europe.

2.1 The idiom of co-production: Unravelling the intertwinement of the knowledge and social order

Research on the notion that scientific and technological discoveries have a significant impact on society and that they are, in turn, driven by economic, political and societal processes spans several decades and forms an important part of STS and its related fields. Today, a considerable number of modern citizens profiting from the produce of innovation and employing it in their everyday lives most probably are aware of the way these commodities – be they electronic devices, the internet or new therapies – have changed the way we live and affected our society. In turn, it has been argued in

academic circles that the process of scientific knowledge production is increasingly being permeated by societal elements and interests. Notwithstanding, the intriguing question is how, on what levels and through which channels this 'cross-fertilisation' between the realms of science and society actually takes place. How can this process be retraced and explained and what is its impact upon the world we live in?

Among numerous authors who have addressed these questions, Bruno Latour and Steve Woolgar argued already in 1979 that the social and scientific world cannot exist separately from one another as "the scientific realm is merely the end result of many other operations that are in the social realm" (1988b: 13). Bijker and Law attempted to identify a means to "describe and explain the co-evolution of what are usually distinguished as sociotechnical context and sociotechnical content" (1992: 21) implying that the organisational, geographical and cultural framework indeed influences the content or outcome. Gibbons et al. (1994) focused on the development of the process of scientific knowledge production suggesting a shift towards a 'Mode 2' of doing things which is more socially reflexive and inclusive. Building among others on these different articulations, Sheila Jasanoff put forward the term of co-production defining it as the "simultaneous production of knowledge and social order" (1996: 393). So called co-productionist studies have made it their goal to draw attention to and map these processes of mutual influence and co-evolution of science and society while at the same time attempting to capture the complexity of their implications and raise awareness of their significance for both realms. Scholars point out that important developments in the 20th century alone, such as the atomic bomb, the Pill, the discovery of the internet or the fear of the Y2K bug, have vividly shown just how strongly intertwined societal and scientific processes are (Jasanoff 2004: 1). What is more, the use and impact of scientific discoveries is never quite solely confined to the borders of one area of social life. In turn, society has regularly left its mark upon and even transformed natural artefacts.

Using the logic and applying the principles of seasoned epistemic fields such as economics, political sciences, sociology, philosophy, anthropology or history to support this argument can indeed contribute quite interesting insights into how or why techno-scientific development affects the way we live today, as well as into the interactions that occur between innovation and the workings of society. However, 'mono-

thematic' epistemic fields often capture but a few of the dimensions of the phenomenon at hand and their methodological and theoretical armoury may in some cases fail to look through the multiple levels of intertwinement of the natural and social world with the required precision. Existing sciences find it increasingly hard to explain human responses to complex developments such as climate change, the expansion of the internet, new reproductive technologies and emerging diseases, to name but a few (Jasanoff 2004: 2). The field of science and technology studies (STS) takes into consideration many of the aspects of the social sciences. STS focuses on the "investigation of knowledge societies in all their complexity" and provides methods and findings that are "indispensable for the analysis of power, culture and social change" (Jasanoff 2004: 2, 4). In her acclaimed anthology of co-productionist studies "States of Knowledge: The co-production of Science and Social Order" Sheila Jasanoff (2004) thus proposes the notion of co-production as an experiment to bridge these divisions between epistemic fields and at the same time to facilitate transdisciplinary exchange and help locate convergences.

The process of co-production involves implicit or even explicit *ordering* of knowledge – mostly scientifically induced – but also of the societal elements where this knowledge is applied. Inducing modification or adaptation implies an exertion of power over those constituencies or artefacts being temporarily or permanently altered. Indeed the findings offered by studies using the lens of co-production reveal information about power relations. Those exerting this power, in this case science and technology on the one hand and culture on the other, act as "political agents" (Jasanoff 2004: 14).[19] They actively engage in ordering and re-ordering the natural and the social world. It has, however, become almost impossible to sharply separate the products of culture from those of science and technology as they are all absorbed, moulded and transformed by society and emerge as novel articulations of fundamental values such as citizenship, nationhood, the public and private sphere, freedom and control (Jasanoff 2004: 14). It is this brewing process co-production attempts to offer insights into. Notwithstanding, Jasanoff emphasises that perceptions of the form and degree of

[19] Here Jasanoff also refers to the work of Michel Foucault (see for instance Foucault 1994 [1982]).

influence of the social on the scientific and the other way around vary significantly in STS scholarship.[20]

Having sketched the different dimensions of co-production, we move on to its forms and areas of application, their potential and limitations. On which levels of social aggregation and in which kinds of institutional spaces or structures can co-production be identified? In other words, which are the sites scholars of a co-productionist methodology mainly focus on and how close must they look to achieve solid results? According to Jasanoff (2004: 38), the process of ordering knowledge and ordering society can ideally be observed through the making of identities, of institutions, of discourses and of representations, for this is where scientific knowledge "embeds and is strongly embedded" (Jasanoff 2004: 3). This sounds logical when considering that "ways of knowing the world are inseparably linked to ways in which people seek to organise and control it" (Jasanoff 2004: i). Surely enough, the question regarding the purpose these four established "pathways" serve arises. Jasanoff (2004: 38-41) lays out their main tenets as follows: The formation, preservation and contesting of *identity* is, in her view, a recurring function in co-productionist accounts. As part of human nature, creating identity is perhaps the most dependable way of restoring sense and order. Looking into identity recalls in my view the question of cross-European understanding of scientific development. The implementation of a European Research Area could be viewed as a particularly interesting example of an effort to construct identity through common standards affecting both science and society, thus moving from science in Europe towards European science. Yet, which prerequisites must be fulfilled in order to someday achieve a scientific Europe? One is perhaps the existence of truly European 'science publics'. I argue in this thesis that the Euroscience Open Forum not only provides a space for discussion among others on the question of a European identity. Much rather, it features as an arena, where European 'inner-scientific publics' are performed and become visible as well as where their individual identities are 'carved out' and positioned within an extended research system in Europe.

---

[20] Jasanoff especially refers to the work of Hacking (1999), Latour (1996), Collins/Yearley (1992) and Callon/Latour (1992).

The role of *institutions* as important places for capturing, ordering and disseminating information and the authority exerted as a consequence thereof are a further important element. They are points of reference for the quality and validity of new knowledge and serve as society's memory or as "inscription devices" as Latour and Woolgar put it (Latour 1987; Latour/ Woolgar 1988b). I will argue that ESOF set out to become a laboratory, where the constituting elements of the research system could be put under the microscope and perhaps also re-arranged. More concretely, it attempted to institutionalise debates on the future of this system, its membership as well as its place within the context of Europe. As an institutionalised space for exchange, ESOF could be viewed as becoming – with time – one "stable repository of knowledge" (Jasanoff 2004: 39) on the relationship between science and society as well as between science and Europe, by allowing existing debates to be enriched with new notions. It is thus suggested, that ESOF as a new institution contributes "the web of social and normative understandings" (Jasanoff 2004: 40) necessary for characterising this relationship.

Making *discourses* is nothing less than developing vocabularies to articulate novel approaches and explain new socio-scientific phenomena. This process may involve inventing a whole new set of terms or drawing upon existing discourses and adapting them to emerging needs. This thesis will argue that ESOF contributes to developing the discourse on the intertwinement between science and society further, delivers insights into the publics inhabiting the extended research system today, as well as points to the potential existence of a new type of public: knowledge brokers[21].

Finally, the process of making representations is, according to Jasanoff, perhaps the most fragile and less palpable of all because of its high susceptibility to historical, political and cultural influences. Still, it represents a core process of co-production as it attempts to make scientific knowledge tangible in social terms. The process of communication of issues relevant to the research system and to science policy in Europe occurring at ESOF attempts to create a type of representation of the relationship between science and Europe.

[21] I will elaborate on the term further in chapter 5.

However, the definition of the four sites of co-production begs for more explanation. Which processes should we be focusing on when analysing the making of social identities, institutions, representations and discourses? This is where Jasanoff (2004: 38) provides a horizontal guideline with four focal points: first, STS scholars look at the emergence and stabilisation of new techno-scientific objects or phenomena, how they are identified, demarcated and incorporated into existing social orders; second, co-productionist methodology also concentrates on the framing and resolution of controversy, as it tells the story of competing lines of thought as well as of the prevailing of one over the other; the third strand of research focuses on the intelligibility and portability of techno-scientific products and artefacts across time and space; the fourth pathway follows cultural practices of science and technology and asks how the produce of techno-scientific innovation is shaped by and adapts to different political and cultural settings. These four themes act as stepping stones to co-productionist endeavours.

As Jasanoff points out, co-production is not conceived as a "fully fledged theory" (2004: 3) with a universal explanatory power that claims to be able to capture the slippery essence of socio-scientific interaction. It is rather an idiom than an axiom; one could even say a filter. Its goal is to draw our attention to the process of socio-scientific interconnectivity and interaction. In this sense, it is also intended to offer a fresh alternative to social and natural determinism by simultaneously focusing on both agents and considering them equal contributors to the process. Furthermore, co-production helps make the structure and dimensions of this interaction visible and develop at least a general understanding of its outcomes. Consequently, co-production rather describes than explains and is not set on delivering proof or final and undisputable outcomes. Though the process of co-production may at first glance seem quite abstract or all-encompassing, its scope becomes clear when it is turned into a basic sensitivity in a process of analysis. Then, one becomes aware of just how many facets and implications emerge out of a co-productionist analysis following the previously mentioned guidelines. The case of how modern societies assess and manage the risks that emerge out of scientific and technological progress helps exemplify this. At the same time, it nicely links the notion of co-production to a number of obser-

vations the field of STS has made during the past decades and thus sets the stage for their further analysis in the pages to come.

On the deficits of expertise and the gaps of knowledge: Addressing the challenges of techno-scientific societies

We live in a time, when science and technology enjoy a high degree of autonomy and trust on the part of society. We thus need to learn to live and deal with problems as they arise (hubris). Notions such as 'Mode 2' invite to explore the importance for science of being open to society. What is more, science has come to play an important role in policy making. Critical scholars have however pointed out that it is not possible – even for highly advanced science and technology – to fully predict or control all developments. Indeed, science's contribution to societal decision-making has limits and these need to be acknowledged by scientists, by policy makers and, ultimately, by society. The evidence provided by science should not be seen as being able to solve all societal problems. This 'dilemma' could be viewed as a characteristic example of the impact of science and society upon each other. It also shows how the societal and scientific realms have become more interconnected and interdependent than ever and why increased efforts are necessary to secure a mutual understanding and exchange. This perceived need is one which the Euroscience Open Forum was conceived to address. Scientists and policy makers represented key stakeholders of the Forum early on, while science policy topics made out a considerable portion of the conference programme.

In recent decades, assessment and control of 'risk' emerging out of scientific and technological discoveries has become both an element of study in the social sciences as well as an important component for political decision-making. 'Crises' such as the one emerging out of the 'mad cow disease' epidemic (BSE) or, more recently, the Ebola and Zika epidemics, or controversial debates, for instance on genetically modified foods and nanotechnology, have to a large extent increased sensitivity over the issue of risk. Still, uncertainty has always been an intrinsic part of scientific enquiry. Hence, risk could be seen as being inseparable from the techno-scientific process and its progress. In her essay "Technologies of humility: Citizen participation in governing science" Sheila Jasanoff (2003: 224) stresses that "risk…is not a matter of simple probabilities, to be rationally calculated by experts and avoided in accordance with the cold

arithmetic of cost-benefit analysis". Merely causal analyses are too one-sided to cope with the multiple dimensions of the problems societies face today. Technological advances should thus be viewed not only from the point of view of their impact but also of their intentions or aims (Jasanoff 2003: 224). This, however, requires a different approach to how science and technology are governed within science's own institutions as well as how political decision-making based on techno-scientific policy advice is made. The result has been a unanimous call for more accountability on the part of researchers, decision makers and society when producing and using scientific knowledge (Jasanoff 2003: 226). Interestingly enough, this issue is reflected in a number of key debates, from somewhat different perspectives respectively.

How does society interact with the scientific realm and how are these two spheres co- and interdependent? Which role do the actors involved assume in this process? I have chosen to address these questions because I believe that the notion of interdependence and interaction between these spheres lays the argumentative groundwork for the observation of the transformation of the research system as well as of the subsequent crystallisation of a set of new publics that engage and contribute to the process of scientific knowledge production. Together with the concept of the knowledge society, co-production thus serves as a cross-cutting element and conceptual framework for the case study I will be referring to in this thesis as well as acts as explanatory passage towards the thematic debates that surround and permeate this case. It does so by putting forward the simple yet challenging proposition that we cannot any more afford to think in simple or unidirectional models of causality, stressing either that science and technology are framing society (and we cannot do anything against it) or that everything is socially constructed. Techno-scientific knowledge and its social articulations have become far too complex to be the result of a linear process unfolding merely in one direction. The levels of interaction, the sources and outlets of information and the publics receiving, processing and broadcasting the contents of socio-scientific knowledge are multiple and exist and function simultaneously. Consequently, a more comprehensive approach is needed to capture their workings and comprehend their implications.

The 'Mode 2' approach as proposed by Gibbons et al. (1994) for instance, which will feature more extensively later on, argues that scientific knowledge production has

moved on to new sites, beyond the closed disciplinary spaces it inhabited in the past, and become more transdisciplinary and problem-oriented. This implies that there is a broader set of publics with different backgrounds contributing to it at any given time and that its results become more diverse and inclusive. For today's complex problems cannot be solved solely in the context of either basic or applied research, but by using both theoretical and practical methods and tapping knowledge sources also outside the academic realm. Thus, one could argue that the knowledge produced in 'Mode 2' fashion, is one where a co-productionist process can be traced. Accountability according to this line of thought consequently assumes a twofold meaning or, even more precisely, stands on two pillars: on the one hand, it implies a broader participatory base spanning academic science, industry, policy and society involved in knowledge production; on the other hand it deems usefulness, efficiency and effectiveness with regard to providing solutions for the problem at hand to be key quality criteria.

Another prevalent argumentation for more accountability is delivered by the science and society movement and in particular the 'participatory trend', which will feature in more detail later on. Here, we witness an explicit rather than implicit approach, involving a call for a broader societal participation in political decision-making regarding science and technology. This should ideally lead to an increased transparency over the use of public funds for science as well as to a better understanding of the implications – both positive and negative – of scientific knowledge production. Similar to 'Mode 2', the participatory turn breaks with the Mertonian logic of 'pure science' (Merton 1974a [1938]) and the subsequent monopoly of expertise. However, an increased and systematic participation in the governance of science by societal and political agents presumably leads to a permeation of scientific and technological knowledge by societal values and policy priorities. In this case, co-production of the natural and social order thus occurs in the name of (or is expected to lead to) accountability.

However, neither the 'Mode 2' approach nor the participatory turn alone can lead to a democratisation of technological societies (Jasanoff 2003: 238). Management mechanisms, institutions and regulations governing science will remain hollow without a change of mind-set. Unhindered co-production of the knowledge and the social order can in this case occur only if the "culture of governance", rather than just its structure, adapts to new circumstances and needs allowing a shift in the "substance of participa-

tory politics" (Jasanoff 2003: 238). To this end, Jasanoff proposes so called "technologies of humility" as an urgently needed addition to the "technologies of hubris", a term which she uses to describe conventional predictive methods – such as risk assessment, cost-benefit analysis or modelling and simulation of natural phenomena – that claim objectivity and a high degree of certainty, yet in reality feature numerous weaknesses. Concretely, "technologies of hubris" tend to suppress uncertainty, overrate the known and underestimate the unknown or ambiguous. Moreover, they often are impermeable to alternative or opposing arguments and positions to the dominant discourse, thus neither accommodating public debate or criticism nor taking it into consideration. Finally they cling to supposedly objective or 'manageable' assumptions as the basis of their analysis, even when these parameters turn out to be unrealistic (Jasanoff 2003: 239). Though such predictive methods should not be abolished altogether as they constitute important tools for informed decisions, Jasanoff proposes their enrichment through "technologies of humility", which – as the word humility suggests – aim at qualifying dominant discourses and expert positions by countering them with a consolidated and plausible "civic epistemology", calling attention to the "possibility of unforeseen consequences", uncovering the "normative that lurks within the technical" and laying the foundation for "plural viewpoints and collective learning" (Jasanoff 2003: 240). To achieve this awareness and sensitisation scientific and technological advances (or "every human enterprise that intends to alter society") must be viewed and scrutinised on the basis of the following four questions: "What is the purpose? Who will be hurt? Who benefits? How can we know?" (Jasanoff 2003: 240). The focus of our predictive efforts should therefore rest on "framing, vulnerability, distribution and learning" respectively (Jasanoff 2003: 240). Public participation focusing on these aspects promises to unfold in a constructive and inclusive manner and deliver valuable insight into the issue at hand and thus serve the decision-making process considerably.

Combining "technologies of hubris" and "technologies of humility" would lead to "social technologies" as novel approaches of decision-making that "engage the human subject as an active, imaginative agent, as well as a source of knowledge, insight and memory" (Jasanoff 2003: 243). The limitations in the aspired 'whole' process of co-

production would thus be overcome, if not already institutionally then at least within the cultural mind-set.

2.2 Defining the knowledge society

The development of the concept of the knowledge society can be viewed as being inextricably linked with socio-political, cultural, economic and technological developments in the 20th and 21st century. It is characterised, among others, by the dissemination and extensive use of knowledge in all areas of everyday life as well as in public and private institutions (Stehr 2001: 11) and is thus of particular relevance for the process of exploring the state of the relationship between science and society in general and – as I intend to do in this thesis – science and Europe in particular. For it can indeed be viewed as a prime example of the co-production of the social and knowledge order. Throughout the previous decades, a number of epistemic fields and 'schools' have laid claim to this notion. The term 'knowledge society' has furthermore enjoyed numerous articulations by eminent scholars, policy makers and other experts, in their majority geographically originating from Europe or the United States[22] and is thus characterised by a strong multiplicity (Hofmann 2009: 1; see also Law/Mol 2002: 8). At the same time (and perhaps also due to this multiplicity), the overarching debate on the emergence and gradual establishment of a knowledge society in a sense delivers the 'grand narrative' for an important phenomenon in recent socio-political history while attempting to provide explanations for a number of significant changes and developments deriving from it. The majority of these shifts and developments can be observed during a period of time spanning the 20th century and continuing until today.

However, which definition of knowledge are we referring to when speaking of a knowledge society? This question can be answered somewhat differently, depending on the 'school' we call upon as well as on the period of time we are examining. Yet, one characteristic seems to remain unchanged and central: the knowledge at hand is eco-

[22] The reflection on the meaning, use and impact of scientific and technological knowledge in society indeed goes back almost a century and spans several fields of enquiry. 'Classics' such as Marx and Engels or Max Weber dealt with these questions, as did several sociologists in the mid or late twentieth century such as Bell, Lane, Heidenreich and Stehr.

nomically relevant. For most modern articulations of the knowledge society presuppose that the knowledge being referred to is a source of profit or power. Take for instance the tradition of the industrial or capitalist society. It is characterised, among others, by a more systematic and rational use of technical and organisational knowledge (Stehr 1994: 28):

> *While inventions and innovations did develop and diffuse in, for example, feudal Europe, the process was marginal, slow and uneven. During the period of industrialisation, learning and innovation became a ubiquitous process. While most people in more traditional societies could live their whole life on the basis of a rather narrow and constant set of skills used in environments with rather constant characteristics, this is no longer the case in the industrial economy. (Lundvall/Johnson 1994: 24)*

Analyses on the role and use of knowledge in the capitalist or industrial society also featured in the work of several eminent social scientists towards the end of the 19th and during the first decades of the 20th century. They each examined the issue from quite different perspectives. Karl Marx and Friedrich Engels spoke of a specialised knowledge deriving from technological development. In their view, the possession of this knowledge implied power. This power however, remained in the hands of the 'bourgeoisie' or the 'capitalists' and was used by them to exploit simple workers, who were deprived of the possibility to acquire the new knowledge (Marx/Engels 1969: 54 ff.). The sociologist Max Weber on the other hand argued that institutions – "bureaucracies" as he called them – not individuals are the keepers of knowledge and therefore form the basis of the modern knowledge society. This knowledge he defines as "*Fachwissen*" meaning the current technical, administrative and economic know-how, which institutions require in order to function and which, when accumulated, becomes procedural, experience-based knowledge or "*Dienstwissen*" (Weber 1972: 128 ff.). Weber therefore argues that the knowledge on which modern society is based is not necessarily or exclusively *scientific* knowledge. Neither is it restricted to nor is it the privilege of one field, but rather "established in the regulatory structures of institutions, provided that existing regulations can adapt to new tasks and experience" (Heidenreich 2003: 32). Joseph Schumpeter (1935 [1912]: 101) doubts the ability of institutions' knowledge to evolve and adapt to new circumstances. In his view, innovation is achieved mainly through charismatic and forward-looking entrepreneurs, who found new companies and seize the available innovation potential. They possess both administrational and technological knowledge, which is complemented or even en-

hanced by personal vision and charisma. This argument also appeared some years later in the writings of Peter Drucker (1957), who first spoke of managers.

Following World War II, the capitalist-oriented economic systems that had emerged in Europe and the United States in the 1930s and 1940s developed on the basis of large industrial progress, which in turn depended heavily on the production and use of new scientific and technological knowledge (Hofmann 2009: 1-2). The definition of the knowledge society formulated in the decades following World War II and especially during the 1960s and 1970s thus significantly reinforced the economic relevance of this knowledge, for it had become a production factor in an economic sense and an important source of economic growth and value creation (Stehr 1994: 32). An increasing automation of production techniques at the same time decreased the value of manual labour and shifted the focus towards 'knowledge workers', who processed knowledge and information on a managerial level and created new products and services (Drucker 1957: 119 ff.). The development of information and communication technologies moreover drastically increased the speed with which knowledge and information was exchanged and made available, by almost annihilating obstacles of time and space. In his study "The production and distribution of knowledge in the United States", Fritz Machlup (1962), to give an example, attempted to quantify the knowledge economy. He estimated that the economic output of knowledge production (especially education, research, as well as the development of information and communication technologies, instruments and services) already in the 1960s amounted to 29% of the US gross domestic product thus stressing the significance of future developments in these knowledge fields for the economy of a nation (Hofmann 2009: 33).

Robert E. Lane (1966) was the first to speak of a "knowledgeable society" adhering to principles considered intrinsic to the process of scientific enquiry. He understood it as one in which

> *…more than in other societies, its members: (a) inquire into the basis of their beliefs about man, nature, and society; (b) are guided (perhaps unconsciously) by objective standards of veridical truth, and, at the upper levels of education, follow scientific rules of evidence and inference in inquiry; (c) devote considerable resources to this inquiry and thus have a large store of knowledge; (d) collect, organise, and interpret their knowledge in a constant effort to extract further meaning from it for the purposes at hand; (e) employ this knowledge to illuminate (and perhaps modify) their values and goals as well as to advance them. Just as*

> *the democratic society has a foundation in governmental and interpersonal relations and the affluent society a foundation in economics, so the knowledgeable society has its roots in epistemology and the logic of inquiry. (Lane 1966: 650)*

This notion was taken up by Daniel Bell (1968) in his essay "The measurement of knowledge and technology". There, he identified two reasons why the post-industrial society could also be defined as a knowledge society:

> *First, the sources of innovation are increasingly derivative from research and development (and more directly, there is a new relation between science and technology because of the centrality of theoretical knowledge); and second, the 'weight' of the society – measured by a larger proportion of the Gross National Product and a larger share of employment – is increasingly in the knowledge field. (Bell 1968: 198)*

One could thus argue that it is knowledge deriving from the scientific and technological process or *scientific* knowledge that forms the core of the knowledge society debate. This new type of society was also characterised as one in which knowledge is the source of productivity, growth and social inequality, instead of labour, capital and resources (Drucker 1994). Finally, it also featured the emergence of a new, highly specialised and educated workforce (Heidenreich 2003: 34). Peter Drucker (1957: 62-63) was perhaps the first to refer to knowledge workers in a post-industrialised society, a "professional middle class" as he called it, made up of "men of skill, knowledge and responsible judgement". In the field of scientific research, this group of "knowledge workers" gradually grew beyond the researchers themselves to include for instance specialised technicians and engineers, as well as legal, financial and policy experts. In terms of its 'publics' therefore, the knowledge society seems to be located at the borders between science and society. It thus provides valuable insight into the relationship between these two realms. However, how is the notion of the knowledge society relevant to the exploration of the relationship between science and Europe as a community? I view the uptake of the knowledge society in the context of the development of the European Union as a political articulation of this phenomenon, one which can possibly deliver considerable insight into the state of integration between science and Europe today. What is more, the EU knowledge society debate has also been quite influential in the process of ESOF's emergence. It therefore deserves further elaboration.

At the beginning of the new millennium, the concept of the knowledge society formed part of a political process launched by the European Commission and supported by its

Member States to meet the perceived need to increase Europe's competitiveness as well as to secure its economic growth and social cohesion in the years to come. An alignment of EU Member States in terms of their investment in research and development paired with a considerable increase thereof was considered by policy makers to be of vital importance in the effort to make Europe "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" (European Council 2000). This goal assumed a prominent position on the policy agenda following the articulation of the Lisbon Strategy by European Heads of State in 2000. In the final policy document of the Lisbon European Council, EU member states proclaimed the need to "re-orient […] policies to capture the benefits of the new knowledge-based society" (European Commission 2000b: 2). The means to achieve this common and for Europe's future incremental goal were better policies for the information society, as well as a significant increase in spending on science and technology. Furthermore, in order to advance the impact of research and development efforts of European Member States, policy makers also considered the creation of a European Research Area (European Commission 2000a) to be a necessary step. This 'united space' was expected to provide better support and working conditions for European researchers and boost research-based innovation. In a changing world characterised by an increasing globalisation of research and technology and the emergence of new scientific and technological powers – notably China and India – the achievement of a European Research Area was viewed as a cornerstone of a European knowledge society. Such a society would be one where "research, education, training and innovation are fully mobilised to fulfil the economic, social and environmental ambitions of the EU and the expectations of its citizens" (European Commission 2007: 2). Subsequently, this process was also viewed as having marked the re-defining of scientists' role in Europe. Research professionals were now identified as the 'natural resource' that would guarantee the Continent economic growth and social stability. Moreover, science would receive more funds, but be more strongly judged by its output, which should provide value for money.[23] Scientists and the scientific community at large were therefore seen – more than

[23] This trend was also manifested in the European Commission's Europe 2020 Strategy and

ever – as a 'power house' producing solutions for the problems of today and tomorrow and thus serving society.

Ten years after the Lisbon declaration and following a rather slow implementation[24] of the European Research Area (European Commission 2000a) and the agreed increase in R&D spending (European Commission 2002b) as well as a looming financial crisis, the European Commission presented Europe 2020, the "European Union's ten-year growth strategy"[25]. With this paper, the EU legislative body attempted to address "the shortcomings of our growth model and create the conditions for a different type of growth that is smarter, more sustainable and more inclusive"[26]. To do so, it proclaimed five targets that needed to be achieved by 2020 if Europe were to overcome the economic difficulties it was facing and remain competitive on a global scale. They focused on employment, innovation, education, social inclusion, climate and energy. Europe 2020 furthermore identified seven key areas, on which the EU and Member States have to jointly focus their efforts: the so called Flagship Initiatives represented a framework of actions which were expected to help achieve "smart, sustainable and inclusive growth" (European Commission 2010b: 1). One of these was Innovation Union, an attempt to "improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs" (European Commission 2010b: 5).

Concretely, Innovation Union set out to further promote the implementation of the European Research Area, focus research efforts on the grand challenges such as "en-

---

the subsequent "Innovation Union Flagship Initiative".

[24] According to the Lisbon Strategy evaluation document published by the Commission in 2010, "the original strategy gradually developed into an overly complex structure with multiple goals and actions and an unclear division of responsibilities and tasks, particularly between the EU and national levels" (European Commission 2010a: 1). Following a mid-term review in 2005, the Lisbon Strategy was re-launched with a strong focus on growth and jobs and a new model of implementation and governance between the EU and the Member States. Another aspect one should mention is that during these ten crucial years the EU grew exponentially from 15 members in 2000 to 28 in 2013, and became much more diverse and socio-economically heterogeneous.

[25] http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/index_en.htm accessed on 29.05.2013.

[26] http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/index_en.htm accessed on 29.05.2013.

ergy security, transport, climate change and resource efficiency, health and ageing", "improve framework conditions for business to innovate", "strengthen and further develop the role of EU instruments to support innovation" and "promote knowledge partnerships and strengthen links between education, business, research and innovation" (European Commission 2010b: 12-13). In order to succeed, these efforts required a strong commitment from the Member States in the form of rigorous reforms, higher public investment and incentives for industrial R&D as well as, perhaps most importantly, the training of a larger pool of 'skilled' workers (meaning natural sciences and engineering graduates who understand business and entrepreneurship) (European Commission 2010b: 13). This narrative creates the impression that the aim the Europe 2020 strategy pursued through Innovation Union was to streamline European efforts to promote research and development, while focusing on maximising the potential of smart growth and, ultimately, new employment. The 'knowledge society' in this context is accordingly a society that strives to accumulate new knowledge which is specialised, exploitable and meets the needs of European Member States and their economies. At a first glance, the EU rhetoric seems to follow the argument of a number of knowledge society scholars, who refer to scientific knowledge as not merely a model *of* reality but a model *for* reality as well as a capacity to act (Stehr 1994: 41)[27]. Knowledge is thus to a certain extent equated with a specific product to be delivered by scientific and technological research and swiftly 'injected' into the system, where it will hopefully trigger growth and create new jobs. Though the production of scientific knowledge begins mostly within the geographical borders of the individual Member States, its output is ideally expected to cross these boundaries, enrich the knowledge produced elsewhere in Europe and become enriched by it itself.

Which conclusions could therefore be drawn from the analysis of the political articulation of the knowledge society concept within the context of the European Union with regard to the relationship between science and Europe? If we assume, as stated previously, that the knowledge society is the result of a process of co-production of the social and knowledge order, then we need to consider in our analysis the effects of this

[27] In the original German version: „Als kulturelles Ensemble ist das wissenschaftliche Wissen nicht nur Dechiffrierung der Welt und besseres Weltverständnis, sondern Modell für die Welt."

process on both entities. On the one hand, this policy re-orientation could be viewed as having encouraged or triggered the production of new, ever more specialised knowledge to deal with the 'grand challenges' of our time. This may in turn have led to important discoveries and perhaps even applications, advanced a number of epistemic fields, created jobs and provided career opportunities for researchers. On the other hand however, the societal dynamics set into motion by such a concerted policy initiative to advance science and innovation on a European level and the subsequent need for open and inclusive dialogue on all the potential risks and uncertainties represent equally important dimensions for the analysis. Indeed, the importance of such a process of consultation and deliberation was formulated among others in the so called Science and Society Action Plan (2002): "In a knowledge-based society, democratic governance must ensure that citizens are able to make an informed choice from the options made available to them by responsible scientific and technological progress." (European Commission 2002a: 3).

Though the Lisbon declaration could be viewed as having established the seemingly logical argument that in light of scarce natural resources the European Union's economic development and social prosperity depends on technological achievement and innovation, which in turn require a highly-skilled workforce, it also enhanced uncertainty over the impact of this decision on those who would perhaps not achieve the goal, as well as with regard to certain values that were to some extent being left aside in the process. Indeed, critics have argued that the uptake of the knowledge society debate by EU policy focused perhaps too much on the economic aspect and on the need to pursue innovation as the main source of growth and prosperity for the Union and its Members in the future. It also seems to have underestimated the process of consolidation of scientific and technological results within society, by perhaps presupposing society's acceptance and comprehension of the benefits or even necessity of this techno-scientific progress.[28] By introducing benchmarks for success and

[28] Though the Lisbon Strategy and especially the launch of the European Research Area were flanked by Science and Society initiatives (for instance the Science and Society Action Plan in 2002 or Eurobarometer studies on scientific literacy), critics have pointed to a rather ambivalent stance on the part of EU institutions and Member States respectively in terms of a societally compatible implementation of these strategic initiatives.

productivity, it has been described by observers as having deepened existing societal divides rather than helping to overcome them. Similarly, the question regarding how society has – or perhaps hasn't – adapted to an increasing amount of technological knowledge, was considered to have been insufficiently addressed. Thus, the policy goals formulated in the Lisbon Strategy may have answered some but at the same time opened up many new questions that are still being discussed within and outside the scientific realm.

2.3 Taking a look at the other side of the coin: The impact of the 'social' on the 'scientific' and the development of science into research

> *Latour goes on to argue that science and society cannot be separated; they depend on the same foundation. What has changed is their relationship. In traditional society science was 'external'; society was - or could be - hostile to scientific values and methods, and, in turn, scientists saw their task as the benign reconstitution of society according to 'modern' principles which they were largely responsible for determining. In contemporary society, in contrast, science is 'internal'; as a result science and research are no longer terminal or authoritative projects (however distant the terminus of their inquiry or acknowledgement of their authority), but instead, by creating new knowledge, they add fresh elements of uncertainty and instability. A dialectical relationship has been transformed into a collusive one. In the sub-head in another article Latour sums this up as 'a science freed from the politics of doing away with politics'. (Latour 1997: 232, as cited in Nowotny 2001 et al.:2)*

In the previous section, I have attempted to explain how science has entered and permeated society and how it has come to be viewed as an important component of economic development, prosperity and social cohesion. The process of co-production, however, is a two-tier one; science affects society just as the social order influences the knowledge order. In a further step we must consequently examine how the way we inhabit the world and the values that drive our societies has influenced the scientific realm. In a seminal essay in *Science* magazine, Bruno Latour attempts to answer exactly this question by arguing that especially in the past 150 years there has been a "transition from the culture of 'science' to the culture of 'research'" (1998: 208-9). [29] He describes the difference between the two as follows:

[29] http://www.sciencemag.org/content/280/5361/208.full?sid=659994c1-24e1-4003-852f-99daafa1f47 accessed on 15.02.2013.

> *Science is certainty; research is uncertainty. Science is supposed to be cold, straight, and detached; research is warm, involving, and risky. Science puts an end to the vagaries of human disputes; research creates controversies. Science produces objectivity by escaping as much as possible from the shackles of ideology, passions, and emotions; research feeds on all of those to render objects of inquiry familiar. (Latour 1998: 208-9)*

In other words, research represents the process of scientific knowledge production, the outcome of which is permeated by the social realm. In modern research, society can no longer be seen as a mere spectator with the task of approving or disapproving its outcome, of incorporating or rejecting it without affecting its value and merit. Much rather, in the form of the 'social', "ideology, passion, and emotions" (Latour 1998: 208) form intrinsic components of research and indeed augment rather than diminish its value and validity. The seemingly inseparable nature of science and society is not only a phenomenon or a realisation of our times. However, the relationship between the two has changed dramatically through time, influenced among others by the cultural evolution societies have experienced. Interestingly enough, the mere passing of time has not always brought about a rapprochement of the two or their advancement and progress. In contrast to the scientific achievements of the ancient Babylonians, Egyptians or Greeks for instance, the Middle Ages were undoubtedly a step backwards for both science and society. Notwithstanding, today one could maintain that research has internalised the 'social' and society has acknowledged – and to an extent also incorporated – research. This has led, so scholars of Science and Technology Studies argue, to a more "socially robust knowledge" (Nowotny et al. 2001: 2), but it has also raised uncertainty and made the scientific knowledge production process more complex, diverse and thus perhaps more unstable.

Indeed there are a number of examples that could be put forward to show how the scientific enterprise has changed as a result of strong socio-political and economic shifts and developments.[30] One is for instance a study of the development of the scientific profession itself and of the process of scientific knowledge production in the United States from the 1950s until today. It was conducted by Steven Shapin (2008) in his book "The scientific life: A moral history of a late modern vocation". His observations

[30] Here, I understand the political and economic factor as part of the social.

of techno-science[31] in 20th century USA led him to the conclusion that the socialisation of research practitioners themselves, but also of their respective communities, for instance in terms of authority, quality control and recognition of results, have come to play a significant role in scientific knowledge production. This conclusion he attributes among others to a shift away from the perception of researchers as 'heroes' or supernatural beings as well as from the understanding of science as a vocation or calling of a superior kind. This idea is indeed not new, for already in 1919 Max Weber referred to the nature of the scientific enquiry as a normal profession, which contributes "ad infinitum" (Weber 1922) to the advancement of knowledge. Researchers are thus knowledge workers, who attempt to answer specific questions regarding the natural and social world. Though they may work hard and with devotion, there is no guarantee as to what their contribution to science will be and whether or not they will conceive a purely new idea during their scientific career (Weber 1958: 115).[32]

Notwithstanding, Shapin argues that there are some characteristics of a researcher, such as his or her reputation and authority within the respective epistemic field and perhaps also beyond it, that indeed affect the process of scientific knowledge production. He thus knowingly contradicts the perception of science only being executed in a pure context, 'unspoiled' by personal and thus subjective beliefs and attributes of its practitioners (Shapin 2008: 1-3). This notion may be understood as a deviation from the Mertonian principle of *universalism*, in that science, its process and product cannot always be subjected to "pre-established impersonal criteria" or not take into consideration "the social and cultural attributes of its practitioner" (Merton 1974b [1942]: 270). Perhaps somewhat ironically, though Merton's approach was among others meant to 'lift the veil of mystery and awe' surrounding scientists and fight the notion of the 'hero' or supernatural being cultivated in the previous centuries, his "institu-

---

[31] Shapin takes on the term from Bruno Latour, according to whom it describes "all the elements tied to the scientific contents no matter how dirty, unexpected, or foreign they may seem" (Latour 1987: 174, as cited in Shapin 2008: 2).

[32] Even more concise in this case could be Thomas Alva Edison's famous phrase "genius is one per cent inspiration, ninety-nine percent perspiration". https://de.wikiquote.org/wiki/Thomas_Alva_Edison accessed on 11.04.2017

tional imperatives"[33] where rather seen as contributing to widening the distance between the scientific realm and society, by denying the former as well as scientific knowledge production their intrinsically social identity. Indeed, the only aspect scientists should, in Merton's view, constantly consider is the impact of their work on society, here however abiding by the principle that science is "in the world, not of it" (Merton 1974b [1942]: 268).

A further example of the impact of the social on the scientific, which could interestingly also be viewed as contradicting Mertonian principles, is the evolution of research practitioners into so called "scientific entrepreneurs" or individuals devoted to both the production of new knowledge and its translation into "artefacts, services, and ultimately money" (Shapin 2008: 209-210). The notion of the scientific entrepreneur could not only be perceived as 'diluting' the broadly established definition of the researcher, but also as rendering the boundaries of the scientific domain fluid through the admission of new practitioners. These include for instance investors in high-tech ventures, research managers and engineers at industrial companies, or legal and technology transfer experts. Their involvement in the process of scientific knowledge production has become quite strong in industrialised countries with high techno-scientific production, something which can in turn be seen as a clear impact of political-economic imperatives on the scientific. Still, what these professionals stand for and pursue represents a sharp contradiction to the principle of *communism* as put forward by Merton (Merton 1974b [1942]: 273-275), since he points out quite clearly that "the communism of the scientific ethos is incompatible with the definition of technology as 'private property' in a capitalistic economy" (Merton 1974b [1942]: 275). Indeed this 'commercialisation of science' and its impact on the scientific profession as well as on the mission and structure of scientific institutions such as universities is a fine example of how society's needs guide those who have been entrusted with advancing knowledge. When taking into consideration that a considerable part of scientific knowledge production is financed by society, inevitably the question arises with

[33] In his famous essay "The normative structure of science" Robert Merton refers to the ethos of science, a "complex of norms and values" which, in his view, bounds researchers. This ethos consists of "four sets of institutional imperatives", namely *universalism, communism, disinterestedness* and *organised scepticism* (Merton 1974b [1942]: 268-270).

regard to what researchers' contribution to the public good should be. Is contributing to economic growth, employment and wealth creation through innovation not considered a "public service" (Shapin 2008: 213)?

The gradual transformation of the research system and subsequently of the process of scientific knowledge production was also captured in a conceptual proposition put forward by Gibbons et al. (1994) in their book "The new production of knowledge". Though this did not represent the only piece of work focusing on the changing nature and workings of the research system[34], it is considered to be the most broadly known and perhaps one of the most influential (Hessels/van Lente 2008: 741). Gibbons et al. suggested that 'Mode 1' knowledge production – or the "way of doing things in research until now" (Nowotny 1996: 19) – has been supplemented by a so called 'Mode 2' knowledge production. This differs from Mode 1 in terms of the context of enquiry, the organisation of the process of research, the reward systems that apply as well as the mechanisms of quality control of the outcome. More specifically, Gibbons et al. argue:

> *In Mode 1 problems are set and solved in a context governed by, the largely academic, interests of a specific community. By contrast, Mode 2 knowledge is carried out in a context of application. Mode 1 is disciplinary while Mode 2 is transdisciplinary. Mode 1 is characterised by homogeneity, Mode 2 by heterogeneity. Organisationally, Mode 1 is hierarchical and tends to preserve its form, while Mode 2 is more heterarchical and transient. Each employs a different type of quality control. In comparison with Mode 1, Mode 2 is more socially accountable and reflexive. It includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localized context. (Gibbons 1994: 3)*

Concretely, they argue that scientific knowledge has increasingly become embedded in social developments and processes. The quantification and evaluation of scientific production has furthermore evolved into a more complex system that seeks not only to measure the quality and impact of scientific results, but also to determine priorities and produce matrixes that guide the distribution of research funds, the procurement of equipment and infrastructure or the increase (or decrease) of scientific personnel. And, perhaps most characteristically, the sheer nature of the scientific profession and with it the 'profile' of its constituents has changed, while new actors with different backgrounds have joined the field. However, all these developments do not necessari-

---

[34] Hessels und van Lente compared the work of Gibbons et al. to other pieces of academic work by proposing relatively similar ideas (Hessels / van Lente 2008: 742 ff.)

ly imply an 'overthrow' of the system that had been in place until now. Rather, though the essence and the workings have undoubtedly evolved, the two 'Modes' continue to exist alongside each other (Gibbons 1994: 14).

Perhaps the most far-reaching argument Gibbons et al. (1994: 27 ff.) and to some extent Nowotny et al. (2001) make with regard to the influence of the social upon the scientific is the element of transdisciplinarity. According to the authors, Mode 2 is characterised not only by a scientific, but also by a social, economic (and perhaps even cultural) 'conscience' and adaptability. Transdisciplinarity is considered to be an attribute of particular importance as it affects the outcome of scientific research, which is considered to be much more than just the sums of the parts of the epistemic fields contributing to it.[35] Indeed the notion of transdisciplinarity goes beyond the mere composition of investigator groups to reflect the multifacetedness of their output, which, apart from the scientific expertise, is characterised by both the scientific and non-scientific socialisation of the respective field as applied by the individual researcher. As *scientific* we define for instance the methods and instruments, the codes of practice, the 'schools' and interpretative approaches. *Non-scientific* elements include social and economic or even technical factors that permeate and shape the 'pure' expertise. One may ask at this point, how these elements can be filtered down to useful and usable knowledge. According to the authors, it is the centrifugal forces of the context of application that discipline and order the process of knowledge production in this complex context, though without limiting or reducing the plurality of skills and expertise applied and thus diminishing the value of the outcome (Gibbons 1994: 5). This outcome however, valuable and novel though it may be, may also be difficult to classify into a specific disciplinary context or epistemic field. Here we see a key difference to Mode 1, where ties to disciplinary 'mother ships' are much stronger, results flow back into these communities, are evaluated and commented upon by the respective 'authorities' and then – if found sound and worthy – communicated in an orderly fashion in their 'heralds', to be tested (or contested) yet again, before they are adopted and applied. In Mode 2 the attributed transdisciplinarity carries with it a distinctive

[35] Hessels and van Lente note that "transdisciplinarity goes beyond interdisciplinarity in the sense that the interaction of scientific disciplines is much more dynamic". (Hessels/van Lente 2008: 741)

dynamic that manifests itself among others in the way results are diffused across the scientific realm and beyond as well as in the way and particularly the speed with which they become [universal] building blocks of a more comprehensive science.

A prerequisite of transdisciplinarity is "heterogeneity and organisational diversity" (Gibbons 1994: 6). The former is manifested among others in terms of the skills of those assembling to tackle a certain problem as well as their respective institutional and epistemic backgrounds. The latter points to hierarchical structures – or the lack thereof, to be precise – as well as to the transient nature of research group constellations, which assemble 'ad hoc' and either dissolve after the intended goal has been achieved or are re-arranged, depending on the development of the issue at hand. This temporality is flanked by an ever increasing variety of physical spaces, where the research is performed and from where the expertise needed stems. We thus see not only universities and research institutes, but also specialised government agencies, think-tanks and consultancies entering the field and offering a platform for new knowledge production (Gibbons 1994: 6).[36] This platform however, is not necessarily physical; indeed new communication technologies and networks allow for virtual exchange as well as an indefinite number of possibilities of linking experience, expertise and infrastructure.

Inevitably the question arises: if so many different actors, carrying diverse socialisations and using diverse methods, contribute to solving problems and creating new knowledge, on which basis can the quality of these results be judged? Who should evaluate them and according to which criteria? Indeed it is argued that transdisciplinarity leads to a quality control process, which rests upon a different set of criteria as in Mode 1, where the process is strictly monitored by the respective community of peers and the adherence to it viewed not only as a prerequisite for knowledge advancement, but also as "the principal way to maintain autonomy over the internal affairs of the community" (Gibbons 1994: 32). Indeed, in Mode 2 we experience a "broadening social composition of the review system" (Gibbons 1994: 8) beyond peers and disciplinary experts and towards new actors representing social, economic and

[36] Gibbons also points out that "the emergence of Mode 2 calls into question the adequacy of familiar knowledge producing institutions" (1994: 1).

political interests. Subsequently, questions are raised regarding the new knowledge's usability and usefulness as well as – perhaps most importantly – its social acceptance. Thereby, increasingly different stakeholders lay claim to this knowledge and examine its implications and impact.

Notwithstanding, especially following specific cases of public debate on contested issues such as GMOs or BSE, critics have pointed out that 'ex-post' examination of new knowledge offering solutions to key problems is not sufficient. For solutions can only be truly compatible with expectations and fulfil the interests involved when these have been formulated at the very beginning and formed the basis not only of the problem solving strategy, but also of the problem itself. This is what Gibbons et al. define as "social accountability and reflexivity", in their eyes an all-encompassing characteristic of Mode 2 scientific knowledge production efforts and an increasingly dominant element in today's knowledge producing communities (Gibbons 1994: 7). What Mode 1 attune research systems considered an 'impurification' of both the process and above all the result of scientific pursuit forms the very core of Mode 2, for today's problems require solutions that transgress the realm of the theoretical, dialectical and canonical, achieve the incorporation of the social in all their facets and thus become an inextricable and dynamic part of human reality.

With this piece of STS literature the authors attempted to put a set of widely observed and seemingly persisting trends affecting scientific knowledge production into a certain perspective and deliver practical insight into the workings of the scientific realm today. By creating the terms 'Mode 1' and 'Mode 2' they aimed at rendering what they saw as two predominant and to a certain extent opposing poles more 'plastic': For them, the two Modes thus refer not only to the process but also – and perhaps more importantly – the *product* of scientific research. They attributed this perceived shift or transition from Mode 1 to Mode 2 among others to the increasing significance of technology and application and the influence of economic-industrial models on the scientific process – in short, the impact of the social on the scientific. The authors therefore add considerable substance to the argument of a changing research system. Though the propositions put forward by Gibbons and later on Nowotny et al. have been criticised among others in conjunction with their coherence (Rip 2002) and theoretical foundation – and indeed, some of the original authors revisited and to some extent re-

assessed their statements in a book published some years later (see Nowotny et al. 2001) – their considerations are seen by many as having reinforced the argument of a co-production of the social and knowledge order by initially drawing particular attention to the increased impact societal elements have upon science and, in their second book, also attempting to define how society, its actors and institutions have also transformed as a result. Interestingly, the two "competing accounts of social change" that Nowotny et al. (2001: 10ff) have identified are the risk society and the knowledge society.

2.4 Science and research between fragmentation and specialisation, unity and disunity

The strands of debates sketched in the previous chapters have a key element in common: they presuppose the value of advancing knowledge production and use as a means of advancing society by securing economic growth, prosperity and social cohesion. Since scientific knowledge bears a social 'mark' and also represents the result of important societal processes, it has clearly become an indispensable part of our cultural existence. Striving for this knowledge by studying scientific results or actively performing research could thus be viewed as being an admirable and worthwhile task. Furthermore, what initially began as a vocation or 'calling', by the beginning of the 20th century evolved into a profession involving theory development, application and teaching. Gradually, rules pertaining to quality and originality (or origin and authorship) were negotiated and established by 'scientific communities', consisting of members of academia and the 'like-minded' pursuing the production of scientific knowledge and making it available to peers.

As engagement in science and research grew, so did the quantity of knowledge originating from scientific research. Increasingly however, quality grew in reverse analogy to quantity and thus concentration and in-depth work on specific areas or fields became unavoidable. Sheer preference of a certain topic over another or even a presumed aptitude, ability or qualification added to this trend. Thus, in the 19th century specialised, disciplinary science gradually emerged out of more universal pursuits of scholars. The increasing complexity of the natural world led scientists' interests towards new specialised disciplines where they could deal not only with "basic princi-

ples of the world but rather with specific ordered structures within it" (Gibbons 1994: 25). Full-scale universities became the nurturing cradles of an undisturbed dwelling on different scientific fields and research questions. The trend towards specialisation was reinforced by the increasing professionalisation of the scientific endeavour and its development into a profession like many others, a process which became even more explicit in the course of the 20th century. In his 1919 essay for instance, Max Weber (1958: 112) noted that "only by specialisation can the scientific worker become fully conscious, for once and perhaps never again in his lifetime, that he has achieved something that will endure". He went on by emphasising that "science has entered a phase of specialisation previously unknown and that this will forever remain the case".

Still, following on the arguments posed in the previous sections, the social has been and continues to be of paramount importance for the development of the scientific. The societal dimension is not only reflected in the outcome of scientific research, but also affects its very purpose. The pursuit of science in the form of the investigation of ethical and ontological questions as well as such pertaining to natural phenomena, the human body and mind or political and economic systems, and the search for solutions to formulated problems have always been at the core of scientists' efforts. At times, science has furthermore aligned its pursuits and purpose with political developments, motivated either by idealistic views or in some cases by rather 'selfish', inward looking aims. A characteristic example of an idealistic movement proclaiming a stronger intertwinement or harmonisation of political and scientific endeavours can be manifested in mid-19th century Germany. Concerned with their country's struggle for unification and at the same time conscious of the fact that science could only prosper within a stable and liberal political system, prominent scholars such as Rudolph Virchow and Hermann von Helmholtz advocated for universality of law and homogeneous methods and structures both for their nation and for science (Galison/Stump 1996: 3).[37] Thus, unity or unification – so their argument – represented the ultimate goal or ideal condition in which both entities could prosper. For science, unity was perceived particularly in the context of universally applicable scientific laws leading to

[37] In his essay "The context of disunity", Galison specifically refers to Virchow's 1847 "Strivings towards Unity" address as well as Hermann von Helmholtz's oration "The aim and progress of physical science" (Galison/Stump 1996: 3).

a “unifying and standardising technological world” (Galison/Stump 1996: 3). For the state, it would imply interconnected geographical and administrative entities adhering to homogeneous rules, regulations and policies.

Indeed, the question on the unity or disunity of science has long been and continues to be highly political, as the attributes of homogeneity vs. diversity are deeply tied to the images of authority of the sciences in relation to one another, but also to the broader position of science in the world (Galison/Stump 1996: 3). At the same time, the question of fragmentation and specialisation is one that affects not only the scientific realm but also society and its perception of science. During the period following World War I, the rapid development of the sciences and technological advancements, their subsequent uptake by society as well as their impact on it, were the object of study of a number of scholars. The Spanish philosopher Ortega y Gasset (1930: 36-37) argued that though society has been quick in embracing the products of technological innovation and the comfort and amusement they bring, the vast majority of citizens (or what he refers to as “mass men”) concentrate on their use or consumption and are (willingly) ignorant of their origins or the principles and mechanisms that brought them about, which have roots in “pure science”. The philosopher equates ignorance of pure science with ignorance of the “principles of civilisation” or the “general principles of culture” (Ortega y Gasset 1930: 36-37). Society thus knowingly opts for selective knowledge or, in other words, specialised and segmented knowledge. Surprisingly enough, this attribute is also shared or indeed cultivated by the “men of science”, considered to be the aristocracy of the “mass men” (Ortega y Gasset 1930: 50), for they are burdened with the task to progress science by specialising their work on concrete questions and clearly – and narrowly – delineated fields. Notwithstanding, the outcomes they produce can make a contribution to “the encyclopaedia of thought”, even if the practitioners are growingly ignorant of “that integral interpretation of the universe which is the only thing deserving the names of science, culture, European civilisation” (Ortega y Gasset 1930: 51). Thus, science as an entity or value is not specialist (Ortega y Gasset 1930: 51). On the contrary: the constitution of its pillars presupposes unification. Its advancement however, can only come about in the form of building blocks that make the whole. These are distributed among the scientific community in increasingly smaller pieces. Investigators’ work subsequently becomes more focused,

while their contact with or understanding of other fields of enquiry diminishes (Levy-Leblond 1992). By the end of the 19th century, so Ortega y Gasset (1930: 52) argues, what was initially the "encyclopaedic" practitioner developed into someone who "'knows' very well his own tiny corner of the universe, [but] is radically ignorant of all the rest". This transition was assisted by a growing "mechanisation" (Ortega y Gasset 1930: 51) or, as one would perhaps say today, standardisation and automation of research procedures and methods especially in the physical and biological sciences, which allowed a larger number of individuals (consisting of 'normal' individuals, rather than geniuses – see here also Shapin 2008) to be trained as scientists and assume specific tasks within their respective field. Though this standardisation and increasingly better communication among 'peer specialists' has significantly contributed to scientific advancements most notably during the 20th century, it also reinforces fragmentation of knowledge within scientific disciplines and among them.

Specialisation in scientific research thus assumes a peculiar, yet necessary state of 'learned or selective ignorance' that characterises its practitioners. According to Robert K. Merton (1974a [1938]: 264), due to the increasing specialisation in scientific research "the modern scientist has necessarily subscribed to a cult of unintelligibility", which among others leads to "an increasing gap between the scientist and the laity". Indeed, by being ignorant of other fields of research and thus components of our civilisation's fabric, the specialist is (bound to be) culturally impaired, even "primitive" (Ortega y Gasset 1930: 52). This state does not only have a negative impact on society's composition and structure, and ultimately its development, but also on the long-term advancement of science itself. For the latter needs to be 'recalibrated' at irregular intervals, which involves viewing the findings constituting its building blocks through a 'universal' lens while considering the latest developments in the fields of the producers as well as the needs of the users. What has become fragmented through longer periods of increasing specialisation needs to be unified again in order to serve as a solid reference and a model for future scientific work. This unifying process however cannot be performed by the focused specialists, but rather requires individuals or groups that can go beyond the narrow boundaries of specific fields (Ortega y Gasset 1930: 52).

Though there have been – and continue to be – numerous examples of brilliant minds with the ability to cross disciplinary thresholds, a lot more will probably be needed to tackle the increasing complexity of science as an all-encompassing entity. Thus, despite the praise and status specialists have sought and received throughout the previous century, each field and era requires cross- and interdisciplinary thinkers to 'tie the loose ends', extract applications and formulate overarching laws. Freeman Dyson (1988, as cited in Galison/Stump 1996: 55) summed this up quite nicely by stating that "every science needs for its healthy growth a creative balance between unifiers and diversifiers". He went on to define unifiers as researchers looking "inward and backward into the past" and diversifiers as "looking outward and forward into the future" (Dyson 1988, as cited in Galison/Stump 1996: 44-45). Whereas the former seek overarching principles which can contribute to reducing the world's complexity, the latter focus on detailed exploration and perceive nature's heterogeneity as a unique challenge. One could therefore argue that science – including its practitioners – is characterised by a constant oscillation between unity and disunity. Specialisation leads to fragmentation, which has to be contained and even reversed once in a while. Recalling Latour's (1998) proposition of a transition from a culture of science to a culture of research, one could indeed match his notion of science with that of a "universal truth" put forward by Ortega y Gasset (1930) and that of research with the segmented and 'unruly' performance of research tasks by investigators in different epistemic fields. However, taking into consideration the massive expansion and advancement of the science canon, can overarching laws be truly universal? What really constitutes unity of science in an age when this pursuit is no longer necessarily tied to the unification of nations or the call for liberal political systems? How is unity defined and how can it be manifested?

After German unification (into the Weimar Republic) as aspired to by Helmholtz, Virchow and their contemporaries had been achieved, the debate over the notion of a unified science continued on an intellectual-ideological level. Political developments continued to play a role, though more indirectly, in the context of socio-cultural deliberations. A prominent example was the Unity of Science founded as a cultural move-

ment out of the Vienna Circle[38] in 1934 and created as an answer to growing political tensions in Europe. Its supporters shared the hope that "an international scientific worldview could curb the racial and nationalistic worldviews" (Galison / Stump 1996: 6). They furthermore saw scientific achievements and technological progress as the means to prevent calamity and the dangers of fanaticism. Members of the Vienna Circle and in particular Otto Neurath and Rudolf Carnap, the intellectual heads of the movement, published many monographs and essays on the Unity of Science idea. In 1937 Neurath launched the project of an International Encyclopaedia of Unity of Science as editor-in-chief, with Carnap and Charles Morris as co-editors. In a letter addressed to the journal *Science* the "Encyclopaedia Committee of Organisation" illustrated its motivation for this undertaking:

> *Recent years have witnessed a striking growth of interest in the scientific enterprise as a whole and especially in the unity of science. The concern throughout the world for the logic of science, the history of science and the sociology of science reveals a systematic tendency to consider science as a whole in terms of the scientific temper itself. A science of science is appearing. This is an indispensable corrective of the extreme specialisation of scientific research. It is an urgent task of science to work out the synthesis of its results and methods. Otherwise science will not have carried to its limit the fulfilment of its own task as science, nor will it perform adequately its educational role in the modern world. (Carnap et al. 1937: 400)*

With this in mind, editors and contributors to this undertaking set out to develop a "unified scientific language", by attempting to outline and define the structural relations between different epistemic fields with regard to their concepts, fundamental principles and methods of enquiry (Carnap et al. 1937: 400). In addressing "the various senses in which science may be considered a unified whole" (Carnap et al. 1937: 400), Unity of Science members agreed on the importance of a unity of the language and the laws of science (Galison/Stump 1996: 159). However, the exact definitions of these goals as well as the methods proposed to achieve them somewhat varied. In the case of the former for instance, it was not about prohibiting the development of separate technical vocabularies within different epistemic fields or attempting to consolidate them. Much rather, it was about defining a source of information as common denominator, "as basic evidence to weave the fabric of science around it", which is publicly

[38] The Vienna Circle was a group of scientifically trained philosophers and philosophically interested scientists who met for discussions on the philosophy of science from 1924 to 1936.

verifiable and reproducible and can allow several scientific disciplines to address the question at hand (this was in particular the approach that Rudolph Carnap took) (Galison/Stump 1996: 159-160). The idea of a unity of scientific laws dealt with the possibility of deriving one set of scientific laws from an overarching or fundamental one (Galison/Stump 1996: 38, 161). This goal, most scholars argued, cannot and shouldn't be an end in itself, but would rather emerge out of the development of research. Researchers should consequently pursue a "rational and equal co-operation of all the sciences rather than the domination of any field by another" (Galison/Stump 1996: 169), in other words a unity of co-operation rather than a unity of imperialism. In the end, what was really sought was harmonious integration rather than singleness (Galison/Stump 1996: 41-42).

Ideologically, the Unity of Science movement was linked to logical positivism or logical empiricism as it was alternatively called, a position advocated by the Vienna Circle which considered empirical or logical verifiability to be a key characteristic of and prerequisite for true scientific knowledge. In this sense, a unified science was one which had achieved transformation of subjective, 'metaphysical' or inconsistent knowledge into objective, consistent and universally comprehensible knowledge (Cat 2010). This would lead to reduced uncertainty and render science an element of social and political stability and thus progress. However, scholars' approaches differed with regard to the rigour of the intended objectivity as well as the ideal level of homogeneity and rigidity (vs. plurality) unified science should achieve. Indeed whereas some associated a higher degree of 'order' with the physical sciences and thus tended towards a predominant position for them in the unity construct, others emphasised the importance of a balance between natural and social sciences – and in particular of the social element as such – and spoke rather of a "mosaic" or "orchestration" (Otto Neurath, as cited in Cat 2010) of scientific knowledge, one which could ideally provide solutions for "complex phenomena in the real world"[39] (Cat 2010). Though the Encyclopaedia undertaking was not successful as originally aspired by its founders and contributors, their ideas and concepts formed the base of the post-war debate on the development

[39] Cat refers to this pragmatic approach as "unity of science at the point of action" (Cat/Cartwright/Chang 1996, as cited in Cat 2010).

of the sciences, on the cross-fertilisation between newly emerging scientific fields as well as on the role of science in politics and society (Galison/Stump 1996: 57).

As the scientific enterprise grew and became increasingly professionalised in the second half of the 20th century, assisted among others by enormous technological advances and automation of procedures, the long standing debate on unity and disunity took a different turn and the two states became more fluent. Where unity had once stood for political liberalism and internationalisation and disunity for domination and intolerance, disunity of science gradually came to be identified with the natural disunity of human inquiry as well as the autonomy of science vis-à-vis politics. Science had achieved a level of authority and its system a level of stability and critical mass that it was no longer necessary to guard it from perceived schismatic philosophical views and tendencies as to its epistemic fields by pursuing a "cosmological or global view of truth" (Suppes 1978: 14). Much rather, unity and the call for reductionism were now expected to make way for "a patient examination of the many ways in which different sciences differ in language, subject matter, and method, as well as by synoptic views of the ways in which they are alike" (Suppes 1978: 9).

Indeed, similar to a democratic society and the diversity of political views it allows, it was this pluralism that came to be seen as the ideal state for the advancement of science. Where consensus was difficult to achieve, concepts such as 'trading zones'[40] and so called 'boundary objects'[41] proved useful. Galison (1996: 157) exemplifies this in his account of the role of computer simulations (and in particular the Monte Carlo method) in nuclear physics following World War II, where he analyses how a new instrument and method to reproduce certain (theoretical) natural phenomena, 'invaded' and ultimately altered physics and other 'solid' scientific disciplines, such as mathematics.

---

[40] Peter Galison defined a 'trading zone' as "an arena in which radically different activities could be locally, but not globally co-ordinated" (Galison/Stump 1996: 119).

[41] In their 1989 essay Star and Griesemer define boundary objects as follows: "Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use…They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation." (Star / Griesemer 1989: 393)

He argued that it created ‘disunity’ in that it diluted the borders between epistemic fields, created new expertise and subsequently new experts. It was a hybrid connecting and affecting different sites of knowledge production without the claim to unite them in any way. In this sense, the concept of disunity as seen here is one of local co-ordination of individual subcultures of science, a self-organisation of science that finds common ground when it needs it to achieve its goals. The process of co-ordination of expertise and negotiation amongst different practitioners to reach this common ground and apply it to solve the defined problem occurs within a ‘trading zone’. These trading zones often revolve around boundary objects, which – as was the case with the Monte Carlo method – act as crystallisation points or catalysts for a diverse set of stakeholders (Gorman 2010: 2). As such, they manage to link “discrete scientific fields […] by strategies of practice that had previously been separated by object of enquiry”.

What is characterised as fragmentation among epistemic fields thus reveals a different dimension. What was and to a certain extent perhaps still is perceived as an estrangement among researchers and their respective disciplines can rather be seen as a pragmatic selection based on epistemic and utilitarian criteria. In this sense, fragmentation should not necessarily be equated with a state of disconnectedness as it can also represent a chance for new and often unexpected constellations of enquiry. Indeed, with the progress of science especially in the late 20th century, fragmentation and specialisation combined have become important if research is to develop all its potential and find answers to the ever more complex questions it is called upon to solve. In turn, this phenomenon inevitably influences the identity of those producing the new scientific knowledge. They are significantly more diverse with regard to the expertise they carry and may stem from very different parts of the scientific realm, including its borders, or even beyond it. This evolution of specialisation and fragmentation from mere concentration towards plurality is also captured in the concept of the transition from a Mode 1 to a Mode 2 knowledge production proposed by Gibbons et al (1994): whereas in Mode 1 research is performed for its own sake within disciplinary realms and institutions, in Mode 2 specialised knowledge is selectively ‘recruited’ to address a certain research question. Fragmentation is thus temporarily overcome

through non-institutionalised transdisciplinary collaboration, which ceases as soon as the research question is answered.[42]

Immediately, a natural reflex of those socialised in the context of an institutionalised research system is to enquire, how this extended membership can be accommodated in the existing structures. In short, how can we achieve a balance between specialisation on the one hand and pluralism and interdisciplinarity on the other without diluting the core of scientific discovery, while at the same time harvesting knowledge from new (and perhaps unexpected) sources? Is it sufficient for our institutions to simply adapt to these circumstances and can they do so with rather minor changes? Or do we need to conceive completely new settings that render knowledge production processes more transparent and employ new methods of collecting, synthesising and disseminating information? Indeed, there (still) exists considerable uncertainty in the scientific realm of how a potential reform of existing structures should look like to serve the needs of a new kind of knowledge production (Jasanoff/Kim 2009: 235). Moreover, traditional systems continue to question the necessity of such an overhaul, even though increasingly bold science policy reforms clearly point in this direction. I argue that, in the meantime, this perceived lack of spaces where this new form of knowledge can emerge or at least where exchange on issues, methods and understanding of the knowledge production process can take place, is to some extent being filled by a type of external or "extended labs" (Nowotny/Felt 1997). These alternative spaces attempt to provide a higher degree of flexibility, openness and permeability for the knowledge production and application process. In many cases, they may prove to be more adaptable to new circumstances, but also to new methods and mentalities employed by new practitioners and contributors alike. They can resemble established research performing institutions or rather focus on advancing 'knowledge about knowledge' as well as about its producers and users. As such, they offer the opportunity to at least

[42] Gibbons et al. (1994: 34) speak of a highly differentiated, heterogeneous growth of knowledge manifested in the key components and practices of the scientific 'métier'. A characteristic example can be found in authorship patterns of scientific papers, the traditional vehicle of scientific communication. Not only is the average number of authors per paper increasing; so are the diversity of specialisms and disciplines involved in the writing of a single paper and the range of institutions and organisations from which the authors originate. In addition, the geographical distribution of these institutions continues to broaden.

temporarily overcome fragmentation by embracing diversity and highlighting new constellations of thought and enquiry. The Euroscience Open Forum aims to serve as such an extended lab by providing a diverse set of epistemic fields with a space for presenting, reflecting and juxtaposing their findings and at the same time by opening this process to a broad spectrum of scientifically involved publics. For, as mentioned before, creation and development of scientific knowledge increasingly occurs via a broader set of stakeholders, making it more socially reflexive and accountable. How these actors have been involved and what their contribution is or can be will be dealt with in more detail at a later point in this thesis.

Now, coming back to the argument made at the outset of this conceptual exploration, one should not neglect to closely examine the product of this new type of scientific knowledge production process. What impact does disunity, as we experience it today, have on knowledge itself as this is reduced, disassembled and re-constructed in constantly new ways by an ever expanding set of actors contributing new ingredients to the 'dough'? What can be said about the value of this new knowledge for both science and society and how can it be appraised and by whom? In the introduction of his insightful essay "Science and the political imagination in contemporary democracies" Yaron Ezrahi (2004: 254-273 tellingly quotes "Chorus I" of T. S. Eliot's poem *The Rock*:

> *Where is the wisdom we have lost in knowledge?*
>
> *Where is the knowledge we have lost in information?*
>
> *(Eliot 1960)*

In these few lines Eliot captures what he sees as the (mainly negative) impact of disunity and specialisation of knowledge: a narrowing of our perception of the world we live in that can lead to delusion[43] or even blindness. In his own account, Ezrahi defines information as highly contextualised, 'made-to-fit' knowledge which is intended to be used to solve concrete, pre-defined problems or employed within specific situations. He also describes information as "thin knowledge" (Ezrahi 2004: 257). However, if information is "thin knowledge" then what does this tell us about the quality, depth and

[43] A very alarming yet surprisingly current metaphor is delivered by Plato in his famous Cave Allegory referred to in his oeuvre *Politeia*.

therefore the value of highly specialised knowledge? Should one automatically conclude that stronger concentration alone implies diminishing quality? Indeed, as mentioned earlier, eminent scholars would vertically disagree: Max Weber (1958) sustained that only a specialised scientist is a true scientist, one who truly understands his craft and can thus achieve a higher degree of focus on a limited amount of questions. Perhaps, what Ezrahi means to tell us is indeed what we have referred to as the impact of the social on the scientific and, in this particular case, the socio-political contextualisation of scientific knowledge. Consequently, what Ezrahi defines as information may be what we have already referred to as 'socially robust knowledge' (Nowotny et al. 2001). As such it can be linked to other pieces of information as if it were one piece of a larger puzzle. Through social intervention, fragmented knowledge becomes unified and specialised knowledge is placed into a wider context, briefly or for a longer period of time, for instance until social conditions change or the knowledge at hand is replaced by new findings. In this sense, social intervention may be seen as the main catalyst for the constant oscillation between the states of unity and disunity.

The recourse into the history of the debate thus shows, among others, that the question over unity or disunity, homogeneity or diversity, though in itself an intrinsic scientific debate, was and is also relevant for societal and political processes. On the one hand, this is due to the politically and societally turbulent times, which scholars faced throughout different periods of time. On the other hand however, it makes the very strong political and societal dimension of science visible. Indeed, for scientific knowledge to be sustainable in that it is scientifically sound while at the same time fulfilling the needs of and advancing modern society, it needs to be socially accountable and adaptive. Highly specialised knowledge or information however is often stripped from its broader scientific and above all societal context. Specialisation can thus inhibit the process of co-production. This is why, as Ortega y Gasset but also other scholars argued, once in a while science must undergo a 'unifying process' in the sense that it needs to reflect on its socio-political implications and re-position itself within society. This process may prove equally demanding as scientific research itself. Above all, its exercise requires novel arenas that reflect the plurality both of science and society and bring together representatives from both worlds. In this dissertation, I will argue that the Euroscience Open Forum attempts to fulfil this role.

2.5 Changing, enriching and expanding publics for science: Science and technology in democratic societies

The strands of debates portrayed in the previous pages highlighted the different forms that the co-production and co-evolution of science and society can take as well as the potential impact of this process on the fabric of both entities. We referred among others to expanding identities of knowledge practitioners and a resulting new kind of knowledge production that is more "socially robust" (Nowotny et al. 2001). However, if a system changes its way of producing its main product, in our case scientific knowledge, then such a tremendous shift cannot be limited to the inner structures of this system. It rather extends onto the training and working methods of knowledge producers, the overall setup of the 'operation' and the way the results are being disseminated and perceived by the 'users', namely society. This is indeed an important point that remains to be explored for it touches upon the notion of social participation in scientific knowledge production as well as the question of structure and governance of the scientific realm. We thus need to go a step further – or back, depending on the point of view – and illuminate key phases of science-society relations in modern times. This recourse is expected to help us comprehend how actor constellations are performed as well as how they change as a result of novel configurations in knowledge production, distribution and uptake.

2.5.1 From 'science *and* society' to 'science *in* society': Making co-production of the societal and the scientific a reality

The last decades of the 20th century saw the development of a debate on science and society relations in Europe paired with an appraisal of their intensity and quality. Perhaps its most prevalent outcome was a perceived need for improvement of these relations. This could be addressed through identifying mechanisms and strategies to overcome a diagnosed "public unease" with products of techno-scientific work, such as for instance increasing public accountability and systematically harvesting 'non-expert' knowledge on issues of governance and on thematic research priorities (Felt/Wynne 2007: 6). Notwithstanding, the implementation of these efforts depended heavily on the perception of the 'problem' at hand as well as of the 'ideal state'. However, this perception has evolved significantly through time. What began as 'public understand-

ing of science'[44] involving efforts to counteract what was viewed as a 'deficit' (Irwin/Wynne 1996; Wynne 1991) in comprehension and therefore acceptance, rather quickly evolved into a push for early[45] and constructive public engagement of a wide range of actors through dialogue and participatory governance, thus moving towards a stronger integration of science in society (Felt et al. 2013: 9). Still, though progress has been made with regard to science-society relations, experts argue that the process rather resembles "sedimentation" (Felt et al. 2013: 3) than a true paradigm shift. This becomes especially apparent when critical issues in the science and innovation system arise and the resulting pressure causes some of the earlier perceptions and debates to re-surface.

Indeed, though I have shown that the impact of the social upon the scientific is considerable, this notion and specifically the role of societal actors in the process of scientific knowledge production and governance have been – and to some extent continue to be – contested. If one takes European countries as an example, one can hardly speak of a consistent understanding of and approach to a systematic involvement of civil society in the governance of science and the definition of public interests and resulting thematic and financial priorities. Though the discussion regarding participatory democracy and the capacity of citizens to actively and meaningfully contribute to the governance of a state is not new, its focus on *scientific* governance can be viewed as having its roots in the Public Understanding of Science (PUS) movement which emerged in the mid-80s. A prominent articulation of PUS is to be found in the homonymous report of the Royal Society published in 1985, in which established scientists and scientific policy advisors called for an urgent improvement of the "general level of public understanding of science" (Royal Society 1985: 6). Citizens, they argued, needed a certain level of awareness regarding the science and technology permeating their everyday lives so that they can appreciate public investment in respective efforts,

---

[44] The 1985 Report of the Royal Society is considered by many as having 'kick-started' the debate on Public Understanding of Science.

[45] In their 2004 report Wilsdon and Willis (2007: 70) argue for "upstream engagement", which in their view involves, among others, early-stage exchange between those developing new technologies and a wide range of actors, thus allowing "more diverse forms of public knowledge and social intelligence" to permeate the development process.

make informed decisions in a democratic state as well as accept the processes of scientific enquiry and its products as useful and worthy efforts. Their failure to do so was largely attributed to a lack of understanding, a diagnosed "scientific illiteracy" (Felt/Wynne 2007: 56). This state of a perceived lack of confidence in and support for novel scientific endeavours was considered an imminent threat to the prosperity of a modern nation depending heavily on techno-scientific innovation for its economic progress. Overcoming it should therefore be an utmost priority for politics, industry and the scientific community itself (Royal Society 1985).

The suggested solution focused mainly on an 'education offensive' to begin in schools at a young age and continue throughout an average citizen's private and professional life. It would comprise systematic programmes in school at least until the age of 16 and later on popular science courses, lectures and presentations as well as science festivals and events, accompanied by extensive media coverage and special formats on television and in the press. Scientists were strongly urged to communicate their work more systematically, either directly or through science journalists and in fact to consider it "their duty to do so" (Royal Society 1985: 6). Research performing or technology-based industry was finally also encouraged to provide local communities insight into their work and their contribution to the economy (Royal Society 1985: 17). It was expected that these concerted efforts would 'enlighten' citizens on the undisputed importance of scientifically induced innovation, dispel any fears or reservations linked to new technologies and their pursuit and put them in a position to constructively employ their benefits rather than obstruct them and thus hinder overall progress. This approach de facto cemented the resistance of policy and scientific governing bodies to changing established practices of priority setting and implementation, despite acknowledgement of the deficits in the relations between science and society (Felt/Wynne 2007: 57). For even as the 'deficit model', referring to a knowledge deficit on the part of society, was gradually reconsidered and replaced by the so called Public Engagement with Science movement (Fochler/Müller 2006: 5), the commitment of policy makers and the governing apparatus of science to accommodate the results of these new efforts and even adapt their ways to meet citizens half-way remained quite vague (Felt/Wynne 2007: 59).

The realisation that new modes of science and its governance were needed and the resulting turn towards public engagement manifested itself in Europe towards the end of the 1990s. It was characterised by a multitude of declarations, reports and policy papers in numerous European countries[46] "denouncing the old top-down, one way information politics" (Felt/Wynne 2007: 58) and involved the introduction of numerous new formats of public participation, such as consensus conferences, citizens' panels and public consultation exercises. However, though a general understanding gradually developed that it was 'politically incorrect' to develop and implement policies on techno-scientific issues without even a hint of public dialogue, the premises of this new participatory trend remained entrenched in rather old-fashioned perceptions of society's role and potential in co-determining or co-designing scientific governance. On the one hand, the intentions and ultimate goals of this new trend towards engagement were rather inconsistent and opaque, especially for society, but often also for policy makers and scientists themselves. They ranged from a perceived 'participatory democratisation' of until recently inaccessible techno-scientific 'bastions', to a response to calls for accountability in an effort to strengthen or restore public trust in respective policy decisions and the credibility of the key actors. In fewer cases, they aimed at developing new ways of policy making and innovation involving mutual exchange and 'cross-fertilisation' of ideas and knowledge and even more seldom at a truly open debate on established practices of scientific governance and their potential reform (Felt/Wynne 2007: 59). On the other hand, the vaguely defined goal of the participatory trend was paired with a predetermined or 'made-to-fit' imagination of contributors from the part of society.

The transition process towards 'dialogue' was thus one closely linked to a stronger, implicit or explicit effort to artificially form and perform the publics to be engaged. Whereas in the case of PUS activities we see a focus on specific societal groups (e.g. school children, women) with diagnosed 'weaknesses' in general science education (and thus appreciation and contribution potential), engagement initiatives begin with

[46] See for instance Memorandum „Dialog Wissenschaft und Gesellschaft" 1999, http://www.wissenschaft-im-dialog.de/fileadmin/redakteure/dokumente/push_memorandum_1999.pdf (accessed on 27.01.2013).

certain issues of assumed 'public' interest and subsequently construct this 'public' either by identifying so called 'stakeholders' or by allowing participation of citizens as individuals. In both cases, the question of selection, inclusion and exclusion as well as who performs it is a crucial and highly contested one. For it extends far beyond mere organisational aspects, permeating the very core of our political tradition and culture, namely how participatory democracy is conceived, preserved and lived.

Especially in the European context, this issue carries historical importance embodied in the very 'raison d'être' of the European Union and its institutions. Parallel to and flanking similar efforts by several other European countries (such as France, Denmark, and Sweden and later also Germany, Portugal and Italy) the European Union thus gradually picked up the issue in the context of its Framework Programmes and later on through dedicated policy papers an initiatives. Already the 5th Framework Programme earmarked funds[47] for promoting activities aimed to improve science-society relations. The respective programme, called Raising Public Awareness of Science and Technology, initially included the support of networks for the exchange of best practice, roundtable meetings to promote dialogue and science related information, as well as the European Science and Technology Week. Soon however, the programmes became more concrete, reflecting developments of EU policy pushing for a European Research Area (European Commission 2000a), as well as reacting to the above mentioned turn towards public engagement. Thus, programmes funded at a later stage of FP5 pursued explicit dialogue with citizens on different issues of scientific research and governance and a stronger involvement of specialised media and science communicators (European Commission 2003: 3).

On the level of policy papers, building on the Lisbon Strategy (European Commission 2000b), the proclamation of the aim to establish a European Research Area (European Commission 2000a) as well as on the White Paper on European Governance (European Commission 2001), the Science and Society Action Plan published in 2002 aimed at "pooling efforts at European level to develop stronger and more harmonious relations

[47] Unfortunately, a mere 12 million Euros, out of 13,7 billion of the total budget, was made available during the running period of the 5th Framework Programme from 1998 to 2002 ftp://ftp.cordis.europa.eu/pub/improving/docs/rpa_projects_fp5.pdf (accessed on 20.12.2013).

between science and society" (European Commission 2002: 3). Indeed, it was intended as an operationalisation plan for three interconnected debates highlighting different aspects of the scientific enterprise that needed to be strengthened in Europe and for which mobilisation of 'the citizen' was essential. The first is the 'anchorage' of Europe's economic future upon scientific research and, more specifically, a knowledge-based economy. The second is the lifting of administrational barriers to the mobility of researchers and scientific knowledge within the European Union and subsequently the recruitment of more 'bright minds' for the scientific enterprise. The third is the harmonisation (among EU members) of governance principles for research systems with the aim to render them more efficient, flexible and responsive to societal and economic needs as well as more transparent. The methods engaged to promote these efforts leading to an 'empowerment' of European society focused on three pillars. The first intended to promote science education and culture by rendering both the research profession as well as its output visible and attractive to society. The second pillar focused on bringing "science policies closer to citizens" and involving them in the policy making procedure through public consultations, debates and the assessment of specific issues and technologies (European Commission 2002: 7). The third pillar recognised the necessity of using scientific knowledge effectively and transparently to support policy decisions.

Though the goals formulated in the Action Plan were rather conservatively formulated and the respective measures perhaps not far-reaching or bold enough, they signalled the gradual abandoning of the deficit-model as well as a move towards public engagement. Furthermore, and even more importantly, they raised the issue of a knowledge democracy, one where citizens not only have access to information on techno-scientific developments, but actually deploy this knowledge in the context of democratic processes as well as in the context of their roles in a given economic system. This state is ideally characterised among others by an active contribution of citizens to the knowledge production process, through direct and indirect, continuous or ad hoc involvement and exchange of expertise. The underlying principle is trust (Felt 2000): in the ability of non-scientists to relate to and comprehend specific scientific pursuits and ultimately co-develop strands of thought and research paths for them to be adequately addressed; in the recognition by professional researchers of the 'added

value' that lay expertise can bring to scientific knowledge and its production process, particularly by helping them to frame it more effectively and by opening their eyes to unknown or perhaps underestimated aspects; in the commitment of policy makers to systematically promote rather than hinder this mutual enrichment without preconditions, opaque regulations or bias. The existence of these framework conditions would indicate the achievement of a knowledge democracy, involving the gradual passage from a public education, to a public dialogue and participation model, to a co-production of knowledge.

Notwithstanding, the discussion on the construction of a democratic public as well as its role and contribution to the knowledge production process has been a recurring issue for many decades. Already in the 1920s, the so called 'Lippmann-Dewey debate' highlighted some of the most important arguments for and against the ability of citizens to participate in the definition of public policy. The increasing complexity of public issues (paired with a quite particular political situation following World War I) urged many prominent thinkers in the United States to express serious doubts concerning the breadth of knowledge society can actually acquire, process and use to form a 'public opinion' as well as make informed decisions. A known figure among them, Walter Lippmann expressed these views in his books "Public Opinion" (2012 [1922]) and "The Phantom Public" (2011 [1925]). He argued that the task of forming policy and directing public affairs should be left to elected representatives and professional administrators with the help of expert advisors for "public opinion does not, and simply cannot, rule a nation and propound its policy, but may merely choose among alternatives propounded and proposed by competing elites" (Lippmann 2011 [1925]: xiiv). Especially the latter were expected to address the increasing specialisation of knowledge in numerous fields affecting the commons and counterbalance the inability of 'normal' citizens to become "omnicompetent", a phenomenon which Lippmann considered a key weakness of democracy and a "false ideal" (Lippmann 2011 [1925]: 29). Essential to comprehend this approach was Lippmann's understanding of knowledge and truth on the one hand and 'the public' on the other. As a journalist, he realised that the media, which could be seen as a link between policy and society, could – despite perhaps honourable efforts by some representatives of the guild – hardly fulfil the task of educating the public by providing truly objective information. At the same time, he attest-

ed citizens little or no specific interest in global political issues, the study or comprehension thereof. Indeed, his perception of them was as a "bewildered herd" (Lippmann 2011 [1925]: 145), uninformed and thus vulnerable to misleading ideas.

In his response to these arguments, published in a book entitled "The public and its problems", John Dewey focused on two issues put forward by Lippmann: First, on the role of experts in a democratic society as well as on their relationship to policy makers and especially citizens. Second, on the strategy to help society tackle the increasing complexity modernity brings along and 'empower' it to contribute to public governance. In principle, Dewey (1927: 19) acknowledged the difficulties posed to participatory democracy through the expansion and specialisation of knowledge and agreed with Lippmann that no one citizen can become 'omnicompetent'. However, this state applied for so called experts as well, who would sooner or later also be constrained to focus their work on a small selection of topics, in order to be able to keep ahead of developments and contribute to public policy. Therefore, whereas the "vast complexities of the modern age" (Dewey 1927: 19) and all the innovations mankind has achieved have increased society's reliance on experts dramatically, in order to maintain the democratic process it is of utmost importance for citizens to consciously, critically and systematically deploy these experts and subsequently employ the produce of their work. Furthermore – and here we indeed notice many resemblances to the scientific realm – Dewey argues for a contribution of the citizen to the process of knowledge creation and problem solving, based on his or her practical experience with a given issue.[48] This requires a methodical approach designing the interaction between experts and citizens. At the same time, it also requires measures to counterbalance the public's lack of in-depth expert knowledge through directed education.

[48] Here Dewey (1927: 154) uses the example of a shoe whereby "the man who wears the shoe knows best that it pinches and where it pinches, even if the expert shoemaker is the best judge of how the trouble is to be remedied". Without the input of the wearer of the shoe, the shoemaker may not address the problem adequately, for the wearer provides the subject matter for framing and performing the enquiry. In his essay on Cambrian sheep farmers, Brian Wynne (1992) made a very similar argument.

Indeed Dewey (1927: 155 ff.) firmly believed that citizens could thus be empowered to actively contribute to a number of processes of a state and that education[49] could help forge a "Great Community" or a "democratically effective Public". Here we should point out that, similar to the scientific enterprise, in politics too there are both overarching issues of governance and specialised issues of content to tackle. Dewey considers citizens almost intrinsically apt to addressing the former, whereas needing support for the latter. The framework conditions for both include, in his view, freedom of social enquiry and the dissemination of its results. What he calls "publicity" – which could be interpreted as transparency and public access to information – as well as freedom of expression are further prerequisites for the creation of a Great Community, for "knowledge is a function of association and communication; it depends upon tradition, upon tools and methods socially transmitted, developed and sanctioned" (Dewey 1927: 158). However, designing and implementing social enquiry requires a profound understanding of the different identities of 'the public', for there are indeed many 'publics' within society that constitute themselves in view of specific issues and then dissolve (or evolve) when these are no longer relevant. Throughout this process, the public stands "in a directive and supportive relationship to the state and its representative and administrative institutions" (Dewey 1927: 24). Thus, political power in Dewey's view (1927: 23/121) refers both to the role the individual plays in forming and directing the activities of the community as well as the possibility that is open to them to defining and upholding their community's values and positions. In case that the state resists society's will for change or reform because of differing interests, then publics – in a more 'oppositional' turn – may choose to nurture and exercise political power in the context of 'external' institutions. These can be permanent citizens' associations or recurring activities such as meetings and fora for independent and unbiased dialogue and exchange.

Drawing a parallel to science, its content and governance, it could be argued that the Euroscience Open Forum was conceived among others in order to fulfil the role of such an external political entity as well as an extended scientific lab and thus compensate

[49] Though Dewey did not define the premises of this education in detail, he believed that its design could be inspired by the "spirit and method" of science (1927: 166).

for a perceived inadequacy in the way a number of issues are being addressed by existing institutions and their actors. Indeed, if we view the core idea of the Dewey/Lippmann debate against the backdrop of the debate on the popularisation of science and citizens' contribution to its governance and performance, we realise that there are quite a few similarities and that the overarching theme goes back almost a century. On the basis of the arguments put forward, we can conclude that a democracy of scientific knowledge can be achieved through co-production of the social and the scientific whereby the ability of both realms and their publics to contribute to the creation and use of scientific knowledge is not put into question, their respective 'expertise' is harvested in appropriate ways and its results implemented to the benefit of all. For it is only when this occurs – namely, when science truly is a "source of variety and flexibility" (Callon 1994: 410) going beyond mere information and occurring in the context of 'hybrid collectives and networks' – that the results of scientific enquiry achieve the status of a "public good" (Callon 1994: 395 ff.). The freedoms of a liberal society form the foundation for such a process, but systematic methods of fostering input, performing analysis and making good use of the output are essential. Communication and 'publication' of information permeates the entire process and can either facilitate or hinder it, if not performed adequately. Which key factors this so called 'medialisation' of scientific knowledge involved and how it is – and should be – implemented will be examined in the next chapter.

2.5.2 The role of mass media in the dissemination of scientific knowledge: Friend or foe?

Communication is inherent to science and a vital part of researchers' activities, as output needs to be disseminated among peers and scrutinised by them.[50] Epistemic fields are thus "communication communities" (Franzen/Rödder/Weingart 2012: 355), which independently and in delimitation to other disciplines define the objects of enquiry and the respective research questions and thus also determine the quality of scientific activity. As mentioned earlier, increasing specialisation leads to fragmenta-

[50] This opinion was advocated also by Robert K. Merton, who defined communalism and organised scepticism as two of his "institutional imperatives" comprising "the ethos of modern science" (Merton 1974b [1942]: 226).

tion of knowledge, which in turn causes fragmentation of communication among epistemic fields, since the knowledge barriers become increasingly high. This is why communication between disciplines can be viewed as a process of popularisation with only small differences to communication towards society.[51] At the same time, increased specialisation of knowledge and the intensified use of jargon also make communication towards society more challenging. The introduction of PUS and Public Engagement with Science and Technology involved efforts to publicise and popularise information stemming from scientific research as well as to introduce dialogue with and involve society into the process of agenda-setting (Fochler/Müller 2006). Throughout the transition from one movement to the other – from efforts aiming at increasing awareness of and appreciation for science, to active engagement of citizens in the process of scientific knowledge production and priority setting – the mass media have played an essential part in the process of popularisation. Though actual public making of the results of scientific research is a phenomenon that goes back centuries and spans different cultures and outlets[52], the involvement and targeted use of the entire palette of mass media as a means of communicating key information gained im-

---

[51] Ludwig Fleck, as cited in Franzen/Rödder/Weingart 2012: 363.

[52] Indeed, in the 17th and 18th century, given that scientific research was supported predominantly by the sovereign or the aristocracy, the success of the scientific endeavour and consequently the credibility of the researcher heavily depended on 'official' approval. Thus, popularisation initially took place in the context of demonstrations or lectures directed towards the patrons and their court. Gradually however, salons, fairs and meetings of knowledgeable societies, lay or professional, established themselves as further settings for the popularisation and dissemination of knowledge stemming from scientific research, thus involving additional publics in the process. By the end of the 18th century, as research and its methods became professionalised and ever more complex, public experiments and demonstrations predominantly gave way to written reports, making scientific journals the main outlets for the most important developments and addressing a more demanding and knowledgeable audience. Alongside this primary communication in scientific publications, a secondary communication directed towards lay publics took place: throughout the 19th century and up to World War I, educated citizens became enthusiastic consumers of the latest scientific and technological achievements. The demand was met by established scientists (such as Alexander von Humboldt with his *Kosmos*-Lectures) acting as 'popularisers' of research. After World War II, both the fabric of science and its publics changed significantly. The former had become very specialised, complex and abstract making popularisation quite difficult. The latter became – also due to the role science and technology had played during and in the years following the war – increasingly critical. Most importantly however, popularisation of scientific results came to be seen by the scientific community as 'defilement', a practice not worthy of dedicated scientists (Franzen/Rödder/Weingart 2012: 356-357).

portance and scope in the 20th century (Bucchi 2008). The motivation behind this practice was and is multifold, as are the expected benefits. Profiting from technological advancements, such as radio and later on television broadcasting, mass media have developed into large commercial corporations reaching millions of people and different publics, their new-found reach alluring for those seeking visibility. This development has also led to a professionalisation of journalism, including science journalism. Today, science journalists (often with a respective academic background themselves) not only contribute to traditional popularisation and education, but also aim at informative entertainment (Maasen et al. 2012: 357; Fochler/Müller 2006). On the other hand, communication towards society has become part of researchers' daily routines[53], an obligatory activity for research institutions and a prerequisite for funding. Though both sides or 'systems' have developed simultaneously throughout the past decades, learned from each other and adapted to its other's needs and particularities, the scientific realm has always held the leading role vis-à-vis the media. Its claim on this role has been founded on the argument of scientific authority and expertise as a guarantor of the 'truth', namely of accuracy and reliability of the information released. Inevitably however, increased communication beyond the boundaries of the scientific realm and the subsequent continuous interaction with the media has also changed the scientific enterprise itself. This process of close "science-media-interconnection"[54] and in particular its impact on the scientific realm has been characterised as 'medialisation' of science.

Coined by Peter Weingart in his 2001 book, this term tells the tale of a decreasing distance and growing interdependence between science and the media. And though the scientific realm sees itself solely as the sender rather than the receiver, there is substantial research that points to the opposite (Franzen/Rödder/Weingart 2012: 355 ff.). It could indeed be argued that the interplay between science and the media has had a

---

[53] Though differences may exist among epistemic fields as well as young and older practitioners and their affinity to the media, one can speak of a general trend, which is strengthened among others through regulations for competitive funding requiring science communication.

[54] Free translation of the German term "*Wissenschaft-Medien-Kopplung*" formulated by Peter Weingart (2001: 252 ff.)

considerable impact on the former, especially with regard to three aspects: the first has to do with researchers themselves and their careers as it looks at the relation between scientific reputations on the one hand and media exposure and prominence on the other. This continues to be a major topic of discussion in relevant fora (among them ESOF) as it affects the very essence of researchers' self-image and purpose as well as the criteria applied to measure the quality of his or her work; the second aspect revolves around the setting of the research agenda, which in turn is linked to the third aspect, namely research funding, its mechanisms and criteria. Here the question arises whether science still remains free to set its own priorities and define its fields of enquiry based on curiosity and with the sole aim of advancing knowledge. Indeed, this 'social contract' established between science and government in the post-war years, whereby "basic research, uncontaminated by industrial application or government policy, would thrive in the free air of universities" and "scientists would establish the substantive aims as well as the intellectual standards of research" (Jasanoff 2003: 227), has been largely replaced by a state, in which science strongly competes for funds with other sectors of public life. In order to prevail, it has had to become tangibly and not, as before, merely ideally accountable. The notion of accountability towards society has thus reached new dimensions spanning not only ethical issues or questions of good scientific conduct; much rather, today it is brought into connection with output and success in terms of value for the money invested. National research systems are reviewed regularly in this respect and also compared to institutions perceived as their international competitors. Indicators include among others (for more applied fields) the number of patents filed or spin-offs emerging, the amount of third-party funding received and of course the number and impact of scientific papers published. Especially the latter has become the quality criterion par excellence, epitomised in the so called *h*-index[55]. Interestingly enough, by measuring output in terms of scientific papers, as well as the reproduction thereof, the *h*-index implicitly asserts

[55] Proposed by the theoretical physicist Jorge Hirsch in 2005, the *h*-index (named after Hirsch himself) aimed at measuring the quantity and quality of a researcher's (in this case a theoretical physicist's) output by measuring the number of published papers as well as the frequency with which these papers have been cited by other researchers. Gradually, this method was adopted by other epistemic fields as well, despite significant differences in publication practices and the character of respective scientific journals.

visibility, initially within the scientific community, as an attribute of success and thus as a selection basis for the distribution of funds and positions.

Now, as the need to establish a researcher's or institution's reputation also outside the confines of science has become increasingly important, engaging the mass media in their activities has become the method of choice. Through visibility of their work in the media, scientists and their employers hope to achieve a number of goals. They aim at securing the public's undivided attention and support for scientific and technological developments and ideally disperse every shadow of a doubt or perceived mistrust by society. Society's acceptance is in turn the basis for legitimisation of research practices and at the same time confirmation of science's authority over the production of (scientific) knowledge. Authority on the other hand is the currency needed to influence political decisions**,** be it by providing the necessary evidence base or – with respect to the governance and funding of the research system itself – confirming that science deserves both financial acknowledgement and regulatory autonomy. Another important goal pursued increasingly through visibility in the media is to secure the next generation of researchers by making especially the key scientific fields for technological development and innovation appealing to young people and engaging them at an early stage (Felt/Fochler 2013: 3 ff.). At the same time, it is hoped that systematic information and early stage education can help 'construct the scientific citizen' (Irwin 2001), one who will maintain a constructive research and innovation-friendly attitude (Felt/Fochler 2013: 3).

This is why universities, non-university research centres and laboratories and other science organisations have, with the help of newly established or 'upgraded' press and public relations departments, significantly professionalised the way they portray and promote themselves (Weingart 2001: 246). Disseminating information through different channels and allowing insight into the workings of research has become a necessity for the valorisation of science (Felt/Fochler 2013: 2). Communication experts select and strategically release information, thus adapting scientific communication to the formats of the mass media (Franzen/Rödder/Weingart 2012: 357) and acting as mediators and 'translators' between them and the scientific realm. We also notice a parallel development of mass media in order to accommodate the information in an adequate fashion and on a level of professionalism that is required to address the complexity of

the content to be reproduced. This professionalisation and intensity on both sides however, alludes to a more extended perception of the notion of medialisation involving not just the representation of science in the mass media, but the whole process of making science public and communicating its contents to different audiences for different purposes. This occurs mainly as a process of storytelling leading to the establishment of certain "public images" of the scientific process (Felt/Fochler 2013) or "sociotechnical imaginaries" (Jasanoff/Kim 2009). It also involves a personification of those "doing science", whereby the scientist as a character is embedded in a narrative on his or her work and, career and living conditions (Shapin 2008).

In the past decades, science communication has thus increasingly become a process of storytelling, adopting the method of narration, mainly dominant in the mass media, to convey its messages, while making them easily comprehensible and intriguing. Initially directed towards society via the media, this practice of communication has gradually become established also within the scientific realm (Felt/Fochler 2013: 5). This effect of medialisation – among others characterised as "press-packaging science" (Felt/Fochler 2012: 142 ff.) – has in this case permeated key activities of researchers, such as funding applications, conference presentations or teaching. By now, it is a 'soft' or 'vocational skill' taught during scientific training and nourished throughout a researcher career.[56] In recent times, a tendency of the scientific community to create an almost perfect causal relationship between scientific research and social welfare and prosperity, blinding out the uncertainty and complexity inherent to scientific pursuit can be noticed. This "economy of promises" (Felt/Wynne 2007) is often used by researchers for the purpose of professional advancement, a practice which has among others led to cases of scientific misconduct[57].

One result of medialisation is thus the creation of a certain imaginary of research that does not always reflect reality and portrays science as "a fast and successful enterprise, where science is in control and provides solutions to clearly defined societal problems" (Felt/Fochler 2012: 10). In this process, the relation between science and

---

[56] Here I should mention that science communication courses were offered to young researchers within the context of ESOF's Career Programme.

[57] For some famous examples see Weingart 2001, 284 ff.

society is placed on an unequal or perhaps even dishonest footing. Though scientists often criticise these practices of raising hardly achievable expectations, they simultaneously contribute themselves to their perpetuation (Felt/Fochler 2013). In an effort to appeal to a larger audience, sometimes false or at least deliberately incomplete images or stories are told and constructed which, however, do not always lead to the desired result. What is more, through the nourishment of specific narratives feeding on the opinion of a portion of the scientific community in the public sphere, the "openness to competing interpretations" (Czarniawska 2004: 7) is often compromised. Most importantly however, it can be argued that "this intensified and diversified storytelling about science tacitly governs research and creates a specific imaginary of science in broader societal arenas" (Felt/Fochler 2013: 4). Notwithstanding, by bringing society closer to science, we inevitably experience a 'meddling' with certain principles that characterise science, such as the criteria for success or failure. Scientists are thus confronted with the dilemma that "under the conditions of an increased medialisation of science they are both producers and subjects of stories about science" (Felt/Fochler 2013: 8). Moreover, the gap between the stories being told about science, its practice and the lives and careers of its practitioners, and reality is increasing, the borderlines between the two becoming ever more blurred (Nowotny et al. 2001). The impact of this phenomenon is especially strong with the young generation, for it affects not only their epistemic pursuits, but to some extent also dictates the qualities a scientist should ideally have as a person.

Medialisation thus refers to a both intended and unintended effect on the scientific realm caused by the latter's orientation towards the media (Weingart 2001: 253). These effects can be seen from numerous perspectives, both positive and negative. On the one hand, the diagnosed rapprochement alludes to a "re-integration of science into society" (Weingart 2001: 354). On the other hand medialisation of science can also be synonym to a dilution of what is considered as the very foundation of science, namely its independence, its ability to govern itself as well as its authority (and to a certain extent exclusivity) over (scientific) truth, that being the output of scientific knowledge production which has undergone peer review. In other words, access to and use of the media is a 'curse and blessing' at the same time, depending on how it is performed and which goals are pursued. This can be examined in the context of three

characteristic examples (Weingart 2001). The first is the pre-publication of scientific results in the mass media (including the internet). In this case, the established, yet laborious process of publishing in scientific journals is accelerated or bypassed by researchers, the mass media used or in some cases exploited for the purpose of securing priority over peers and competitors within the scientific realm.[58] The intended effect is therefore *inner-scientific* or in other words directed mainly inwards. However, there are also cases when scientists seek publicity in the mass media in order to establish or improve their (scientific) reputation, even without a claim for a certain scientific discovery. This represents the second example which, as the first, is often criticised by the scientific community and has frequently had a negative impact on scientific careers. The third example is perhaps the most far reaching one, as it goes beyond the actions and reputations of individuals (and perhaps institutions) and concerns 'issues' with a scientific provenance articulated in publicly performed discourses, which, depending on the outcome, may have a negative impact on the credibility of the scientific realm as a whole. For increased communication of scientific results via the media, especially when this involves sensational predictions and respective warnings, can undermine the fragile credibility of science itself when performed systematically and with exaggerated intensity (Weingart 2001: 21). On the other hand, the media also have to deal with a certain 'communication risk', which has to do with the loss of attention and thus market shares. Their decision with regard to the content published thus heavily relies on their perception of their readership's interests. At the same time, they need to simplify complex information and transform uncertainty into comprehensible causal connections (Weingart 2001: 22). In a knowledge society however, uncertainty and risk are a constant companion of both the process of scientific knowledge production and evidence-based political decision-making (Jasanoff 2003). Still, they sometimes tend to be overlooked or downplayed by both the media and researchers for the sake of sensationalism or for the purpose of influencing agenda-setting in science policy.

---

[58] Interestingly enough, established scientific journals themselves practice a 'simultaneous publication', whereby upcoming papers with high visibility potential are communicated by their own press offices to the mass media before publication, assigned with an embargo. When published in both outlets, they generate publicity for the journal and the authors and may – as pre-publication – also result in an increase in citation rates for the latter.

The phenomenon of medialisation tacitly implies certain groups of people fulfilling the different roles. Drawing attention to their identity and contribution is of particular importance because it will help show just how strongly intertwined the social and the scientific are, while emphasising the role of the media as mouthpiece of science and at the same time catalyser for the latter's relationship to society. Indeed the two realms are embodied not just by one, but by several publics respectively[59], the borderlines of their membership becoming increasingly blurry. Publics not engaging in academic research are becoming *inner-scientific* due to their in-depth knowledge of the scientific enterprise and its workings as well as their function as its 'customers', sponsors or administrators. Acting as mouthpiece, mass media also take on the role of [scientific] knowledge producer vis-à-vis or even in competition to scientific research. (Nowotny et al. 2001: 98). Researchers on the other hand transcend the boundaries of their epistemic field, reaching out not only towards other scientific communities, but also towards society, as expert advisors, educators, mentors or entertainers. The media assist them in most of these activities**.** The social and the scientific could therefore be seen as two overlapping circles, rather than two separate spheres. Where they overlap is most probably where 'inner-scientific publics' meet and operate. Aren't we thus referring to two entities that ultimately belong to the 'inner' core of the scientific realm and witnessing an exchange between 'inner-scientific publics'? Indeed, we could speak of a 'science-media-intertwinement' rather than just 'interconnection'. I will argue later on in this thesis that this phenomenon can be observed in the context of the Euroscience Open Forum and that consequently the boundary of scientific knowledge and popular science knowledge becomes fluid.

Communicating science towards society – or at least towards other publics rather than just scientific peers – is therefore in itself not a new phenomenon, but rather a practice that developed almost centuries ago. However, as this practice has evolved over time, its form and frequency have changed significantly: today science finds itself in a very

[59] Weingart (2001: 249) points out that we cannot (any more) perceive society as *the* public or one homogeneous group of people eagerly awaiting information from the scientific realm. Consequently, top-down forms of 'enlightenment' have to give way to means of establishing credibility and procuring knowledge fitting for a mass democratic social order. Only then can science preserve its special role of producing privileged knowledge.

close relationship to its societal environment and the media have assumed a new role as critical observers of this relationship (Weingart 2001: 252).[60] This observation forms the basis of what has been defined as "medialisation of research": this term indicates that considering the increased role of the media in influencing (or even forming) public opinion and the perception of the world we live in on the one hand, as well as the increased competition within the scientific realm and with other societal fields for decreasing financial resources and thus for public attention on the other, science's orientation towards the media for assistance is increasing significantly (Weingart 2001: 252). Thus, the media are not merely receiving and further transmitting information; indeed, they have the resources and capacity to construct and perform key discourses affecting science, politics and society. Consequently, scientific knowledge production has become more pluralistic in its performance and quality and is no longer restricted to the scientific realm alone. Much rather, it represents a key component of the co-production of science and society.

The key question remains however, whether this 'democratisation of knowledge' has had an impact on the scientific mechanisms of self-governance, in which case adhering to the expectations and formats of the mass media becomes more important than adhering to the 'truth', as well as to the scientific knowledge produced under these circumstances. Has science been successful in achieving legitimisation and thus broader societal acceptance through communication? And, most importantly, how has this process affected the social structure of science, its quality assurance mechanisms and ultimately, its credibility? Though some analysts speak of a loss of autonomy of science when science funding decisions are influenced by media-related criteria (Franzen/Rödder/Weingart 2012: 361), whether the process of scientific knowledge production itself and its fabric are affected by medialisation cannot be concluded with certainty.

---

[60] Weingart refers to this relationship as "science-media-interconnection" (*Wissenschaft-Medien-Kopplung*) (Weingart 2001: 252)

3 CASE STUDY AND METHODOLOGICAL CONSIDERATIONS

In the previous chapter, I illustrated the strands of debates that in my view provide the relevant conceptual framework within which to examine the emergence of the Euroscience Open Forum. I will now lay out the methodological considerations on which the empirical analysis will be based. I should perhaps stress in advance that this first-time study of the ESOF phenomenon has called for a considerable amount of flexibility and openness towards the very diverse material as well as the recurrent changes in geographical, structural and cultural setting accompanying every new ESOF meeting. With no – to my knowledge – previous work on the Euroscience Open Forum available, a systematic approach has been necessary. Similar to an onion, the different 'layers' of this complex and multifaceted phenomenon have been 'peeled' one by one to reveal an astounding structural and thematical richness, yet also considerable diversity and inconsistency. Hence, narrowing down and ultimately defining the object of study in more detail has required an iterative process of ordering and refinement of the information available. Though I have been inspired and guided in this process by the seasoned methodological pathways of case study design, Grounded Theory in its constructionist approach (Charmaz 2006, 2008; Clarke 2005) and discourse analysis, I have not followed them rigidly or in an overarching fashion. Rather, they have been helpful at different stages of the analysis performed in this thesis, as well as in connection with different sets of research questions respectively. Before outlining the key elements of these methodological 'schools', I will summarise the research questions laid out already in the introduction as well as provide an overview of the material I have collected and will employ throughout this research endeavour.

3.1 Research questions

This thesis aims to contribute to better understanding how European science and European society are co-produced and how their relation can be characterised today. Thus, the overarching question I pose in this thesis is whether political efforts in Europe focus on promoting science in Europe, on producing a distinctly European science or on building a scientific Europe. I will argue that this question needs to be considered against the backdrop of a changing research system, which is becoming more open to societal elements, methods and, especially, to different actors. I believe that

the Euroscience Open Forum, founded as a series of European general science meetings, represents an excellent 'biotope' within which to study these developments, for it was created as a platform where science and Europe as a community, as well as their respective membership, are performed and shaped. In this sense, ESOF is viewed as a performative space where a number of professionals and stakeholders assume specific identities and are performed into 'publics' operating at the boundaries of the scientific and social realm.

In order to analyse the Euroscience Open Forum's contribution to shaping the relationship between science and Europe and prepare the ground for its employment as a case study, I will first retrace the history of Euroscience, ESOF's founder organisation, and subsequently of the Euroscience Open Forum and ask what considerations and circumstances led the initiators to attempt such an undertaking. I will then continue with an analysis of the first three ESOF meetings (Stockholm in 2004, Munich in 2006 and Barcelona in 2008), while focusing specifically on the actors that attend ESOF and the different roles and functions these assume and fulfil within every event. I will underpin these observations with statistics showing the respective outcome of the first three meetings in terms of their participants. Moreover, I will ask how the Fora where embedded in the European and how into the national or local context. Finally, I will analyse the role of AAAS and its Annual Meeting and examine how they influenced ESOF's conceptualisation and implementation.

Second, I will explore how ESOF fosters the emergence of new actor constellations operating at the boundaries between science and society and fulfilling specific roles within this 'inner-scientific' space. Consequently, I will examine how a space for actors emerges at ESOF as well as what kind of 'publics' are constituted in this space. What can be said about their respective roles and functions and how do these 'unfold' in the ESOF meetings? How do these publics meet and interact with each other in the context of ESOF and what do these dynamics reveal about the relation between science and Europe? And how, out of these actor constellations, can European knowledge societies be performed?

Third, I believe it is intriguing to observe what imagination of a European science as well as of Europe as a community is embedded in the ESOF undertaking. How does

ESOF attempt to 'naturalise' the idea of a European scientific community? If we assume – as I have done here – that ESOF is a space where an imagination of Europe and its relation with science is being performed, then how does this occur and how is it made visible? Ultimately, these considerations should ideally also deliver a first reflection on ESOF's future potential and perhaps even its limitations.

3.2 ESOF: The object of study and the information behind it

The Euroscience Open Forum was introduced in 2004 as a novel meeting and has since taken place seven times[61] on a biannual basis. The general idea to organise such an event in Europe however had 'incubated' the minds of several professionals since the end of the 1990s.[62] The people involved in the early stages of development of ESOF appear to have had two things in common: first, they had all attended the Annual Meeting of the American Association for the Advancement of Science (AAAS) in the United States and second, they were more or less engaged in the attempt to establish a similar organisation in Europe, to be called Euroscience. In order to be able to grasp the complex setting which presumably led to the conception of ESOF and historically re-construct the founding process and the first three editions of the Forum, I will build upon a diverse set of material. The thematic context for the use of this material is twofold. On the one hand, I examine the overarching political discourse and strategic framework on the European level at the time of ESOF's inception and enquire whether they favoured and encouraged such an initiative and to what extent they influenced the Forum's development. On the other hand, I retrace the beginnings of Euroscience and, subsequently, ESOF and tell the story of the latter throughout its first three editions. I go about this in a chronological order and have accordingly defined four phases (0-3) which will guide the reader through the different stages of implementation.

According to its founders, ESOF set out to provide a much needed arena in Europe, where those contributing to the scientific endeavour can meet and interact. In addi-

---

[61] ESOF2004, the first of its kind, was held in Stockholm. The following ESOF meetings were: Munich in 2006, Barcelona in 2008, Turin in 2010, Dublin in 2012, Copenhagen in 2014 and Manchester in 2016.

[62] This is reflected in the statements of several stakeholders with whom interviews were conducted. I will elaborate on this in chapter 4.

tion to being a European platform for "dialogue on science"[63], ESOF also sought early on to address *European* scientific issues and attract *European* publics, while at the same time reaching out to the local scientific and lay community in the city where it was hosted. Thus, material documenting socio-political developments in Europe shortly before and during the time of ESOF's inception and implementation, as well as in the years that followed, is expected to serve the purpose of illustrating the 'state of mind' that fostered and nourished the meeting. I will therefore draw upon political documents published by the European Union and by selected Member States. For instance, I will refer to the Lisbon European Council Conclusions as well as to policy papers that point towards ways to transform the Union into a sustainable knowledge society and economy, such as the Green Paper on the European Research Area (European Commission 2007). Furthermore, reports by European think tanks, such as the OECD, and national advisory bodies (e.g. UK Royal Society or the German Council of Science and Humanities) reflecting on the role of science and technology will be acknowledged. Sources providing information on public opinion toward research and innovation in Europe and in individual EU countries, such as the Eurobarometer[64] reports or articles from scientific journals and general media, will also contribute to the analysis performed in this thesis.

In order to re-construct ESOF's history, I have assembled extensive information on Euroscience and on ESOF itself. This includes material stemming from Euroscience General Assemblies, as well as from the Fora in Stockholm, Munich and Barcelona, such as the respective conference programme, audio-visual recordings of symposia and lectures held during these meetings, speakers' presentations, background information on their research and related news articles. This material is also expected to help 'retrace' the different actors and stakeholders participating in these activities, their role within the context of the ESOF event as well as within the European research system as a whole. Conference statistics revealing information on the people who par-

---

[63] ESOF2004 Programme Book: G7.

[64] The European Union has conducted Eurobarometer surveys since the 1970s. A number of Special Eurobarometer surveys focused especially on science and technology. For more information and the reports see http://ec.europa.eu/COMMFrontOffice/PublicOpinion/ (accessed on 02.02.2016).

ticipated in the ESOF meetings and their affiliation may prove quite useful in this context. I have decided to extend my analysis to the first three editions of the conference because I believe that this initial phase was crucial to the success or failure of the ESOF undertaking and can thus yield intriguing insights into the intentions and the outcomes of this endeavour. My aim is to also show whether an evolution of ESOF with respect to the concept itself and its components as well as its attendees is visible throughout these stages. Moreover, since the available material is not equally systematic for every ESOF edition or fully comparable, I expect the reference to three Fora instead of just one to provide the reader with a more solid overview of the phenomenon's development. The ESOF meeting in Turin is viewed from a certain distance, whereas the events in Dublin, Copenhagen and Manchester are not considered here. Consequently, this thesis does not claim completeness with regard to examining the entire progression of ESOF from its foundation until today.

Interviews with eleven stakeholders[65] involved in the ESOF undertaking, some of which have also played a part in the realisation of the initial idea, aim to compensate for unavailable data and enrich the pool of material on which the analysis will be based. At the same time, they shed light onto the intentions and motivation of influential individuals who shaped the Euroscience Open Forum perhaps just as much as the socio-political context did – or even more. Indeed, this is not necessarily a rare phenomenon; behind the inception of something completely novel one can often find one or more contributors featuring as both idea givers and 'pulling-horses'. In the case of ESOF, there seem to be a handful of key individuals who contributed ideas, infrastructure, funds and large amounts of their time. For this thesis, I have conducted interviews with most of the persons pertaining to this 'founders group'. Though the personal recollections harvested herewith might not fully replace carefully documented organisational procedures, such as committee meeting minutes and reports, they do provide insight into the workings of the ESOF events and disclose information on how initial ideas and expectations materialised. Still, it must be said that this source of information is not fully unbiased. This also applies to my own extensive observations

[65] See 7.3

of ESOF2006 and ESOF2008 as an organiser of the Munich event and a Committee Member in Barcelona.[66]

The foundation of Euroscience is not unimportant, as this "grass-roots organisation"[67] would later serve as a type of 'institutional base' for the Euroscience Open Forum (hence also the name of the Forum). The empirical section of the thesis therefore also features a short recourse into the history of Euroscience and especially its beginnings which to some extent overlapped with the conceptualisation phase of ESOF. Unfortunately, the material available from this period is not extensive. It includes, among others, a manifesto published in 1996 in the journal *Nature* as well as minutes from a number of Governing Board and General Assembly meetings. Furthermore, a booklet published on the occasion of the 10th anniversary of the organisation retraces Euroscience's first steps through personal recollections of some of its most prominent members and supporters.

Notwithstanding, when viewing and analysing the information available on Euroscience and ESOF and especially the ideas behind their inception, one cannot avoid referring to the American Association for the Advancement of Science (AAAS) and its Annual Meeting. Indeed, both appear to have substantially influenced Euroscience and ESOF respectively. Some observers even sustain that Euroscience and the Euroscience Open Forum aimed at becoming the "European equivalents"[68]. A fully fledged comparison of the two institutions and the respective science meetings may therefore be an intriguing undertaking. In this thesis however, I will rather refer to the AAAS and its Annual Meeting selectively and on a case by case basis in order to make certain points. To do so, I will draw on a broad array of data stemming from AAAS publications as well as from the Annual Meetings themselves. An extensive interview with one longstanding AAAS official, notes from informal discussions with further AAAS functionaries and

---

[66] From January 2005 until October 2006 I worked as Press and Marketing Officer for the Euroscience Open Forum 2006. I furthermore contributed to ESOF2008 as Co-Chair and to ESOF2010 as Chair of the Communications Committee.

[67] This is how Euroscience defines itself in its Manifesto published in the journal *Nature* (Praderie 1996). See also http://www.esof.eu/index.php?section=19-euroscience (accessed on 03.07.2011).

[68] Lestienne 2009; Klapisch 2009.

Annual Meeting participants, as well as personal recollections and impressions of five Annual Meetings (2005, 2006, 2008, 2009, and 2010) complete the data.

Finally, chapter 2 has profited greatly from a broad range of STS literature as well as from respective contributions by related disciplines such as sociology, political science, communication, economics and history.

3.3 Methodological considerations

The multileveled research questions being posed in this thesis as well as the diverse nature of the empirical material forming its basis call for a rather flexible research design. Three methodological approaches have been selected in an effort to accommodate the multidimensionality of the data and use it effectively to reach compelling conclusions. These are the case study, discourse analysis and Grounded Theory in its "constructionist" or "postmodern" interpretation as put forward by Adele Clarke (2005) and Kathy Charmaz (2006, 2008).

3.3.1 Viewing ESOF as a case study

Though often criticised in the past, case studies are today viewed by scholars as being an established method for empirical social analysis in fields such as social anthropology, psychology as well as educational and organisational research (de Vaus 2001: 219). In sociology, case studies gained credibility among others through research projects such as the "Middletown Studies" (Lynd 1929) and the "Street Corner Society Studies" (Whyte 1993 [1943]) and have since then contributed significantly to the methodological development of the field. STS scholars have also used case studies to better understand situated practices at play as well as the orders and values at work in a concrete setting.

Case study design allows for objects or phenomena to be examined within their context of existence or emergence (Yin 1993: xi). Even if the boundaries of the case itself and its context may not always be sharply discernible, case study design is characterised by considerable flexibility. This can be quite helpful when examining a novel phenomenon, which involves many variables and levels of analysis and draws information and data from many sources, as is the case with the Euroscience Open Forum. I believe

ESOF represents an adequate case study through which to observe Europe, science as well as their mutual relationship in the making, over time and across different sites. Indeed, given the influence that both temporal and long-term contextual conditions – for instance debates and policies on the EU or national level (especially in the country where ESOF is currently taking place) – may have on the structure and thematic focus of each meeting, a separation of the object of research and its context would most probably deprive the analysis of valuable material and thus compelling results.

According to Robert Yin (1994: 3-4) and David de Vaus (2001: 221-223), case studies may be used for exploratory, descriptive or explanatory purposes. All three types require that data collection, classification and analysis are guided by carefully defined theoretical propositions (Yin 1994: 13). 'Theory' not only facilitates the research design process, but also lays the foundation for the replication and generalisation of the achieved conclusions, so that they may also be applicable to other sociological enquiries (Yin 1993: xiii). Explanatory case studies are a means of theory testing whereas exploratory case studies a means of theory building. In the theory testing model, the process begins with the definition of specific propositions, whose validity is then tested in "real world situations" (de Vaus 2001: 223). The theory building process begins with a question or basic statement, which is then applied onto or examined in the context of the selected case. This process can then lead to a more specific theory or set of propositions. Finally, a case study design should define whether one is dealing with a single or a multiple case study (Yin 1994: 19-22; de Vaus 2001: 220-221). A case can also comprise one or more units of analysis, which can be holistic or embedded depending on their respective focus, namely whether the analysis takes place on a "holistic level" or the embedded elements of the research object are also viewed separately (de Vaus 2001: 220).

The characteristics of case studies as defined by Yin (1993, 1994) and de Vaus (2001) have inspired my analysis and guided my methodological approach. Even ex post however, it seems difficult and perhaps even short-sighted to exclusively assign ESOF to one of the above mentioned types. For, due to its multifaceted character, the ESOF case study can be employed in a number of different ways and lead to respectively diverse results.

3.3.2 Applying Grounded Theory and discourse analysis to ESOF

In addition to case study research design, the diversity and mostly qualitative nature of the collected material on ESOF calls for the employment of further methods of data analysis. Grounded Theory can help extract more findings out of the data and thus formulate plausible propositions concerning the object of research. Discourse analysis can in turn help use the data to define (and refine) the discursive – be it political, societal or scientific – framework for ESOF and position the meeting within it. Though I will not be applying either method in a rigid way, they will provide procedural and contemplative guidance for extraction of viable trends and conclusions from the available data.

I deem Grounded Theory in its constructionist or postmodern interpretation (Charmaz 2006, 2008; Clarke 2005) to be particularly adequate for the collection and systematic interpretation of qualitative data as well as for subsequently generating theories from this process. Respectively, data collection, categorisation and analysis, as well as the formulation of research questions represent an iterative process, with recurrent decision-making on the next steps of the analysis.

Bearing in mind that the study of ESOF implies the inclusion of non-systematic or unique and informal empirical data (e.g. stemming from participant observation, discussions during the scientific sessions and events taking place during ESOF conferences), the constructionist approach to Grounded Theory (which began as a positivist articulation in the 60s [Strauss/Glaser 1967]) seems to be the method of choice in order to investigate "how research participants construct their lives and worlds" (Charmaz 2008: 403), as it places particular emphasis on the emergent properties of categories in the data. In employing Grounded Theory, I thus follow the following assumptions formulated by Charmaz:

> *(1) Reality is multiple, processual, and constructed – but constructed under particular conditions; (2) the research process emerges from interaction; (3) it takes into account the researcher's positionality, as well as that of the research participants; (4) the researcher and researched* construct *the data – data are a product of the research process, not simply observed objects of it. (Charmaz 2008: 402)*

Since ESOF is a novel event and has not, to my knowledge, been dealt with in the context of an academic research project yet, I believe Grounded Theory may provide an

unbiased way to view ESOF and let the data and information lead the way towards certain assumptions with regard to the meeting and especially to the groups of people addressed by it.

Discourse analysis will complement Grounded Theory by adding a further dimension to the process of qualitative data analysis and theory building. The research design will follow some of the premises laid out by Michel Foucault in his writings on the "Order of the Discourse" (Foucault 1991/1972). Perhaps one of the most important arguments Foucault makes is that discourse is a "power/knowledge formation" (Waldschmidt 2006: 197), in other words a mechanism of control and exclusion that moderates the creation of "true knowledge" (Foucault 1991/1972). This inherent mechanism is the 'order' of the discourse; discourse analysis serves as a means to filter it out and illustrate its dynamics. When examining the relation between discourse and power, it is of vital importance to identify the publics, institutions or social worlds engaged in the process of knowledge production and define the "cognitive interphase" (van Dijk 1993: 249) where these cross each other.

It is fair to assume that the socio-scientific and socio-political context of creation and development of ESOF could be considered just as important to answering the research questions of this thesis, as are the content and dynamics of the debates on aspects of the research system unravelling *at* ESOF. Indeed, as an entity ESOF seems to inscribe itself within certain discourses and at the same time provide a space for performing these and other discourses. Discourse analysis will attempt to shed light onto the conditions and "assumptions that enable the existence" of ESOF and "make them explicit" and understandable. This approach may, to a certain extent, occur on a meta-level, take into account established ideas and theoretical considerations, and investigate the relation – if any – between them and ESOF. In order to reduce the observation to a manageable size, certain discourses and discursive contexts have been identified that are considered particularly important for the study of ESOF. The broader lines of these debates as well as some selected strands have been sketched in chapter 2 and will form the framework for the empirical analysis in this thesis. Within the context of ESOF they unravel and to some extent also compete against other. However, these discursive contexts do not represent the only possible interpretative framework for ESOF, but rather offer merely some – of probably many – versions of reality.

4 EMPIRICAL ANALYSIS: THE EMERGENCE AND DEVELOPMENT OF THE EUROSCIENCE OPEN FORUM IN EUROPE

Observing a new phenomenon for the first time is an exciting, yet also a challenging task. One is confronted with a pristine field of analysis waiting to be sorted, set into a specific framework and interpreted. This process often involves preferring certain aspects over others, omitting information which is regarded as not relevant and finally studying the available material following the research question one has posed. To my knowledge, this thesis represents the first piece of scientific work that critically reflects on the dynamics at work during the founding phase of the Euroscience Open Forum. My hope is that it may spark an interest in analysing this scientific conference further, while viewing it from different perspectives not featured here. Moreover, as ESOF develops in the coming years, a detailed history and recollection of its first steps will become indispensable (to its future). However, delivering a comprehensive historical recollection is not the intention of this thesis. My objective is rather to focus on a particular aspect, which I consider of paramount importance for the science system in Europe and which can be observed beautifully within the context of ESOF: the construction and performance of what I will call 'inner-scientific publics'. Retracing the development process of ESOF is essential because it helps highlight the 'struggle' of these publics with the changes the research system is undergoing. These changes were in some cases induced or at least set in motion by socio-political developments in Europe at the time of ESOF's inception and during the first years of its maturity. Inevitably, they are to a large extent also reflected in the meeting itself.

Hence, I begin by illustrating how the political climate towards research changed at the outset of the new millennium and how the importance of science for the Continent's future was acknowledged by European Heads of State and the EU Commission alike and formulated in documents, such as the Lisbon Strategy. As a result, several countries where engaging in reforms of their research system in order to increase its effectiveness and efficiency and introducing new measures to achieve a stronger visibility for the research profession, as numbers of qualified workers all but met the increasing demand. At the same time, the aim of achieving a European Research Area attempted to counter the perceived fragmentation amongst national science policies and promote better co-ordination and increased mobility between the scientific

communities (European Commission 2000a). I will argue that these developments created a fruitful ground for the inception and subsequent support of a meeting such as ESOF.

The conceptualisation and implementation phase of the Euroscience Open Forum and its first three editions will be re-constructed in four, in my view, key phases. Phase 0 concentrates on the preparatory work performed throughout the period from 1993 to roughly 1998 and retraces the emergence of Euroscience, ESOF's founding organisation. Inspired by its US 'counterpart' AAAS, Euroscience aimed to become a mouthpiece for European science, for its actors and stakeholders. Phase 1 begins end of 1997 and will illustrate how the idea to organise a pan-European interdisciplinary science meeting emerged and grew. A particular focus will be placed on the efforts to address and engage three important stakeholders: the Swedish institutions, the EU Commission and AAAS. For these also correspond to three important dimensions that characterise ESOF: the national, the European as well as, when considering the 'role-model' AAAS, the 'meta-level'. Phase 2 sets off with the first meeting of the ESOF2004 Steering Committee in Berlin in March 2002 and accordingly explores the preparation phase of the Euroscience Open Forum 2004, the first of its kind. It will sketch the consensus-building and negotiation process that unfolded throughout the two years prior to the first ESOF meeting in Stockholm while at the same time identify and analyse the most important ideas and interests that found their way into the structure of ESOF meetings. Finally, Phase 3 will focus on the implementation of the meetings in Stockholm, Munich and Barcelona and reflect on how and to what extent they served as platforms for debate and exchange on scientific and science policy issues. The chapter will end with a statistical overview of participants in these meetings and set out what I consider to be the key groups or publics 'populating' ESOF, thus preparing the ground for the analysis of these publics in chapter 5.

4.1 From niche to mainstream: (Re-)discovering Europe's research and innovation potential as a key factor for growth and jobs

The beginning of the 21st century is seen as a time of significant political and economic developments in Europe. The European Union was on its way to produce a new treaty (Treaty of Nice, 2001) and had introduced a new common currency, the Euro, just one

year before. Policy makers were eager to capture the symbolism and momentum of the new millennium and take on a great challenge for Europe's future. At the same time it was becoming clear that the European Union – though overall in good economic shape – had to adapt its instruments and policy to remain internationally competitive as well as secure employment and innovation and through it social and economic stability in the years to come. This view was not only gaining ground in European capitals. It was also put forward by EU bodies, most notably the European Commission. In fact, in its 'Contribution to the Special European Council in Lisbon', though it attested the Union "the best economic outlook and macroeconomic conditions for a generation" (European Commission 2000: 2), it also called upon Member States to face "the paradigm shift caused by globalisation and the new knowledge economy" by "radically transform[ing] Europe's economy and society" (European Commission 2000: 2).

In the same document, the Commission specified the challenges it saw lying ahead, which involved among others socioeconomic fields considered to be crucial, such as employment and innovation. In securing optimal conditions in these fields, the EU executive body argued, laid the key to Europe's future prosperity and competitiveness (European Commission 2000). Research and technology played an important role in this context, for they represented "an engine of economic and social progress" (European Commission 2000: 18). The strong fragmentation characterising scientific activities and policies within the European Union however, was perceived as hindering the research community from developing its full potential. Furthermore, compared to its major competitors USA and Japan, Europe's technology transfer and entrepreneurship landscape was seen as being held back by red tape and heterogeneous regulations between individual Member States. Better co-ordination and integration of R&D efforts was thus deemed necessary (European Commission 2000: 18).

Discussions over stronger political commitment and higher economic investment in research and innovation subsequently featured in several official EU proceedings and affected the decisions that followed. This development is for instance especially visible in the conclusions of the Lisbon European Council published in March 2000. In the so called Lisbon Strategy the European Heads of State set the goal for Europe to "become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social

cohesion" (European Council 2000: 5). The means to achieve this common objective considered incremental for Europe's future were, among others, "better policies for the information society and R&D" as well as "structural reform for competitiveness and innovation" (European Council 2000: 5). Two years later, in their spring meeting in Barcelona, European Heads of States went a step further by putting a 'price tag' on these goals: EU countries should do everything in their power to significantly increase their research and development expenditures, reaching if possible 3% of GDP by 2010. Two thirds of the respective funds should have to be contributed by industry (European Council 2002: 20).

In the meantime, the European Commission had in January 2000 launched its idea of a European Research Area with the aim of promoting freedom of movement for scientific knowledge and those producing it, just as the EU Single Market did for goods, persons, services and capital within the European Union.[69] The term 'Area' was deliberately chosen to reflect the goal of increasing mobility for scientific personnel but most importantly for ideas and research results (Buysse 2009: 17). Recognising that Europe's investment in research and innovation as well as its human scientific capital was decreasing (compared to the US and Japan), the Commission proposed measures to reverse this "current trend [which] could lead to a loss of growth and competitiveness in an increasingly global economy", catch up with other technological nations and "achieve the transition to a knowledge-based economy" (European Commission 2000a: 1). Moreover, the Commission advocated for a better co-ordination on a European level of research policy and expenditures, as well as stronger networking and the construction of a 'critical mass' in specific scientific and technological fields (Report of the Expert Group 2009: 5): "De-compartmentalisation and better integration of Europe's scientific and technological area is an indispensable condition for invigorating research in Europe" (European Commission 2000a: 7).

At the European Council in Lisbon, Heads of State adopted the proposal, deeming the creation of a European Research Area necessary in order to achieve a maximum output of the research and development efforts of European Member States, provide better support and working conditions for European researchers and boost research-

[69] http://ec.europa.eu/priorities/internal-market_en (accessed on 17.03.2016).

based innovation (European Council 2000: 12). Many aspects of the European Research Area however, especially those focused at "overcoming fragmentation of research activities, programmes and policies across Europe" did not gain ground as quickly as expected and were at the same time pursued rather hesitantly by the European Commission and Member States alike (European Commission 2007: 2).

Notwithstanding the rather slow implementation of ERA, a large part of which was dependent upon the compliance of the Members States as it touched upon issues within their jurisdiction, some progress was achieved in conjunction with the reform of the main European funding mechanism for research. Indeed, though the Commission had pointed out that the Framework Programme (FP) alone cannot make ERA a reality, beginning with the sixth five-year FP introduced in 2002, it was considered "the main financial and legal instrument of the European Commission… alongside national efforts and other European co-operative research activities" (European Commission 2002b: 3). FP6 therefore involved a reorganisation of the structure and programmes aimed at fulfilling the 'Europeanisation' process set out in the ERA document (European Commission 2000a) and also responding to the new goals proclaimed in the Lisbon declaration.

At the same time FP6 also involved a re-appraisal of the European Added Value idea embodying the improvement of the European innovation system (Expert Report 2009: 4). From the launch of FP6 onwards, creating European Added Value rested not only in promoting networking, mobility and better infrastructures. It rather became more multileveled and complex shifting towards "variable geometry interventions" (Expert Report 2009: 5; see also Stampfer 2008). This development led on the one hand to the establishment of more 'á la carte' instruments such as the European Technology Platforms, ERA-Nets and later on the European Institute of Technology and Innovation, which did not require participation by every Member State. On the other hand, it implicitly involved a more pluralistic implementation of the subsidiarity principle, for instance through the establishment in 2007 of the European Research Council for promoting excellent basic research, a long-time request of the research community. The definition of ERA delivered in the Green Paper "The European Research Area: New Perspectives" (European Commission 2007) published in April 2007 in an effort to reinvigorate the ERA process serves as a further example: "The ERA concept combines: a

European ‘internal market’ for research, where researchers, technology and knowledge freely circulate; effective European-level co-ordination of national and regional research activities, programmes and policies; and initiatives implemented and funded at European level.” (European Commission 2007: 2). This definition shows how the concept of ERA evolved over time towards a more flexible alternative to the subsidiarity principle by arguing that the EU is the “natural level” for large-scale initiatives (Report of the Expert Group 2009: 6): “ERA is not a state but the […] outcome of a long-lasting process of Europeanisation” (Larédo 2008: 1, orig. in Report of the Expert Group 2009: 6).

Another aspect which gained increased visibility in the 6th Framework Programme was the 'Science and Society' theme under the ‘Structuring the ERA’ line. With a dedicated budget of 80 million Euros, the initiative aimed at “developing structural links between institutions and activities concerned with the dialogue between the scientific community and society at large” (European Commission 2002b: 9). It was adopted on the basis of the ‘Science and Society Action Plan’ published by the Commission in December 2001.

Finally, it is worth noting that the long-awaited ‘forward leap’ in European research funding, came not with FP6 – which at ca. 17,9 billion Euros represented only a rather small increase compared to its predecessor – but rather with FP7 (50,5 billion Euros excluding Euratom) seven years after the Lisbon Strategy and five years after the Barcelona declaration.

Nevertheless, though the Lisbon Strategy was based on a rather logical “diagnosis”[70], namely that in the light of scarce natural resources the European Union’s economic development and social prosperity depends on technological achievement and innovation, which in turn require a highly-skilled workforce, it also made economic and societal divides among EU countries more visible. The implementation of the Strategy was furthermore regarded as inconsistent and its objectives were readjusted repeatedly in the years that followed its proclamation (European Parliament 2010, see also

[70] “Kok review of Lisbon Strategy: Excellent on diagnosis, weak on remedies” in EurActiv 3 November 2004. http://www.euractiv.com/section/innovation-industry/news/kok-review-of-lisbon-strategy-excellent-on-diagnosis-weak-on-remedies (accessed on 17.03.2016).

Kok 2004). Furthermore, uncertainty grew within societal groups over the impact of the decisions on those who would most probably not meet the targets as well as with regard to social values that were seen as being left aside in the process. Concerns were also expressed that the objectives formulated in the Lisbon declaration may also affect the European social model with regard to solidarity for and tolerance towards less qualified or unemployed citizens. By introducing benchmarks for success and productivity and calling for "innovation scoreboards" (European Council 2000: 12), the Lisbon declaration to some extent confirmed these worries.

Another issue that sparked considerable debate involved the role that higher education played in the Lisbon construct (Keeling 2006). Higher education institutions were now implicitly (or even explicitly) expected to be[come] 'talent incubators' for the best and brightest, who would then hopefully go on to achieve a highly productive career. Such an approach, students and academic circles argued, could jeopardize the diversity of higher education fields, as some could be favoured over others with regard to their economic potential later on: "Treating higher education as a commodity would be detrimental to crucial goals of higher education." (ESIB 2004: 3). These and many other expressions of concern made it clear that "only if social and environmental goals are put on an equal footing with economic integration will it be possible to increase social productivity in Europe" (Fischer et al. 2010: 1).

Despite its somewhat 'deterministic' approach, the Lisbon Strategy and the goal of a knowledge-based economy to become the norm in EU Member States formulated therein is regarded as having reinforced the discourse on the significance of science, technology and innovation for Europe's [economic] future (European Commission 2010a). The consensus reached among Member States in the document put science and technology on the public agenda and gave regulatory bodies within the European Union, but also Member States, a mandate to pursue the goals of boosting scientific development even more vigorously. Thus, spending more money on science and promoting a better understanding of and literacy in it gradually became an even more 'worthy cause'. Though not all countries followed suit (and many are still struggling with the 3% goal even after more than fifteen years), the Lisbon declaration succeeded in establishing a direct link between research and innovation and the Continent's prosperity.

This new found attention for R&D soon spilled over to the research system as a whole and especially to scientists, who found themselves in a new role: they were now identified as a 'resource' that was expected to contribute to economic growth and social stability. Perhaps more than ever, they were regarded by politics as a 'powerhouse', producing solutions for the problems of today and tomorrow and thus serving society. If research and innovation were to secure Europe's future however, the research system was in turn expected to open itself to the laws of the market, become internationally competitive and fulfil the 'quota' placed upon it by policy. This meant that, while more funds would be allocated to research, its methods, governance, productivity and qualification would be put to the test. In other words, if researchers were to be the main beneficiaries of the shift in policy and priorities following the Lisbon Strategy, their *mode-á-faire* would have to come under scrutiny, be taken apart and evaluated. It would be important to secure the utmost efficiency and provide tax payers the best value for their money. This argumentation became visible in several European countries, where new measures were introduced to make science more effective and its products 'countable'.[71] New budgets for research were often coupled with new regulations for more flexibility, efficiency and competitiveness.

The scientific profession was therefore changing as scientists became subject to increased evaluation, while being expected to regularly communicate their work and at the same time lobby policy makers and society for funds. The new measures however, while to some extent decided upon and implemented in the name of the Lisbon Strategy, often indirectly contradicted the goals formulated therein, such as an increased

[71] Prominent examples of this trend can for instance be found in Germany with the so called 'Excellence Initiative' (*Exzellenzinitiative*), which broke with the paradigm of 'equality in quality' among German universities. As part of this competition, the Deutsche Forschungsgemeinschaft (DFG), the Federal Ministry for Education and Research and *Wissenschaftsrat* (German Council of Science and Humanities) called upon the research landscape to come up with fresh ideas on research, while networking more strongly and opening up to international collaboration and competition. Those with the best concepts not only received considerable amounts of money, but also – and more importantly – were pronounced Elite Universities. Another example is the introduction of the Research Excellence Framework in the UK. This new system, which replaced the Research Assessment Exercise (RAE) in 2014, evaluates the quality of research performed at UK higher education institutions and helps decide over the distribution of funds. While RAE produced its results solely based on a peer-review procedure, the Research Excellence Framework will rely much more on bibliometrics and quantitative data, such as the number of scientific publications and impact factors, and also include 'impact' as an additional criterion.

mobility of researchers and amelioration of their working conditions (for instance with regard to pension rights and short-term employment contracts), facilitation of innovation through e.g. a European patent system, and the concentration of human and financial resources beyond national borders. In fact Member States were and still are quite reluctant to see their tax payers' capital flow out of the country into research performed by other nationals somewhere else. Governments also pose certain challenges to researchers wanting to go abroad or come from another country, for instance by not fully recognising their degrees or academic qualifications or not fully acknowledging their social security expenditures. Issues such as these, while identified in numerous policy papers (including the EU Commission's January 2000 concept on the European Research Area) and political speeches, were only partially met with specific countermeasures.

Within this context, one of momentum and hope but at the same time re-orientation and change for science and technology in Europe began the conceptualisation and implementation of the Euroscience Open Forum. Though the idea to initiate such an event had probably incubated in the minds of several visionaries for quite some time, the developments on a European level during the first years of the 21st century cultivated a political framework and social mind-set which is seen as having facilitated the first steps towards a European meeting on science. ESOF could therefore be perceived as a product of its time, yet to some extent also one which was long overdue. On the one hand, ESOF's articulation was aided by political developments on both the European and national level (particularly in Sweden, where it was first held and where the initial commitment to the event was made). On the other hand, it was seen as representing the long-awaited acting upon 'evergreen' issues on the role and impact of science and technology in policy, society and the economy. Thus, the idea to create a forum to become a sounding board for current scientific developments, a testing ground for new policy concepts, a recruiting field for the research system and a marketing event for hosting cities hit a nerve as it merged in one convenient bundle what each of its potential addressees sought.

In 2003, an editorial in *Science* magazine referred to the upcoming first edition of the Euroscience Open Forum as an "all-European science event" further manifesting the "trend toward scientific denationalisation" (Kennedy 2003). This perception built upon

the discourse set forth by the launch of the ERA concept (European Commission 2000a), but also found support in the rhetoric of the initiators of the Euroscience Open Forum, who considered the meeting "a motor to let the European scientific community grow together" and at the same time "a showcase, nationally, on the European level and internationally [of] the strength of European science" (Wünning Tschol 2008). The general objective of achieving "a higher degree of integration between the scientific communities of European countries … [and] a better co-ordination of European research" (Praderie 1996) had furthermore been advocated by Euroscience, ESOF's founding organisation, some years before.

Thus, the expectations placed upon the Euroscience Open Forum were quite high. They drew among others upon the broader "sociotechnical imaginaries" (Jasanoff/Kim 2009) shared both by ESOF's founders and its addressees, be they European scientists, policy makers, research managers, or science journalists with regard to the role of science and technology in society and policy as well as the impact of the latter two on the former. Yet, how did these imaginations look like, who produced them and what propelled them? How did they shape the event, which prevailed over others? And, most importantly, which publics projected which expectations upon this new phenomenon?

To answer these questions, it is essential to view the Euroscience Open Forum within the socio-scientific, cultural and political context from which it emerged, both on a European and a national (i.e. in the host countries) level. Furthermore, one has to take into consideration the role of Euroscience, ESOF's founding organisation, in this undertaking. Finally, reference will be made to the American Association for the Advancement of Science (AAAS) and its Annual Meeting, an important source of inspiration for the pioneers of Euroscience and ESOF respectively as well as a 'barometer' for their success. Though a fully-fledged comparison is not intended in this thesis, it is interesting to reflect upon the US counterparts' influence on Euroscience and ESOF respectively, as well as ask whether the opposite also took place.

4.2 Phase 0: AAAS in Europe? First considerations to provide European researchers with a common voice (1993-1998)

By the 1990s, Europe could boast some prominent examples of stronger European co-operation in science, such as the Centre Européen de Recherche Nucleaire (CERN) founded in 1954 bringing together several countries' nuclear research efforts, the European Southern Observatory established in the 1950s to allow European astronomers to "work together to build and operate advanced astronomical facilities that were beyond the capabilities of any individual country"[72], the European Space Agency since 1964 aiming to promote co-operation among European States in space research and technology or the European Molecular Biology Organisation (EMBO), which began its activities in 1964 to "raise the level of biological research in Europe"[73] and established a laboratory in 1974. These institutions were but a few examples of how synergies in science and technology could be created and used to provide optimal results. Such cases did not only represent a political and scientific commitment to the respective research fields; they also implied consensus among several European countries that it would take a concentration of efforts and means to achieve techno-scientific output of the highest quality, while remaining internationally competitive, in particular vis-à-vis the United States.

The decisions to found these organisations however, are considered to have been part of a process in which the scientific community had only partially or indirectly been consulted. European science therefore seemed not to be as well organised in pursuing and enforcing its demands upon policy makers as, for instance, industry or consumer groups were. This was particularly true on the EU level. Though many individual organisations as well as federations had offices in Brussels, hardly any were perceived as speaking on behalf of and lobbying intensely for European science. In turn, policy makers entrusted with finding solutions to existing problems and securing more funds for research often lamented the lack of arguments and dependable information on researchers' needs and positions as well as criticised the difficulty in finding experts and appropriate contact persons to provide them with the input they need. Character-

[72] http://www.eso.org/public/about-eso/timeline/ (accessed on 05.03.2015).

[73] http://www.embo.org/aboutembo/history.html (accessed on 03.09.2011).

istically, Members of European Parliament (MEPs) described lobbying by scientists and scientific institutions "at best…as discrete, at worst, [as] barely existent" (Abbott 1999). The research community was thus called upon to identify its key issues and requests and stand behind them publicly while winning over the relevant policy makers for its cause. At the same time, it was also expected to fulfil its perceived role in the public debate as a community of highly educated and skilled citizens, who contribute a great amount to economic and social prosperity. In other words, scientists were expected to 'tout their own horns' and put forward their demands effectively, while actively investing time and effort to promote a better understanding of their work by society and policy.

These ideas were put forward by an emerging grass-roots organisation of scientists that slowly formed from 1995 onwards in France. Though many visionaries and critics alike had expressed similar thoughts in the past, this was probably the first time that representatives of the scientific community decided to actually act on them. Those pertaining to the small group of initiators had had eye-opening experiences during their times outside the lab, be it during a secondment at the OECD, a diplomatic or ministerial posting abroad or while in a management position at a European research facility regularly dealing with EU and Member States representatives (Praderie 2007). Their observations were similar: how poorly scientists understood and subsequently played the political game; how modestly they propagated their expertise and qualification and respectively perceived their social standing and influence; how little they communicated with society at large; how weakly they stood up for their issues and lobbied on a national level, let alone on a European level; and how far behind Europe was in this respect compared to the United States.74 This last point had indeed been one of the main arguments of an embassy report circulated among senior research staff in France. Therein, neuroscientist Rémy Lestienne, at the time scientific attaché at the French Embassy in Washington D.C., called for a stronger presence of researchers in Europe through the establishment of a strong association, who would speak on

[74] These observations were shared by a number of individuals interviewed for this thesis (Lestienne 2009, Klapisch 2009, Sundberg 2008, Kordon 2008, Praderie 2007).

their behalf and promote their issues towards policy makers and society.75 Lestienne had been inspired in his articulation by the American Association for the Advancement of Science (AAAS), a US-based non-profit professional association founded in 1848, acting as lobbyist, counsellor and educator in issues regarding science and technology[76] and publisher of the renowned journal *Science*. During his time in the United States from 1990 to 1994, Lestienne had come in contact with AAAS and also attended many of its events, including its flagship Annual Meeting. He had been particularly impressed by this four-day conference attracting several thousand researchers of all fields, science policy makers, journalists and other research professionals from the United States and abroad (Lestienne 2009). Lestienne was also intrigued by the AAAS model itself, especially its efforts to fulfil an advisory and lobbying role in US policy making (Lestienne 2009). In his report entitled "The American Association for the advancement of science: An example for the European scientific community?"[77], he argued that European research needed an organisation modelled after AAAS – a European Association for the Advancement of Science – to place important issues related to science and technology on the agenda of policy makers and society alike. Moreover, he called for a similar scientific meeting to be held in Europe, ideally organised by an envisaged European equivalent to AAAS (Lestienne 2009). Not surprisingly, Lestienne became one of the founding members of Euroscience, as the grass-roots association officially established in 1997 was named.

Two other significant members, who later became the first Secretary General and the President of the newly founded association respectively, were Françoise Praderie and Claude Kordon. The former was a senior astronomer at the Paris Observatory, who had run the Megascience Forum at the Organisation for Economic Co-operation and De-

---

[75] Rémy Lestienne's report was circulated among leading scientific organisations in France. Though it was noticed, among others by prominent researchers such as Francois Kourilsky, Director of Centre Nationale de la Recherche Scientifique (CNRS), it did not lead to any concrete action at first. The key recommendation formulated in the document was indeed picked up two years later in the context of the foundation of Euroscience.

[76] For more information on AAAS see also http://www.aaas.org/aboutaaas/ (accessed on 19.08.2011).

[77] This title is a free translation of the French original. The information on the content of the report stems from Mr Lestienne himself. As there were only hard copies of the report, it is not available to him anymore. It was thus not possible to retrieve a copy of the original text.

velopment (OECD) and had also led the Earth and Space Sciences department at the French Ministry for Research. The latter was a neuro-endocrinologist, at the time director of the Institut National de la Santé et de la Recherche Médicale (INSERM) and European Science Foundation (ESF) Executive Committee member (formerly also coordinator of Life and Health sciences in the new French Ministry of Research). Praderie and Kordon had met at a conference in Paris in 1995 amidst the French presidential election campaign to discuss how research should position itself towards political candidates and formulate its objectives and concerns. There, Praderie had proposed the creation of a professional association which speaks for science not only nationally but on a European scale. She was convinced that "European scientists ought to get organised, make themselves heard and do so at the European level" (Praderie 2007: 11). For this they needed a new European Association for the Advancement of Science (EAAS). Though numerous learned societies (e.g. European Physical Society, European Mathematical Society) and academies of science did exist at the time, they mainly represented specific disciplines and thus rather focused on the issues of a limited 'clientele'. Transdisciplinary associations such as the British Association for the Advancement of Science[78] yielded influence mostly on a national level. Finally, other organisations comprised of national research councils and institutions, such as the European Science Foundation, did not necessarily have the mandate to campaign for science. None, Praderie argued, spoke for all European scientists in all research fields and thus helped construct a unified European 'front' for issues regarding science and technology. The time was ripe for such an organisation (Praderie 2007).

During the conceptualisation phase, Praderie, Kordon and Lestienne were joined by five more scientists[79], including Jean Pierre Bourguignon[80], Director of the Institut des Hautes Etudes Scientifiques, as well as European Mathematical Society chairman

---

[78] Since 2009 called British Science Association.

[79] The initiators were Jean Pierre Bourguignon, Hervé Chneiweiss, Claude Kordon, Rémy Lestienne, Françoise Praderie, Françoise Rousseau, Jean-Claude Salomon and William El-Kaim (Praderie 2007).

[80] Bourguignon had also attended the AAAS Annual Meeting and had been impressed by the meeting's volume and vitality as well as its ability to present scientific advances in different fields and provide a space for discussion, especially between scientists and journalists (Praderie 2007).

(1995) and member of the CNRS European Policy Committee. The group worked throughout 1995-1996 defining the scope and goals of the new organisation and looking for support amongst peers and collaborators. By the end of 1996, several senior scientists and science policy officials had joined the 'cause', but many more were needed. The group of initiators thus produced a 'manifesto' presenting the organisation, highlighting its values, general objectives and action lines and calling upon those sharing them to become members. Interestingly enough, though citizens interested in and concerned about science were also addressed by Euroscience and could be involved in its activities, initiators chose to publish this announcement solely within the exclusive circles of the scientific community. Thus, an article entitled "A new opportunity for science in Europe" appeared in November 1996 in *Nature*[81], one of the most revered European scientific journals, which at the time had a circulation of approximately 40.000 (Praderie 2007), though with a significantly larger readership among academic institutions. In the 'manifesto', founders admitted to aiming at achieving "scientific credibility" (Praderie 1996) first, before addressing other groups of people from within and outside the scientific enterprise. Euroscience founders had therefore initially sent out a "call to European scientists for the creation of a large, multidisciplinary movement for the promotion of science and technology in Europe" to a circle of high-profile representatives of the scientific community. They subsequently received "immediate support from 145 distinguished scientists from 22 European countries" representing a "fair balance of disciplines" (Praderie 1996). These 'founding members' along with those who had responded to the 'manifesto' were invited to attend the Constitutive Assembly of Euroscience in March 1997 in Strasbourg, where the new organisation would be based. This development was also picked up by European media[82], but also by AAAS in its journal *Science*[83].

---

[81] Praderie, Françoise (1996): A new opportunity for science in Europe, Nature Vol. 384, 14 November 1996, 108.

[82] See for example: *Sueddeutsche Zeitung*, 27 March 1997, *DIE ZEIT*, 21 March 1997 (DE), *Le Soir*, 5 et 6 March 1997 (FR), *Research Europe*, 20 March 1997 (EU), *The Guardian*, 20 March 1997 (UK), *Tagesanzeiger*, 18 March 1997 (CH).

[83] "Scientific Community: A New Voice for European Scientists?" in *Science*, 21 March 1997.

At the Constitutive Assembly, lively discussions were held with regard to membership and scope of the association. Indeed, though the 'manifesto' did advocate for a strong articulation of science's positions and contributions and called the scientific community to join the 'cause', initiators had deliberately refrained from providing a concrete outline of the new entity, for instance by defining objectives or membership criteria. On the contrary: they aimed at structuring the organisation by implementing a "bottom-up vision of science governance" (Sundberg 2007: 41). However, the first communication implied that scientists would assume a 'primus inter pares' role in this undertaking. In the course of the two day meeting, attended by ca. 250 researchers, policy makers from the EU Commission and Parliament, science managers, communicators and journalists, diverging expectations and imaginations of what Euroscience should become and pursue became visible. Opinions ranged from a lobby organisation for all science-related issues, to an institution focusing on the relationship between science and society, to a fundraising body especially for research projects in Eastern European countries (Kordon 2003, Klapisch 2009). Finally, it was agreed that the main objectives of Euroscience would be to represent, speak and act on behalf of scientists in Europe, give science and research a common voice and reduce the strong fragmentation characterising it on a European level.[84] The organisation furthermore would seek to increase awareness regarding scientists' societal and cultural responsibilities and act as an intermediate between science and technology on the one hand and civil society on the other (Praderie 2007; Kordon 2003). Euroscience would thus provide policy makers and administrators with solicited and unsolicited information and advice on important issues affecting the scientific enterprise and seek to influence European research policy for the benefit of the scientific community.

Following the AAAS model[85], Euroscience introduced no explicit restrictions to membership but rather appealed to "teachers, scientists actively involved in research and education (academic and industrial, young and established, representing all areas of

---

[84] Euroscience Statutes 1998: 3.

[85] AAAS is "open to all", http://www.aaas.org/aboutaaas (accessed on 19.08.2011). Its membership consists of "scientists, engineers, educators, students, policymakers, and concerned citizens who make up the AAAS community", http://www.aaas.org/membership/benefits (accessed on 19.08.2011).

science and engineering including social sciences and the humanities) and partners of science from the media, industry, science management and consumer groups" (Praderie 1996) to join. Thus a very broad community of individuals – not institutions – was targeted, leaving questions open with regard to the organisation's ability to appeal to so many different groups of people and at the same time serve their interests effectively (Kordon 2003). Coupled with Euroscience's geographic orientation, encompassing not only the European Union but the entire European Continent including Russia, the established institutional framework presented the organisation's operational entity with a challenging – if not to say almost utopian – task. This situation was made even more difficult by a significant lack of funding[86], which endures today and has deprived Euroscience of the opportunity to build up a professional administration to strategically plan, co-ordinate and support members' voluntary activities[87].

4.3 Phase 1: A European general science meeting is proposed, lobbied for and negotiated (1997-2002)

As Euroscience began to take form, Working Groups were established to address fields and topics ranging from Science Policy, Young Researchers, Public Awareness of Science to East-West Integration and Women in Science and publish information and reports on the ensuing debates. The issues selected were by no means coincidental, as

---

[86] Following its constitution, Euroscience sought both the financial and the administrative support of several European and national institutions as well as of private companies and foundations. Specifically, Euroscience Steering Board Members approached among others CERN, UNESCO, the European Science Foundation but also College Budapest, Louis Pasteur University, Strasbourg and the Paris Observatory, which had initially provided office space and support. Wilhelm Krull, secretary-general of the Volkswagen Foundation in Germany, attempted to establish a Euroscience Foundation to allow for more effective fundraising. Moreover, one of the first financial supporters of Euroscience was Stifterverband für die Deutsche Wissenschaft (donors' association of over 3000 German companies), further proof of German involvement in the organisation, which would turn out to be of particular importance for the development of ESOF some years later.

[87] Twenty years after its inception, Euroscience cannot necessarily be seen as having achieved the critical mass in membership and influence originally intended and aspired to. Through the perseverance of numerous active and well-connected members however, it has attempted to shape European science policy and strengthen the European Research Area, even if in a modest way. Euroscience advocates a European research environment, which is internationally competitive and offers better employment conditions for young scientists. The organisation furthermore "promotes the responsible conduct of researchers and use of science as well as the freedom to conduct research" (Banda 2007: 4).

they reflected to a great extent those set forth by the European Commission in its 5th, and later in the 6th Framework Programme. Emphasising the decentralised character of the new association, Local Sections were furthermore set up and run by Euroscience members attempting to engage the local communities of research professionals and non-scientists in symposia and formats such as 'Science Cafés'. Though their structure and means were modest, some of these local activities did manage to address a considerable amount of researchers, science professionals and citizens, such as for instance a Science Café established in Geneva (Klapisch 2009).

While the groundwork with regard to establishing a solid foundation for Euroscience and its Local Sections was still at a very early stage, soon considerations arose with regard to 'enriching' the association's activities by organising a significantly larger event with a European or even an international scope. Though it was clear that neither the funds nor the infrastructure were available to master such a task, Euroscience initiators nonetheless considered this an important aspect of the association's profile in terms of visibility and credibility, but also with regard to the recruitment of new members. The model considered by Euroscience Governing Board members resembled the AAAS Annual Meeting. Indeed, though science events on a national scale in Europe bearing some similarity to the US gathering did exist (e.g. the Science Festival of the British Association for the Advancement of Science or the International Science Festival in Gothenburg, Sweden), a multidisciplinary conference specifically addressing European academic and industrial scientists as well as science policy makers, managers, communicators, journalists and citizens had not yet been implemented. Lacking experience in this field and at the same time wanting to establish ties with AAAS, Euroscience approached members of the US organisation and proposed collaboration in organising a joint 'Transatlantic Colloquium' in two years' time (1999). Following its inauguration, the Colloquium would take place alternatively in Europe and the United States. It would feature plenary lectures on scientific breakthroughs as well as on current and controversial science policy issues. The lectures would be accompanied by parallel sessions and workshops on a variety of scientific topics, where issues of common interest to both Europe and North America could be discussed. Around 600 participants from the USA and Europe were envisaged (Sundberg 2007: 42). Eventually,

attempts would be made to involve other relevant European organisations as well (Euroscience Newsletter Dec. 1997: 8).

In February 1998 a meeting between Euroscience and AAAS officials was held in Philadelphia and a follow-up meeting was organised in Paris three months later (Sundberg 2007: 42). However, it soon became clear that each organisation pursued different interests and had a divergent perception of how this idea could actually be implemented. Euroscience members, though aware of the smaller scale as well as the breadth and impact of their organisation, pursued collaboration on an equal footing, thus proposing a separate event to be established. AAAS officials on the other hand, suggested an integration of the aspired symposium into the Annual Meeting itself, for organisational and perhaps also strategic reasons, as the proposed symposium could have been regarded as potential competition. As no consensus was reached, plans to establish a 'Transatlantic Colloquium' were soon abandoned.

However, notwithstanding initial difficulties, the idea of setting up a European equivalent to the AAAS Annual Meeting that would showcase the best European science has to offer and involve all stakeholders in the sciences and the humanities persisted. Euroscience members returning from the United States praised (and envied) the high-level science presented at the Annual Meeting as well as the large numbers of researchers from a number of epistemic fields and science media flocking to it every year. Their hope was that a similar event in Europe would help bring science and technology higher up on the agenda of policy and society. This thought was by no means new; it had probably been shared also by other members of the European scientific community, including EU officials, who had experienced the US event. However, it had probably never been *acted* upon in a decisive manner.

Finally, in 1999 the idea of a transdisciplinary science event was put forward by physiologist Carl Johan Sundberg, a member of the Euroscience Governing Board. Apart from being a researcher and professor at Karolinska Institutet in Stockholm, Sundberg had also served as an expert on advisory bodies for policy makers (e.g. Swedish Parliamentary Commissions), as well as worked in science communication and research publishing. In particular, he had organised several popular science exhibitions and made the experience, that when addressed in the right way and offered the opportunity to do so, citizens respond to displays of scientific processes, ask many questions

and want to know more about the topics at hand. He subsequently introduced two courses on popular science communication for scientists at Karolinska. In the meantime, Sundberg had also established together with other colleagues a company offering education courses to private companies (such as pharmaceutical, software and research equipment companies) aiming at collaborating with research institutions (in the health area) and wanting to comprehend how research is performed and administrated as well as which stage of research has use for what product or service. All these experiences had helped him apprehend the strong interdependence of the different actors pertaining to the research and innovation system and at the same time discern the fragmentation existing between them as well as the lack of knowledge of each other's modus operandi. He therefore asked himself whether there was a way to bring these groups together and advance mutual understanding and communication (Sundberg 2011).

The right context, within which an answer to this question could be found, seemed to have presented itself when Sundberg read the Euroscience announcement in *Nature* magazine. Indeed, the idea of a "bottom-up, grass-roots organisation" (Sundberg 2011: 2) speaking and lobbying for researchers and promoting interaction, exchange and a better understanding between those interested and involved in science and technology appealed to him as well as to other professionals, who would later become equally involved in the ESOF undertaking. However, despite the idealism and enthusiasm characterising the initial meetings of the new organisation, there hardly seemed to be a strategic approach with regard to how it could rapidly gain membership, funds and subsequently influence on a European level. In an attempt to support the organisation in achieving stronger visibility and impact, Sundberg proposed at the Governing Board meeting in December 1999 the organisation of a forum for all the sciences, attracting those groups of people involved in the scientific enterprise, which Euroscience also hoped to make its members. The meeting could be held in five years' time (2004) in Stockholm. From an organisational point of view, the Euroscience General Assembly as well as meetings of the Local Sections and Working Groups could be integrated into this conference and thus also bring together existing Euroscience members from all over Europe and Russia. From a strategic point of view, Sundberg hoped that it would be a good way to promote the organisation, help it attract more members and ulti-

mately provide a much-needed mouthpiece for the scientific community. In his view, Euroscience represented the right framework and an ideal host primarily because it was an independent organisation free from political control and financial interests. Moreover, the association had already caught the attention of members of the scientific community, the media, EU bodies such as the European Parliament and the European Commission, who would in turn be useful partners for the envisaged meeting. The reception of the proposal by Euroscience members was positive (Sundberg was then also informed of the efforts made by Praderie and others to organise a Transatlantic Colloquium) and it was decided that it should be actively pursued.

The idea to organise a pan-European transdisciplinary science meeting was indeed simple yet novel and timely, especially due to its inclusiveness and its aim to overcome communication barriers, be they within the scientific community, between researchers and their counterparts from industry, policy makers, science media, as well as between the scientific realm and society at large. According to its founders[88], ESOF was needed because of a lack in Europe of "an independent arena for dialogue on and about the sciences" (Sundberg 2007: 41). Indeed, until that point there probably was no single place in time in Europe, where researchers and all the other groups contributing to the scientific enterprise – such as policy makers, science managers, industry representatives and science journalists – could meet and communicate openly about the issues that affect them (Sundberg 2007: 41). Independence was perceived by advocates of the envisaged forum as the lack of political and financial influence or agenda both on a national and a European level. The envisaged 'arena' was not understood as static but rather as an ad-hoc space, flexible enough to react to current trends and reflect the cultural and geographic diversity of Europe. With regard to the content of the conference, initiators and supporters alike agreed that it must be multidisciplinary with regard to the research fields featured, but that it must also include cross-sectoral themes such as researcher careers, science communication and funding as well as a reflection on science itself and its politics. Furthermore, the event was expected to

[88] This is evident in several interviews conducted with individuals, who were instrumental in conceptualising and implementing the Euroscience Open Forum and can therefore be considered as 'founders'. These were, in my perception and based on my research, Carl Johan Sundberg, Ingrid Wünning Tschol and Ekkehard Winter. An important role was also played by Jens Degett in the initial phase, though no interview was conducted with him.

also provide science with more visibility and make its applications, its workings and structure comprehensible for policy makers deciding on new regulations, citizens funding it through their taxes and media fulfilling the role of translator and disseminator towards society at large.

The expectation was that the articulation of and debate on controversial issues, coupled with the echo provided among others by extensive media coverage would eventually transform what was to become the Euroscience Open Forum into a lobbying entity for scientists in the direction of policy makers and society, a place in time where they could “speak up for what they believe in” (Sundberg 2011: 4). Indeed ESOF founders experienced regularly the fragmentation characterising European science and felt that “competitiveness was not at all where it should be compared to the intellectual and monetary resources that Europe possesses” (Sundberg 2011: 4). The pursuit of such a forum therefore had both an idealistic and a pragmatic dimension. On the one hand, it was seen as a means to ‘empower’ science and help it assume its rightful place in the public discourse. This implied articulating and effectively disseminating specific messages, which in turn presupposes dialogue and exchange between the different ‘fractions' of the research system.

On the other hand, ESOF was considered as a means to “gravitate Euroscience in the direction of relevance” (Sundberg 2011: 5) and provide the organisation with a forum, which would make its efforts and activities visible to a much larger public than it could reach out to and attract at the time. Euroscience members very soon realised that an undertaking of this magnitude would require not only specialised infrastructure and personnel but also broad political and financial support. Thus, in the months that followed, Carl Sundberg together with other Euroscience representatives set out to get the endorsement of influential partners, which they believed could contribute to the realisation of the ESOF idea and thus secure the success of the meeting. This was necessary on a national (in this case mainly Sweden, as it was the first European country to be approached with regard to hosting the meeting) but also on a EU level, for both political levels where science was nurtured, financed, designed and governed in Europe, had to be addressed. On the international front, it was furthermore important to approach the organisers of the event that had admittedly inspired the ESOF undertaking and learn as much about it as possible.

Notwithstanding, its multifaceted approach seems to represent a quality that distinguishes the Euroscience Open Forum from other events, be they science festivals or disciplinary conferences. It was perhaps thanks to this diverse potential that the idea appealed to so many different stakeholders so early. The ESOF concept was specific enough to mobilise and justify substantial funding and support by established institutions, yet at the same time flexible and fluid enough to reflect the goals and ambitions of a variety of actors pertaining to the broader research system. Indeed, they all projected their own expectations upon the emerging forum and pursued different goals through their support for and commitment to it. If one asked how they perceived ESOF and how they would describe the event in a few words, one would receive descriptions focusing on different components of the Forum interestingly corresponding to the respective field of work of the interviewee. In the following pages, I will attempt to reconstruct the ESOF respective perception of three, in my view, important 'stakeholders': the European Commission, the Swedish supporters of ESOF2004 and the American Association for the Advancement of Science.

4.3.1 Approaching the European Commission

The role of the European Union in fostering research had evolved rapidly throughout the previous decades. Developments in the field of science and technology had frequently been ahead of the legislative framework provided by the European Treaties, which had been continuously adapted to provide the necessary legislative foundation and thus legitimisation for science (Eikenberg 2011: TFEU Art. 179; par. 29: 8).[89] Through these changes, the EU level had gained significant means and tools as well as jurisdiction to promote and govern research. This process, which had begun in the 1970s[90] with a Council decision and continued to evolve with every new European

[89] The original comment by Eikenberg reads as follows: "Die tatsächlich praktizierte FTE-Politik der Union hat sich zu keinem Zeitpunkt von den primärrechtlich vorgegebenen Zielen der Einheitlichen Europäischen Akte und später des Maastrichter Vertrages voll einfangen lassen. Im Gegenteil: Die Praxis ist dem Primärrecht stets vorausgeeilt."

[90] In his commentary to European legislation, Eikenberg notes that the groundwork for a European policy on science and technological development was established end of the 1960s beginning of the 1970s. In particular, he refers to the Council Resolutions of 14 January 1974 on the co-ordination of national policies and the definition of projects of interest to the Community in the field of science and technology (OJ C 7, 29.1.1974, p. 2–4) as well as on

Treaty, culminated in the proclamation of research and technological development as a shared competence between the Union and Member States in the Lisbon Treaty (see Art. 179-190 TFEU)[91]. Indeed, articles 179-190 of the Lisbon Treaty "documented in primary law that no stalemate is to be expected within EU research policy and that the coalescence of national policies into a European research policy would continue"[92] (Eikenberg 2011: TFEU Art. 179; Para. 28: 8).

Parallel to the legislative framework of the Union, the political and economic goals associated with the support of research and technological development evolved as well. Not only did they become an intrinsic part of the Union's Lisbon Strategy for growth and jobs and were later on linked to the Barcelona declaration's 3% goal with regard to the budget for research and development (European Council 2002: 20). They also flowed into a concept focusing on the social aspects of scientific research, namely the Commission's proposal to create a European Research Area. This proposal considered, among others, the needs of scientists working within the European Union, but also society's role in this undertaking. The Communication "Towards a European Research Area" was furthermore perhaps the strongest manifestation of the idea that at the beginning of the new millennium, the EU executive body was in the middle of a strategic evolution from 'mere' funding agency for inter-European projects to one "conceptualising and promoting a truly European research policy" (Gerold 2011: 2). In this document, the Commission calls for an "in-depth debate to define a policy approach in order to reinvigorate research in Europe", which is characterised as lagging behind compared to the US and Japan (European Commission 2000a: 5). Through this the EU executive body implicitly lays claim not only to the role of moderator, but also

---

the participation of the European Communities in the European Science Foundation (OJ C 7, 29.1.1974, p. 5–5) as the milestone for and starting point of the development of a European R&D policy (Eikenberg 2011 [Art. 179, Para. 16 TFEU]: 6).

[91] Art. 4. Para. 3 TFEU reads as follows: "In the areas of research, technological development and space, the Union shall have competence to carry out activities, in particular to define and implement programmes; however, the exercise of that competence shall not result in Member States being prevented from exercising theirs."

[92] Free translation of the following original comment by Eikenberg: „Damit wird primärrechtlich dokumentiert, dass in der Forschungspolitik der EU kein Stillstand zu erwarten ist und das Zusammenwachsen der einzelstaatlichen Politiken zu einer gesamteuropäischen Forschungspolitik weiter voranschreitet."

of initiator and driver of the process, thus reinterpreting its position within the European research setting as a strategic policy making entity. In this new capacity, the Commission will on the one hand create the necessary ramifications for a more efficient and effective research in the EU. On the other hand, it will [help] address society's concerns and raise its scientific literacy.

This widening of the EU body's group of addressees to also include society at large was justified by the latter's presumed lack of understanding and acceptance of research and technological development, diagnosed among others by ad hoc Eurobarometer studies[93]. At the same time, there were political and practical considerations to this orientation towards society: on the one hand, it was clear to the Commission, and in particular to Research Commissioner Busquin that if he wanted to "enter the political field he should also have to address societal needs" (Gerold 2011: 3) and thus establish a broader consensus basis for its activities. On the other hand, an undertaking such as the creation of a true area for uninhibited European research would require strong support on the national level and would hence have to focus more intensely on 'winning over' society at large with respect to its support of science and technology.

However, the European Commission had no tradition in addressing European citizens on matters of science and technology (Gerold 2011: 3). Though there were some activities focusing on cross-sectoral issues such as gender, promoting a new generation of scientists as well as previously launched events such as the European Science Week[94],

---

[93] The Special Eurobarometer survey "Europeans, science and technology" published in December 2001 quotes two-thirds of Europeans of saying that they are "often poorly informed about science and technology" while at the same time 45.3% declare that "they are interested in this subject" (Eurobarometer 2001: 6). Furthermore, the survey finds that though "the scientific knowledge of Europeans has evolved little since the last survey", the majority of citizens has a positive perception of science and technology and its role in Europe (Eurobarometer 2001: 6). However, most Europeans do feel the need for some "social control of science" since 80.3% of them supports the notion that "the authorities should formally oblige scientists to observe ethical rules" (Eurobarometer 2001: 7). Finally most Europeans would like to see a stronger involvement of the European Union in science as they believe that the overall level of European research can be improved mainly through enhanced cooperation between European researchers as well as between academic and industrial research, and through stronger co-ordination of research activities on a European level (Eurobarometer 2001: 8).

[94] The European Science Week was "launched outside the framework programme in 1993 in order to promote the European cultural aspects of science to the citizen" (EU Commission 2003: 3).

no comprehensive strategy existed (the Euroscience Open Forum would later on assume a particular role in this context). This lack was compensated through a number of steps. A discussion paper entitled "Science, society and the citizen in Europe" was published in November 2000 launching a public consultation on this issue. A parallel restructuring within the European Commission's DG Research led to the formation of the Science and Society Directorate in January 2001. The new entity would deal with the issues pertaining to the launch of the ERA concept and was also entrusted with taking the necessary measures for its implementation. Furthermore, the stronger focus on the field of Science and Society was flanked by a respective inclusion in Framework Programme 6 and an allocation of a significant amount of money to promote the goals formulated therein (see also Evaluation of 6th FP).[95]

These developments – and in particular the relationship between science and society – were also taken up and debated upon by the European Parliament and the Council of Ministers. In June 2001 the latter agreed upon a resolution[96] in which it "called upon the Member States to become more active in this field and asked the Commission to present proposals on how to strengthen the link between science and society" (Gerold 2011: 3). The Commission responded by presenting the "Science and Society Action Plan" five months later, in November 2001. In this document, the EU body outlines specific actions with which it aims to implement the goals set in the initial document launching the European Research Area. Under the theme "Promoting scientific education and culture in Europe: Towards the establishment of a dialogue at European level" one finds Action 19 proposing the organisation of a "European Convention for Science", which would involve and promote "close co-operation between a wide range of stakeholders from research organisations, public authorities, media, citizens, civil

[95] The Science and Society Directorate was responsible for running the respective field in Framework Programme 6, for which a budget of 80 million Euros had been set aside (this amount made out 0.5% of the total FP budget for the period of 2003 to 2006). Activities under this theme included very specific but also broader steps, such as creating a prize for science communication (Descartes Prize), promoting exchange between organisers of Science Weeks and festivals across Europe, establishing a platform for women in science, supporting better science education and monitoring ethical issues with regard to science (Busquin 2007: 53-54).

[96] Council Resolution of 26 June 2001 on Science and Society and on Women in Science (2001/C 199/01).

society, enterprises, etc. The scientific and technological community will play an essential role by presenting issues of interest to the public at large, and by contributing to the debate." (European Commission 2002a: 14). It is of particular interest to notice, that the authors specifically mention the AAAS Annual Meeting as a source of inspiration for the envisaged convention.[97] What remains open in this context is which organisation would form the European counterpart to the AAAS.

But how do these developments relate to the ESOF undertaking and the idea formulated by its founders? The articulation in the "Science and Society Action Plan" of the intention to organise a European Convention for Science to some extent reveals how the European Commission understood ESOF and how it had integrated it into its new strategy to address the perceived needs of society with regard to science and technology. Indeed, ESOF represented a policy instrument, one to be employed by the EU executive body to "close the gap between pure scientists and the users of science" (Laget 2011: 6). It would thus have to be implemented as a "high visibility" (media participation and subsequent dissemination of key information was from the very beginning considered an indispensable component of the Science and Society scheme and thus also of ESOF) platform for exchange on scientific issues that involves "the widest possible range of stakeholders interested in science and technology at European level" (European Commission 2002a: 14). Only in this way would it succeed in instituting a "true dialogue between science and society" (European Commission 2002a: 14), "combating the disaffection with science that has been reported from everywhere in Europe" (Busquin 2007: 52-53) and thus taking its place at the top of a long line of activities such as consensus conferences, citizens' juries, national and regional consultations, on-line forums and participative foresight programmes, which had emerged during the previous decades to „satisfy this need for mutual understanding" (European Commission 2002a: 14). Though only the inaugural meeting in 2004 in Stockholm was explicitly mentioned in the Science and Society Action Plan, the plan to hold ESOF biannually in a different European city implicitly fulfilled the declared intention of EU Commission and Member States alike to "foster this type of dialogue at all levels: Eu-

[97] One reads in a footnote to Action 19 that "the convention could be inspired by the long-established and well renowned yearly events of the American Association for the Advancement of Science" (European Commission 2002a: 14).

ropean, national, regional and local" (European Commission 2002a: 14). Finally, in addition to representing a practical effort by the Commission to incorporate the Euroscience Open Forum into the framework of its activities, Action 19 could also be perceived as an expression of support for the envisaged meeting, which was considered long overdue and necessary for Europe (Laget 2011: 3).

At this point however, it would be useful to retrace the steps that preceded the articulation of Action 19. Carl Johan Sundberg and his colleagues from Euroscience had met with representatives of the European Commission in September 2000 and asked for support for their proposal. They aimed at organising "a biennial meeting on science and technology, where cross-disciplinary interaction, communication between the public, politicians, policy makers and the media on current trends and future roads for the sciences, a broad dialogue on and about science and popular science presentations of front-line research" (Sundberg 2000: 7) could take place.[98] They argued further that "Europe needs *independent* arenas for *open* dialogues" (Sundberg 2000: 2), thus underlining Euroscience's claim of being a grass-roots as well as politically neutral organisation and therefore, in their view, the most qualified organiser of such an event. This line of thought challenged the one put forward by representatives of the European Commission, wherein neutrality was not perceived in the context of top-down (i.e. the political entities, such as the European Commission) vs. bottom-up (i.e. the scientific community), but rather as the capacity to foster and promote consensus building and co-operation. In their view, the shared competency granted to the European executive body by the Lisbon Treaty paired with the Research Commissioner's policy initiatives rendered the Commission the unequivocal spokesperson of the European scientific community and advocate of its interests. Consequently, an undertaking of the magnitude of ESOF deserved nothing less than to be steered by a steady and experienced hand.

---

[98] Indeed science and society as well as science communication issues were very dominant in the language of the first ESOF presentations and concepts. The presentation employed by Carl Johan Sundberg and other Euroscience members to illustrate the ESOF idea referred among others to the necessity to "enhance the European public's awareness of and interest in science and technology [as well as] … scientists' awareness of the public's righteous role" (Sundberg 2000: 8).

Notwithstanding, there were those who sustained that such a novel initiative stemming from the scientific community – even if not all its members had yet been reached – should receive the support of the European Commission but be left up to the community itself to organise. They believed that this might be a clever way to engage significantly more addressees than other Science and Society activities organised 'centrally' by the EU Commission had managed to do in the past. This argumentation finally prevailed and it was decided that ESOF initiators would receive the necessary financial and administrative support throughout the preparation phase. Furthermore, the EU executive body would assist, consult and to a certain extent oversee the organisation of the first ESOF meeting, thus exercising its role as 'guardian' and at the same time 'advocate' of the European idea(l) and making sure that this undertaking achieved the success it deserved, not (just) for the sake of Euroscience, but for Europe itself.

This intention was officially formulated in the Science and Society Action Plan under Action 19:

> *"The Commission will examine, with representatives of the European scientific community interested in the promotion of science, the feasibility of holding regular events of high visibility and quality ("A European Convention for Science").The Commission will assist in holding a major inaugural event in 2004 involving the widest possible range of stakeholders interested in science and technology at European level." (European Commission 2002a: 14)*

The responsibility for contributing to the implementation of ESOF rested with the newly formed Science and Society Directorate. It was established in January 2001 under the leadership of Rainer Gerold, who soon became an ardent supporter of the ESOF idea. Following a funding proposal by a consortium led by Euroscience, which was submitted to the first call of the Science and Society programme under the theme "Public Understanding and Confidence"[99], substantial funds were provided through Framework Programme 6 (European Research Area line) for the first ESOF meeting in

[99] Contract No SAS6-CT-2003-510152 - ESOF 2004; Theme: Public understanding and confidence; Call: FP6-2002-Science and Society-1; Partners: Euroscience, Academia Europaea, European Association of Research Managers and Administrators, Association Europeenne des Expositions Scientifiques, European Molecular Biology Laboratory, Association Europeenne de l'Universite Association des Boursiers Marie Curie, British association for the Advancement of Science.

Stockholm. Thus, ESOF was positioned not only conceptually but also structurally within the Science and Society theme of ERA.[100]

4.3.2 Identifying the hosts of the inaugural ESOF meeting: The Swedish research organisations

In order to fully serve the European idea(l), the Euroscience Open Forum would have to reach as many European countries as possible and allow a high amount of representatives of the European scientific community to share their knowledge with their peers but also with colleagues within and outside the scientific sphere. The meeting was therefore conceived as a 'Wanderkonferenz', one travelling from one European city to the next, attempting to highlight scientific achievements and engage the local communities of science professionals and citizens. The concept for ESOF proposed by its founders also included a bidding process by competing European cities to host the biannual meeting. The one selected would also be granted the title of 'European City of Science', which would, so Euroscience representatives hoped, prominently place scientific research, its social and economic dimensions on the agenda of the local community of investigators, research managers and citizens. This, however, represented a vision of the future, of how ESOF *could* develop. During the initial phase, its potential hosts had to be persuaded of the 'added value' of this particular meeting vis-à-vis so many others already being held in several European countries.

The selection of Sweden as the first host for ESOF was by no means coincidental. The Nordic country had a long tradition in scientific research and attracted scientists from all around the world as it was home to several high-profile, well-funded research institutions and universities. Sweden was also known and admired for its considerable investment in research and innovation[101] and a flourishing entrepreneurial sector

---

[100] However, it has to be said that this was not an easy process, as there was no precedent for ESOF, neither with regard to the scope of the meeting and its aim, nor – in particular – with regard to the positioning of the meeting within the EU Commission's funding concept. In this sense, ESOF challenged the existing structural and regulatory boundaries (Gerold 2011: 4).

[101] Statistics show that in 2001 Sweden was spending almost 4% of its GDP on research and development, the highest percentage among EU Member States (see also ESOF2004 Programme Book: G9).

stemming largely from scientific innovation[102] largely owing to excellent organisational and cultural framework conditions and a supportive political mind-set. Moreover, scientific research enjoyed high acceptance rates among a well-educated population with mostly liberal views on controversial issues. As in other Nordic countries, the democratic principle of participation was widespread and also being applied to scientific issues, for instance through participatory conferences[103] and the involvement of citizens and science professionals in political decision-making processes. Thus, science was considered a key asset and an important economic factor for the country, and excellent scientific education was deemed essential.

While the European Commission viewed ESOF as a means to reach out to society and promote EU science policy, the Member States saw the conference as a means to explicitly or implicitly influence this policy in the making. Sweden had, alongside Denmark, strongly supported the idea of ERA. As they were both countries with diverse and competitive research systems with a high percentage of foreign researchers and highly qualified experts and had a focus on promoting young talent, they favoured mobility of skills and expertise as well as of research funds. The latter was particularly relevant, as both countries were quite successful in attracting EU Framework Programme funding and participating in collaborative projects. During its European Presidency (January-June 2001) Sweden had focused particularly on issues such as Science and Society and lobbied for a reform of EU research funding to support basic science based on quality (Sundberg 2011: 3), what later on became the European Research Council.[104] In view of their country's successful research and development policy and the subsequently high percentage of entrepreneurship and innovation being achieved, Swedish policy makers were eager to see more of this activity spilling over to the European level as a best-practice example and through it increasing their influence on a political level in Europe. ESOF therefore "fell in well with the mind-set in Sweden

[102] See for instance the European Innovation Scoreboard, where Sweden regularly holds the first place, http://ec.europa.eu/DocsRoom/documents/17858 (accessed on 12.11.2016).

[103] Most notably the ones organised by the Danish Board of Technology Foundation.

[104] Denmark had advocated similar improvements in EU research funding as well as regulations facilitating researcher careers during its own EU Presidency (shortly after Sweden's).

at the time that [the country] should play a bigger role at the European scene" (Sundberg 2011: 3).

When the concept for a meeting such as ESOF was first introduced to high-ranking representatives of the Swedish research community as well as of the Ministry of Research, there was a positive reaction, but for quite different reasons. On the one hand, Swedish scientific institutions considered the national researcher community, citizens of Stockholm and public opinion to be the main recipients. They welcomed the idea as an opportunity to communicate science to a broader audience at home, and at the same time to make their own work and role within the Swedish research system more visible. Socialised in the tradition of high quality standards in scientific research fostered among others by the yearly Nobel Prizes, they were very keen on showcasing current research developments as well as on having eminent representatives from a number of scientific fields speaking at the meeting. Moreover, they placed particular emphasis on science communication and a 'Science in the City' programme, which would address citizens and especially children and youngsters in Stockholm, raise their interest in science and technology and potentially inspire them to follow a researcher career. These considerations were in line with the general state of acceptance of science and technology by the public[105], among others the result of a well-established public engagement with science 'movement' promoted by research institutions such as Karolinska and the Council for Planning and Co-ordination of Research, established in 1979 and supported financially by different charities in the country.[106] Even though it was a gradual achievement with some setbacks[107], it can be regarded as reflecting a perception of science as a "public good" (Callon 1994: 395 ff.) and a democratic principle (Felt 2003: 51), both with regard to its monetary support by the state as well as with regard to the recipients of its fruits. Political stakeholders on the other hand detected in ESOF a means of lobbying towards European institutions and emphasising their messages among others with regard to the implementation of a

[105] See Eurobarometer 2001 and Special Eurobarometer 2005.

[106] Already in 1977, Sweden introduced a law defining the active engagement by scientists and academics in the dissemination of the results of their work towards society as an intrinsic part of their duties, next to teaching and research (Felt 2003: 50).

[107] An example was the nuclear power debate in Sweden in the 1980s.

European Research Area and the creation of a European Research Council. In their eyes, ESOF could help promote on a European level the "philosophy they believed in regarding research and development" (Sundberg 2011: 3). Finally, both identified in ESOF a possibly worthy [European] alternative to the AAAS Annual Meeting, which they knew and admired.

ESOF founders understood both the potential and the different interests of these institutions. In addressing them, they attempted to highlight all these particular aspects. In September 2000, a first meeting between ESOF representatives and the Swedish Minister for Education and Research as well as the Chief Science Advisor to the Prime Minister, Hans Wigzell, took place in Stockholm. The Minister was asked for his endorsement of the undertaking and its goals, a request which he accepted.[108] Financial, political and organisational support was subsequently sought from well-established and respected institutions in the country, such as the Swedish Research Council[109] - which later on became the ESOF host, the Riksbankens Tercenerary Fund and Karolinska Institute. In the course of the following year, Swedish authorities decided in favour of supporting ESOF. In September 2001, Sweden's main science funding agencies committed over half a million Euros to the undertaking, thus providing ESOF advocates with the necessary momentum to begin with the conceptualisation and implementation of the first meeting. This commitment to host the first ESOF meeting and invest a significant amount in an idea that had, after all, not yet been tested was a "key moment" (Sundberg 2011: 3), which encouraged ESOF advocates to pursue their endeavour even more rigorously.

---

[108] In his introductory note featured in the ESOF2004 Programme Book, Thomas Östros, Swedish Minister of Education and Science at the time, states: "In order to strengthen European research, we have to create platforms for dialogue and exchange of ideas, such as this Forum. Europe clearly needs to invest more in science and co-operate more intensely in order for European research to be able to compete internationally…I am convinced that this meeting will be very successful and that it will contribute to strengthening European research and research collaboration." (ESOF2004 Programme Book: G9).

[109] The Swedish Research Council was established in 2001 as a government agency within the Ministry of Education and Research. Its key activities are to fund basic research and advise the government on research-related issues. http://www.vr.se/inenglish/aboutus (accessed on 13.03.2014).

Sundberg's proposal thus fell on fertile ground and met with strong interest on the part of the political sphere and the research establishment, who agreed to sponsor and contribute to what they considered a vehicle to pursue their political and scientific goals. This multileveled support in the initial phase of the ESOF undertaking was decisive, as it attested its seriousness and potential and at the same time made it attractive for additional sponsors following the Stockholm event. As the project began to take shape, further influential partners outside Sweden, such as the Robert Bosch Foundation and Stifterverband für die deutsche Wissenschaft, joined the 'cause' and committed funds to the organisation of the Forum. Sundberg also turned to *Nature* magazine editor Philip Campbell, who had been one of the first to endorse the Euroscience idea and could perhaps assist in promoting a European event similar to the AAAS Annual Meeting.

4.3.3 The American Association for the Advancement of Science: Learning from the 'role-model', getting to know the competitor

What Carl Johan Sundberg and his colleagues from Euroscience lobbied for and attempted to establish in Europe may well have been sensible and necessary – to a large extent even long overdue. The idea however, was by no means new. Just as Euroscience had sought to become a *European* Association for the Advancement of Science (Praderie 2007: 9), thus indirectly acknowledging the US (role-) model, so was the conceptualisation of ESOF to a great extent inspired by the AAAS Annual Meeting. Thus, the US scientific association and its Annual Meeting – which actually began as an 'outreach activity' to its own members and the country's broader scientific community – took on an important role throughout the development process of both Euroscience and later on ESOF by acting as 'best-practice examples' and to some extent by 'showing the way' towards the establishment of their European counterparts.

Indeed, AAAS and its meetings had existed for quite some time. The organisation was established in 1848 with the objective to "promote intercourse [by periodical and migratory meetings] between those who are cultivating science in different parts of the United States; to give a stronger and more general impulse, and a more systematic direction to scientific research; and to procure for the labours of scientific men, in-

creased facilities and a wider usefulness".[110] AAAS thus was the first permanent organisation in the United States formed with the claim of promoting the development of science and engineering at the national level and representing the interests of all its disciplines.[111] From the very beginning, its members consisted of scientists from different fields but also of science enthusiasts, such as naturalists. They diligently attended the association's annual meetings, which took place in a different city every time, hence attempting to attract and engage as many members as possible despite (and at the same time because of) the distance and long journeys necessary. Beginning of the 1900s and after some troubled times for the association during the previous decades, an effort was made to address the phenomenon that increasingly more specialised scientific societies were being founded and holding their own disciplinary meetings. A "Convocation Week", during which all national scientific societies including AAAS would hold their meetings concurrently, was proposed. The Association of American Universities endorsed the proposal, thus enabling faculties to attend. This "Convocation Week" was indeed very successful[112] in the years to come and marked the beginning of what is today the AAAS Annual Meeting[113].

Its efforts and to a large extent its success in 'synchronising' scientific exchange on a national scale can be considered as one core achievement of AAAS. The other is undoubtedly its merger with and later on acquisition and development of *Science* magazine, today one of the world's most influential scientific journals. *Science* provided AAAS with undisputed credibility and legitimisation as an organisation, not only in representing the research community and equipping it with a mouthpiece, but also in preserving and promoting its most valued institution, namely quality assurance

---

[110] AAAS 1856 Constitution adopted by the AAAS Standing Committee, August 25, 1856, and ordered to go into effect at the opening of the 1857 Montreal Meeting. http://archives.aaas.org/docs/documents.php?doc_id=413 (accessed on 09.01.2012).

[111] http://archives.aaas.org/exhibit/origins.php (accessed on 09.01.2012).

[112] "The first winter meeting was held in Washington in December 1902, attracting 989 AAAS members and fellows. Twenty-four affiliated societies with 363 additional registrants held concurrent meetings. *Nature* called it AAAS's "most successful meeting ever," and President Theodore Roosevelt received AAAS members at the White House." http://archives.aaas.org/exhibit/science3.php (accessed on 09.01.2012).

[113] To this day, many scientific societies hold their meetings concurrently with the AAAS Annual Meeting, thus facilitating attendance for their members.

through peer review. In the long run, the magazine's revenues also secured AAAS's financial existence, allowing the association to engage in and dedicate means to additional activities, such as science policy on a national and later international level as well as outreach towards society.

At the beginning of the new millennium, AAAS had grown into an organisation with approximately 300 employees and a variety of activities on a national level. These included promoting education in science, mathematics and technology[114], lobbying for the support of research towards policy makers and advocating for responsible views on the role and impact of science, especially in conjunction with controversial issues such as climate change and evolution (Teich 2011: 2). At the same time, activities outside the US were becoming even more important as globalisation and political change in many parts of the world had also affected scientific research by not only bringing down the remaining barriers to international scientific collaboration, but also by giving rise to new scientific communities thirsty for information and professional acknowledgement. What had thus begun as a purely national organisation and a journal focusing mostly on scientific achievements by US researchers[115] gradually began to pay more attention to developments beyond national borders. Science's management for instance has been particularly keen on expanding its subscriber base (which at the same time constitutes the membership base of AAAS) in Europe and elsewhere. To this end, an office for *Science* magazine was established already in 1993 in Cambridge, UK with the mission to increase membership but also report on the most important scientific and science policy developments in Europe. Still, though *Science* (and its sub-publications) is an internationally read and acclaimed journal, a considerable part of its news and peer reviewed articles still originates from the United States.

---

[114] One of the main AAAS initiatives in education is "Project 2061" aiming to "help all Americans become literate in science, mathematics, and technology. To achieve that goal, Project 2061 conducts research and develops tools and services that educators, researchers, and policymakers can use to make critical and lasting improvements in the nation's education system." http://www.project2061.org/about/default.htm (accessed on 09.01.2012).

[115] Though its focus clearly was to report on the achievements of the emerging US scientific community, *Science* had in fact published works by European researchers early on. The magazine's owner as of 1894 and most influential editor James McKeen Cattell, a psychologist by training, regularly published works by German peers, with whose work he had become acquainted during his studies in Leipzig.
http://archives.aaas.org/exhibit/science2.php (accessed on 09.01.2012).

Though its international activities – conceptualised and implemented through its International Office and involving initiatives such as the establishment of a Centre for Science Diplomacy in 2008 – are considerable and have been significantly enhanced throughout the previous decades, the focus of AAAS also remains (and will most probably remain) the position of scientific research within the United States as well as its uptake by American policy and society. In this sense, the organisation has remained true to its name and mission of promoting science and serving society in the United States.

With this historical development of AAAS, as well as its key focus areas in mind, it is now quite interesting to closely observe the association's perception of and reaction to Euroscience and later of ESOF. To some extent, the creation of a similar association in Europe that would contribute significantly to establishing an independent Europe-wide dialogue on the sciences was flattering. It paid a compliment to AAAS and its work by demonstrating that Europe had 'seen its way'. After all, the Continent and its multinational, fragmented scientific community needed such an entity perhaps even more than the US did. At the same time, this development came with many unknown parameters and open questions: What were the new organisation's aspirations? Which role within Europe, but also internationally, would it claim for itself? And, most importantly, which activities and projects would it pursue in the near future and how could they potentially rival those of AAAS? Euroscience founders' early announcements of their intention to establish both a journal and a large scientific meeting following the AAAS example as well as their close relationship to *Nature* magazine[116] (*Science*'s main competitor) indeed may have raised some concerns over the impact of these developments on the interests of AAAS and *Science* in Europe and beyond. And this perception could perhaps be made accountable for the rather cautious stance the US association kept throughout the initial phase of Euroscience and ESOF. Indeed,

[116] Euroscience indeed chose to publish its 'manifesto' and numerous other articles and announcements in *Nature*. It also sought and received the support of the journal's Editor in Chief, Philipp Campbell, early on. In the years that followed, *Nature* and *Naturejobs* became engaged in ESOF by contributing to the programme of the meeting, but also by supporting its efforts to reach out to more potential participants in Europe. However, at no point – to the author's knowledge and based on her research – was a merger of any kind between Euroscience and *Nature* magazine an intention or a realistic option.

though individual AAAS staff members have been collegial and helpful at different development stages of Euroscience and ESOF respectively – some of them even with a strong personal involvement in both efforts – AAAS's reaction could be characterised as generally interested and supportive, though at times contained and non-committal. From the point of view of 'capacity building' in Europe in the fields of science policy and outreach towards society, the newly established association and its plans to initiate a platform for dialogue on socio-scientific issues indeed presented an interesting development worth observing. An engagement too strong from the US counterpart however, could perhaps dilute the obvious differences (most notably the pre-eminence of the older association) in the public perception. In turn, it could also hinder the newcomer from defining itself and its goals without bias and subsequently 'going down its own path'.

Thus, though AAAS acknowledged Euroscience's (and later on ESOF's) creation in *Science*[117] and certainly monitored its development during the years that followed, no institutional partnership with Euroscience was pursued.[118] Since Euroscience's foundation until today, collaboration has mostly occurred in one direction (from AAAS towards Euroscience) and limited to activities mainly in the context of the Euroscience Open Forum. These include consulting on and providing marketing and communication services for ESOF (for instance through the EurekAlert! portal) and a considerable presence of AAAS at ESOF throughout the scientific programme and the satellite activities. Notwithstanding, almost four years after Euroscience's foundation, AAAS was approached again in a more systematic way by Carl Johan Sundberg. In February 2000 Sundberg travelled to Washington D.C. where he attended the AAAS Annual Meeting for the first time. He conducted extensive interviews with organisers and "meticulously mapped" (Sundberg 2011: 3) structures, processes and mechanisms of the US meeting. He thus understood how the AAAS Annual Meeting was structured, governed and financed. This knowledge would indeed prove itself quite valuable when organising

---

[117] In his article titled "Scientific Community: A New Voice for European Scientists?" Alexander Hellemans comments that "the organizers are unabashed in their use of the American Association for the Advancement of Science (AAAS, Science's publisher) as a model" (*Science* 21 March 1997: Vol. 275 no. 5307 p. 1731).

[118] It was mentioned in a previous chapter that first advances by Euroscience towards closer collaboration with AAAS in the context of a joint colloquium did not come to fruition.

the first ESOF conference in Stockholm. Sundberg also acknowledged how the US meeting acted as a "magnet for the scientific community in the US" (Sundberg 2011: 3) and its over 260 affiliate organisations, many of which hold their own assemblies concurrently. What is more, holding the meeting in alternating cities was (and still is) a means for AAAS to make its presence known beyond the District Capital (where its Headquarters are situated) and increase its influence on a national level. Essentially, a different major US city was selected as a host for the meeting each year. The local scientific community was invited to send representatives and contribute to the programme by submitting proposals for scientific sessions and lectures. It was thus given the opportunity to present itself and its institutions to peers from across the country and also to foreign participants. Publics such as educators, families and children, science journalists but also private companies and industry were also addressed and engaged mainly through satellite events. To a considerable extent, ESOF pursued very similar goals on a European level. Hence, its subsequent implementation in Stockholm mirrored many of the above mentioned activities.

During the preparatory phase that followed on Sundberg's first visit to the AAAS Annual Meeting and later on to the headquarters of the Association, several AAAS officials contributed their know-how and experience and provided ESOF founders with access to information on the structure of their organisation and especially on the workings of the Annual Meeting. Some of them were also invited to attend workshops and act as advisors during the time leading up to the first ESOF meeting. In the following years, ESOF was also repeatedly – and quite positively – covered by *Science* magazine and its creation linked to important developments on a European level, especially in the context of the Lisbon Strategy and ERA.[119] Therefore, one could argue that it was particularly the idea and the subsequent efforts to establish ESOF that captured AAAS's attention and sparked its interest, something which Euroscience had not really been able to achieve before that point. The activities related to ESOF furthermore provided fruitful ground for a stronger engagement of the US organisation in the dwellings of its aspiring European counterpart, even if they didn't lead to an institutional collaboration between the two organisations.

[119] See for instance *Science* Vol. 305 3 September 2004 or *Science* Vol. 306 8 October 2004.

4.4 Phase 2: From vague idea to palpable project. The Euroscience Open Forum is conceptualised (2002-2004)

The period that led to the first Euroscience Open Forum was a process of gradual crystallisation of the initial theoretical proposal, of negotiation and consensus building. The concept of a meeting devoted to science, science policy and science communication was open and flexible enough to accommodate the wishes and expectations of a different set of actors. During its conceptualisation phase, ESOF thus resembled a 'melting pot' of ideas and plans which were 'fertilised' by current science policy debates.[120] During a meeting in Berlin in March 2002, the core group of organisers forming the so called ESOF Steering Committee[121] sought to define the main characteristics and attributes of ESOF for the purpose of internal agreement as well as a basis for the future communication of the undertaking. Hence, the goals of the envisaged meeting were defined as follows: ESOF should "present science and humanities at the cutting edge, stimulate scientific awareness and foster debate on science and society" (ESOF2004 SC Minutes, 05/2002: 1).

The first goal clearly formulated the expectation that the research presented at ESOF should not in any way be inferior to the one presented at a dedicated scientific congress. Researchers across Europe would have a share in ensuring this goal is fulfilled as they would be called upon to actively contribute to the scientific programme of each ESOF meeting. Through an open call for proposals published well in advance of the actual event, the scientific community itself would be asked to submit their ideas for the conference programme and – when selected to do so by a specially established

---

[120] For instance on the need for a European Research Area, on funding models for research on a national and EU level as well as on the development of scientific careers, especially for the younger generation of investigators.

[121] The membership constellation of this meeting to a large extent reflected the respective groups which had initially been approached as potential supporters of the ESOF undertaking. Representatives from Euroscience, Karolinska Institute, the Swedish Research Council, SVT Swedish Television, the European Science Foundation, the Robert Bosch Foundation as well as Stifterverband für die Deutsche Wissenschaft, who comprised the ESOF2004 Steering Committee, added pieces to the ESOF 'puzzle' inspired by their own fields of work as well as by current trends in their respective country of origin. Though not all members were present in their official capacity or necessarily represented the direct intentions of their employers, they did express views based on their personal experience and perception of the prevalent discourses in their respective organisations and countries.

Programme Committee – present their work, explain its use and applications as well as its connection to other epistemic fields. To guide this process, a list of preferred themes was put together for ESOF2004 by the organisers, a process which continued throughout the following ESOF meetings. These themes, ranging from climate and environmental change, nanotechnology and marine biology to science of arts and science and society, spanned several epistemic fields and implied transdisciplinary scientific activities.[122] This process of constructing the programme 'bottom-up' was in itself an ambitious goal, since most researchers (the very best among them even more so) are under pressure to produce and publish palpable results before their competitors do. Inevitably, they hence focus intensely on their projects and avoid activities that do not necessarily contribute to their career development. When they do reach the point of publishing their findings, they are keen on presenting their work to their peers and at carefully selected venues in order to maximally reap the benefits of their success. By not being conceived as a disciplinary scientific congress open only to specialists, ESOF bypassed from the very beginning one of the pillars of the research system. However, ESOF did not want to replace this institution or compete with it, but rather complement it by enabling projects involving research from different fields to be presented as well as by providing a discussion platform for science managers and administrators, who do not that often have the opportunity to speak about their work. For they too could submit proposals for the conference programme for instance on topics such as science policy or science communication.

Hence, organisers were quite keen on maintaining a high level of scientific excellence throughout the programme in order to attract adequate participants, including eminent representatives of the scientific community. Parallel to the scientific sessions left upon researchers to fill, the organisers thus created slots for so called key-note and plenary lectures, which should preferably be assigned to acclaimed researchers (e.g. Nobel laureates). These persons would act as a "locomotive" (Steering Committee Minutes August 2002: 4) for the meeting by increasing its visibility and attractiveness. Their presentations would cover current, and in some cases even controversial, topics

[122] As defined by Nowotny, Scott, and Gibbons (2001) in Re-thinking science: Knowledge and the public in an age of uncertainty.

in scientific research and science policy. An important intention attached to the selection of these particular individuals as contributors to the ESOF programme and content was considered by organisers to be the educational and inspirational value of their talks especially for young scientists and students – in other words for the aspiring generation of scientific research in Europe. The potential application of their work and its implications for other fields and for society represented a further important dimension.

It was mentioned before that the early group of ESOF organisers featured a mixture of different backgrounds, such as active scientists, researchers-turned-administrators or -lobbyists, science communicators and journalists. Their imaginations on how to 'man' the Forum in terms of speakers and participants and how to form its organisational structure (including the Project Team and Committees) were largely influenced by their own 'socialisation'. Indeed, though they aimed at creating something novel, which should ideally be more inclusive and universal in its claims and beliefs, they ultimately largely abided by the norms and conventions prevalent within the research system. This thought comes to mind when noting for instance that hardly any representative of the other groups attending ESOF was considered as a candidate for the keynote and plenary lectures. Indeed, only researchers were deemed sources of inspiration and subjects of admiration for attending publics. What is more, an extensive look at the average keynote and plenary lecturer at ESOF 2004, 2006 and 2008 reveals a rather monotonous picture: a large number are male, of a certain age and representatives of the natural sciences. Still, it should be noted that this represents a contrast to many of the remaining scientific sessions and events during the ESOF meetings, which often featured acclaimed speakers owing not only to their scientific merits but also to their presentation skills and eloquence.

The magnitude of the organisers' claim to enhance scientific awareness and foster debate on science and society, the second goal of ESOF, becomes quite clear when viewed in the light of Mode 2 knowledge production, which sustains that boundaries between society and science become fluid in a way that makes it difficult to distinguish where one begins and the other ends (Nowotny 2006: 4). It is indeed the transgression of boundaries (Nowotny 2006: 4) both internally (among epistemic fields) and externally (beyond the scientific realm and towards society in the sense of citizens but

also in the sense of the societal context in which science emerges and is performed) that ESOF should facilitate. This involves 'raising awareness' not only among researchers themselves with regard for instance to the societal and political implications of their work, but also among other groups in order to make them understand that they are – or at least should be – not only recipients and users, but also actors in the scientific process. The 'debate on science and society' can be a logical consequence of this realisation process: in the moment when both sides admit to their role in the scientific process, they engage in a dialogue not only concerning their own contribution, but also concerning the objects of research themselves and their use or place in public life and academia respectively.

Translation among social worlds and epistemic fields is something ESOF was particularly called upon or conceived to do. A process of translation was expected or foreseen to take place on many different levels: across disciplinary boundaries, between researchers and other professionals, the research system, society and industry (though the latter claim was formulated at a later stage). This translation was of a both thematic and academic nature. The conference programme was to some extent intended to interpret scientific developments, make them comprehensible for non-experts as well as facilitate discussion on science policy issues and issues revolving around scientific research, its performance, its administration, its quality assurance. What was also considered by the organisers a significant contribution to the debate on science and society were the Outreach Activities or the Science in the City programme. Though this component was not the focus of the Euroscience Open Forum and not the main reason for its establishment[123], they were an "indispensable element" (Sundberg 2011: 4) that could help win over additional official supporters and participants alike. In fact, public engagement through science festivals and popular science activities was 'en vogue' in many European countries, in some (e.g. Germany through the *Wissenschaftsjahre*) even pursued top-down with substantial financial means.

Taking the analysis a step further, one could also paraphrase the goal of enhancing scientific awareness to reflect the process of disseminating (among ESOF participants

[123] ESOF founders indeed referred to the Outreach Activities it as a „pleasant side-effect' (Wünning Tschol 2008: 3).

and beyond) knowledge on knowledge, its methods of production, its value and use. 'Awareness' could therefore be considered as the very first level of acknowledgement, followed by understanding for and of science and its products. Acquiescence was perhaps also implied, especially with regard to controversial issues revolving around scientific research. The next and final level was 'enabling' rather than merely 'enhancing' and thus cultivating in the addressed groups and individuals a "capacity to act" (Stehr 1994) for science, within their own particular roles and environments. This capacity could be viewed as particularly relevant also for policy makers. For insight into the scientific realm, its workings and values, as well as consideration of the results of scientific work in the context of evidence-based policy making is an implicit but a further, quite important aspect of organisers' intentions. Awareness should be raised among (attending) policy representatives, who decide on the research system's organisation and funding, but also on issues referring directly to societal or technological challenges needing to be solved (such as energy sources of the future or strategies against climate change).

The actual implementation of the latter two ESOF goals however employed rather conventional instruments and settings, partly featuring unidirectional public engagement activities detached from the 'real' scientific process. The focus of the conference was on mutual information – between researchers themselves but also between them and non-scientists – on current developments, in the hope that it would 'spill-over' to discussion and debate on the implications and applications of the issues at hand. Organisers thus argued that understanding of the scientific process as well as knowledge of some of its most prominent and socio-politically relevant results should be enhanced not only among non-scientists attending the conference or 'out in the street'; rather, researchers themselves should also learn about developments in other disciplines close or far to their own and thus complement their knowledge and broaden their scientific horizons. All this should be accomplished throughout the course of a four to five day event offering a broad palette of lectures, presentations and panel discussions. Though not all issues and scientific disciplines could be covered at once – in fact this claim was never made by ESOF organisers – one did want to address issues of importance to the researcher community, to all the publics closely revolving around it as well as to society at large.

Indeed, the name for the Forum selected during the course of the first preparatory meetings[124] was intended to reflect exactly that: the potential for debate, for interaction and exchange. It consisted of a reference to the founding organisation Euroscience followed by a clear description of what addressees could expect: an open to all and independent forum, where participants can meet and exchange opinions and ideas about science. Catalysing debate "on and about the sciences" (Sundberg 2001: 4) was believed to be vital for the new event, if it were to leave a mark and establish itself as a serious and worthy destination. The Forum was thus conceived mainly as a high-quality source of information about scientific issues and a networking platform for participants.

Finally, what was clear to ESOF organisers from the very beginning was also the necessity to involve further actors in the preparatory phase of their undertaking. These would be either experts in the organisation of similar events, potential sponsors who had to be persuaded of the value of the proposed project as well those who saw in ESOF a worthy cause to transfer their know-how and devote their time to. In fact, throughout its history, ESOF owes a large debt to these individuals, who despite many setbacks and difficulties devoted an immense amount of their not so spare time to the cause. Beyond the parties involved in the conference when it actually takes place, we need to also consider the actors entrusted with organising ESOF in the respective city. Those include the host of the conference (usually a respected organisation or foundation with a vested interest in science and its dissemination), the city administration including the Mayor, whose support is vital for securing funding and running a successful event, the ministry of science and research (on a local and in some countries also on a federal level), and last but not least, the scientific community within the country itself be it from universities or research institutions. All these parties see in ESOF a chance to present themselves and their interests. Industry, both national and from other countries, has also increasingly become an 'public' for ESOF, which is per-

[124] According to the minutes of the third Steering Committee meeting on 24-25 August 2002, the new name was suggested by Gabriela Norlin, newly appointed Project Leader for ESOF 2004. It was intended to replace 'Euroscience2004' or short 'ES2004, which had been used until then for the undertaking.

ceived as offering a neutral platform for presentation be it through the Exhibition or the conference programme itself.

In March 2002, ESOF founders thus formally defined the addressees or 'target groups' for ESOF meetings to come. These were, in the same order as mentioned in the minutes: "Scientists, media, policy makers, teachers/educators, students and industry" (ESOF2004 SC Minutes, 03/2002: 2). When juxtaposing these groups of people to the goals ESOF should pursue and fulfil, one recognises a consistency in the sense that the people mentioned need to be addressed in order for the goals set out by ESOF to be achieved. Though terminological adaptation or specification may have taken place during the following years, one could argue that the core of ESOF's addresses has remained the same. Throughout the first three meetings however, we do notice two exceptions. Though there are no detailed records of attendance, by many oral accounts and according to my own personal observation teachers tend to visit only the Outreach Activities. These however, are not a focus of this thesis. The numbers of industry representatives were in turn, at least during the meetings in Stockholm, Munich and Barcelona rather low both in terms of the number of attendees, as well as in term of sessions on issues affecting industrial research. Still, it should be mentioned that ESOF2008 did feature a small (four sessions) 'Science to Business' programme and made an honest effort to increase these numbers.[125]

4.5 Phase 3: Implementing ESOF (2004-2008)

The months leading up to ESOF2004 was a period of hard work as well of interchanging optimism and doubt as to whether what was still mostly theory could be turned into practice. As was perhaps to be expected, the initial idea to create ESOF had evolved during the various phases of implementation. Each individual and organisation that accepted or declined the call for support had perceived the meeting in a somewhat different way. ESOF had thus been imagined and taken place in the minds of the publics involved in it long before it actually began for the first time on 25 August 2004 in Stockholm.

[125] According to conference statistics, 20% of ESOF2008 registered participants came from the ‚Private Sector'. However, this category does not only include (research performing) industry. It is therefore not possible to reliably re-construct the actual number of attendees.

The thematic foci of ESOF2004, for which programme proposals would later on be invited, had been defined by the Steering Committee roughly two years before the meeting. They were of an almost overwhelming variety and diversity: Mind and Behaviour; Science and Society (or Best Practices of Public Engagement); Man, Humanity and Space (or The Origin of Universe); Future Technology; Climate and Environmental Change; Nano Technology; Evolution of Life / Marine biology; Cognitional Science; Society in Change[126]; Science and Ethics; Governing of Science in Europe; Science of Arts. These tracks would be complemented by 'ad hoc' sessions (top-down) presenting current issues addressed as 'hot topics' in Science (ESOF2004 SC Minutes, 05/2002: 2). One notices, already in the beginning, the claim of ESOF not only to address issues reflecting the research system, its methods, its funding, its policies and people. Rather, excerpts of scientific work – and if possible very current ones too – would be presented at the newly established meeting. This in itself was a novelty, its success uncertain. The reason for this is that it entered the 'territory' of disciplinary conferences, one of the pillars of the scientific enterprise. Another key element of the research system featuring prominently at ESOF was peer review. The initial idea behind the selection process for the scientific programme saw members of the scientific community and beyond sending in their proposals for scientific sessions which would then be submitted to a preliminary peer review process[127]. The final decision would then be made by a high-profile Programme Committee consisting of experts from different scientific fields. It is interesting to point out that AAAS also relies on a Programme Committee for the final selection of the Annual Meeting's programme. The selection of the meeting's scientific sessions involves a two-step procedure, the first part of which is an expert peer-review followed by a deliberation on the best proposals within the Programme Committee, which comprises no more than 20 individuals (mainly from the

[126] The following alternative theme titles were also mentioned in the minutes: The Ageing Society; Urban Ecology; History; Conflict Solution; War and Peace.

[127] Here it is of particular interest to point out that a real peer review process with the assistance of the European Science Foundation was performed, on which the ESOF Programme Committee based its selection. Due to its complexity, it was to my knowledge only performed for ESOF2004 and ESOF2006. Starting with ESOF2008, the programme selection has been made mainly by the Programme Committee, in some cases e based on a prioritisation performed by the Project Team.

United States, nominated by the AAAS Board of Directors) and is installed for a period of two to three years.[128]

During this phase of laying out the main parameters of the undertaking, a comparison with the AAAS Annual Meeting (which all Steering Committee members knew and appreciated) was performed. This included an assessment of the most suiting formats and elements which could fit in well with the first European event of its kind. For, after all, the original idea of the Forum's founders consisted in organising a European version of the AAAS Annual Meeting. This exercise inevitably pointed to differences between the US and European scientific research culture and tradition. The role of public engagement would be more prominent in "the European conference" implemented for instance through "a festival on science films, science theatre like [the] 'Copenhagen' [play], science and arts, public lectures and debates" (ESOF2004 SC Minutes, 03/2002: 1). ESOF would also feature "more interactive format(s) such as 'Socratic debates', 'pro and con' discussions" and focus on controversial issues in science (ESOF2004 SC Minutes, 03/2002: 1). Moreover, "[European] diversity…in topics such as science policy and history" should receive particular attention and be articulated through specially chosen lectures and sessions (ESOF2004 SC Minutes, 03/2002: 1). These would be embedded in two programme components: the Scientific Programme with associated professional Exhibition, taking place within the conference walls and the Outreach Programme intended for the local population and set up in the city. The Outreach Activities as organised and implemented in Stockholm were indeed in the city centre[129] and included a broad variety of activities not quite featured at AAAS meetings. With regard to the scientific programme structure however, the first ESOF edition followed the AAAS Meeting's daily programme format very closely, though the total amount of scientific sessions and lectures was significantly less, approximately half of what the US meeting usually offers its participants.

---

[128] Report by Raphaela Kitson-Pantano, ESOF Hub Director (2008): 15.

[129] For the scientific meeting, the city conference centre in Stockholm was preferred over the more remote exhibition grounds. Closeness to the city centre was also of particular importance for the Science in the City programme, which constituted the epicentre of activities addressing local citizens, children and educators.

The respective geographical focus of the two meetings represented a further significant difference. The Euroscience Open Forum's area of geographical interest was and is Europe, a continent to a large extent united under the EU construct, yet very diverse in the exact elements at play within ESOF (culture, language, science tradition). The assumption upon which ESOF is based is that Europe needs a showcase for the scientific results achieved within its geographic boundaries. ESOF is meant to become a mirror of the best Europe has to offer in science and technology: for the media to report, for the tax payers to see where their money goes, for those with a keen interest to learn, for politicians to achieve a better understanding, for entrepreneurs to be inspired and last but not least for scientists to become even better in their work through cross-disciplinary and socio-political exchange. The United States, the AAAS' 'playground', is indeed a very homogeneous arena compared to the European Continent ESOF mainly wishes to address. Beginning with the language and reaching all the way to issues such as academic tradition and the respective socio-political systems, the challenges ESOF faced were much more complex and called for a high degree of openness, flexibility and resourcefulness. Finally, the geographical aspect also had a significant impact on the identities and ultimately the numbers of participants. For these too, AAAS represented the 'benchmark'. While initial imaginations of ESOF included several thousand attendees, the first meeting attracted approximately 1200 registered participants, a large part of which consisted of the organisers and speakers themselves. In comparison, AAAS Annual Meetings attract and average four to five thousand attendees, in some cases even more. However, one must say that this is a result of a long-standing effort to establish this meeting in the United States which goes back more than a century.[130]

Finally, when examining the ESOF2004 programme, one notices that AAAS contributed two scientific sessions and one plenary lecture to the conference.[131] One should say at

---

[130] Indeed, the AAAS Annual Meeting too had its 'ups and downs' in the past. Following record attendance at the 1969 meeting in Boston, participant numbers declined, reaching a low point in the early 1980s. A concerted effort to restore the quality and vitality of the Annual Meeting in the 1990s, including the establishment of a standing Programme Committee, paid off by leading to stronger programs and increasing attendance.

[131] Shirley Malcom, Head of the Directorate for Education and Human Resources Programs of AAAS, held a keynote speech titled "Telling the stories of science", in which she referred to

this point, that ESOF and Euroscience, in all its years of existence have not reciprocated this. Rather, this opportunity has been taken up quite successfully by the European Commission, who sees itself as the mouthpiece of European science. Almost every year, a large delegation travels to the AAAS Annual Meeting and organises scientific sessions on current issues, specialised workshops and information events on doing research and living in Europe as well as on EU funding opportunities for researchers. The EU body also presents its research institutes (Joint Research Centres, EIROForum) and of course also introduced the European Research Council when it was first established. As a significant sponsor and supporter, it did the same at ESOF2004. The Directorate General Research organised two science policy sessions[132] and was represented by a number of further speakers in other sessions and the Opening Ceremony. It also installed a large stand in the Exhibition alongside other institutional supporters, such as the Swedish Founding Agencies, Johnson & Johnson, Nature Publishing Group, the Robert Bosch Foundation and the Stifterverband für die Deutsche Wissenschaft. The latter two later on expressed a strong interest to 'import' ESOF and have it take place in Germany in 2006. By inspiring a number of influential partners and gaining their support, the Stockholm meeting thus laid the foundation for the continuation of the ESOF experiment.

Through the personal initiative of their functionaries, Ingrid Wünning Tschol and Ekkehard Winter, the Robert Bosch Foundation and the Stifterverband für die Deutsche Wissenschaft (Donor's Association for German Science) respectively pledged a significant amount of funds to ESOF2006. It was decided to hold the meeting in Munich, on the premises of the Deutsches Museum, Germany's renowned science and technology museum idyllically situated on a small island upon the river Isar. Wolfgang Heckl, the museum's director and winner of the first European Descartes Prize for Science Communication in 2004 was selected as Chairman of the ESOF2006 Steering

---

the activities of AAAS in science communication and policy advising. The session "More women in PhDs in science and engineering in Europe?" on the other hand aimed to raise awareness of the altogether low number of female PhD graduates in science and engineering as well as for the need to employ this human capital for the benefit of society. AAAS also organised a reception in the Wasa Museum in the Stockholm harbour.

[132] "Are scientists allowed to have children?" and "Is there a gender bias in scientific research?" (ESOF2004 Programme Book: Ss20) both organised by Rainer Gerold.

Committee and as 'ESOF Champion' (or the public face) of the 2006 meeting. Choosing a museum with a long-standing tradition in public outreach as the host institution, a researcher-turned-museum-director and established science communicator as the meeting's key figure as well as combining the meeting with the 'Wissenschaftssommer', the German National Science Week, was quite telling with regard to the contextual priorities the organisers were intent on setting at the second ESOF meeting: science communication and public outreach were at the forefront of the Munich undertaking. Indeed, this intention is also manifested in the participant outcome: the percentage of press and communication experts for instance represented the highest of the first three ESOF meetings (see 4.6) which indicates that the meeting addressed a strong need for a platform for professional exchange and networking (Weingart 2008: 25) among these groups. Moreover, organisers followed – for the first and only time in the ESOF history to date – a more liberal policy with respect to participation: plenary lectures taking place daily in the Aviation Hall of the Museum were accessible to everyone and the Museum waivered its entrance fees for the duration of the ESOF meeting. The tone given to the Munich event however, also fell in well with current developments in Germany. Only six years before, the Science Years (Wissenschaftsjahre) concept had been introduced by the Federal Ministry for Research and Education in an effort to catch up in the field of public outreach and engagement as well as science communication.[133] German science institutions and relevant NGOs (including the Stifterverband) had signed a memorandum pledging to promote dialogue between science and society only a year before.[134] Germany was indeed a latecomer in these fields, compared for instance to the UK, the US or Scandinavian countries such as Denmark or Sweden. The Science Years were a successful undertaking in that they helped establish science communication as a duty of both science and politics (Weingart 2008: 4). Through this initiative the country managed to co-ordinate existing

[133] The German Science Years were introduced in 2000. The concept behind this undertaking was that each year was devoted to one discipline or epistemic field e.g. Year of Physics (2000), Year of Life Sciences (2001), Year of Geosciences (2002), Year of Chemistry (2003), Year of Engineering (2004), Year of Informatics (2006). As an exception, the year 2005 was dedicated to Albert Einstein.

[134] Memorandum „Dialog Wissenschaft und Gesellschaft" 1999, http://www.wissenschaft-im-dialog.de/fileadmin/redakteure/dokumente/push_memorandum_1999.pdf (accessed on 27.01.2013).

science communication activities as well as introduce new ones, which reached out to and involved a considerable amount of people directly or via the media (Weingart 2008: 4). However, during the first years after the introduction of this new initiative, efforts to increase communication of scientific results towards society at large and 'educate' the public still very much resonated with the so called 'deficit model'[135]. The formats used were not necessarily conceived to promote dialogue on the issues at hand.[136] Critics also noted that the Science Years mainly reached those already adept to or interested in techno-scientific issues, while failing to engage societal groups farther away (Weingart 2008: 4).

Notwithstanding, ESOF was viewed by its German supporters, including the Federal Ministry for Education and Research, as an 'extension' of efforts to promote science communication and with it "education, promotion of a new generation of researchers, participation and science as a cultural activity" (Weingart 2008: 4)[137]. Implicitly, it may have also been perceived as the next step towards a bi- or multidirectional communication or even dialogue on science and technology. The President of the German Federal Republic, who together with Federal Research and Education Minister, Annette Schavan, inaugurated ESOF2006, stated in his opening speech that "if efforts to support science and research are to be intensified, it will be necessary to explain to people why science and research are necessary and important. Initiatives such as the *Wissenschaftssommer*…render the importance of science and innovation palpable…The Euroscience Open Forum will also provide ample space for dialogue with society; interactive exhibitions, hands-on experiments and science cafés will bring scientists and interested visitors together…The particular attention the media have paid to this European science festival is very positive. This was also the case in Stockholm two years ago and I do hope that the spark of curiosity will be passed on to the Munich meeting.

---

[135] The so called 'deficit model' of science communication, which has its roots in the 1985 Royal Society Report "The Public Understanding of Science", refers to a linear 'sender-receiver-model', in which communication of content and information is unidirectional, that is from science towards society (Fochler/Müller 2006: 5).

[136] This deficit was addressed much later through citizen conferences and similar formats profiting from the phenomenon that a considerable part of German society has been and continues to be generally attuned and sensitive to issues involving scientific-technological developments, as for instance the anti-nuclear-movement has shown.

[137] Translation from the German original performed by the author.

It is of particular importance that especially young people allow themselves to become interested in science and fascinated by research. ESOF and the *Wissenschaftssommer* will certainly offer numerous opportunities for this to be accomplished" (Köhler 2006: 4-5).[138] It is evident by this statement and its echo in the media which perception of ESOF prevailed in the public discourse: a meeting focusing on science communication and outreach, a science festival aimed at fascinating society and especially the young generation, triggering its curiosity and improving its understanding of science and innovation. The conference programme, which included numerous sessions on the communication of science, mirrored these elements.

ESOF was also covered by several science TV-shows (such as 'Nano', a science programme produced by the German public broadcaster 3sat) and radio stations (such as DeutschlandRadio) that broadcasted live from the conference newsroom. The combination of the ESOF Outreach Activities with the *Wissenschaftssommer* taking place in the heart of the city and spanning many different activities consequently dominated media reporting on ESOF2006. In numerous interviews and articles reporting on the meeting, its raison d'être was emphasised as being to "show why we invest tax-payers money in scientific research" [139] and "present people the highlights of European research – in all disciplines – so that they become aware of how their tax payers money is invested in scientific research"[140]. ESOF was thus expected to "promote and advance dialogue on complex, relevant and novel scientific issues"[141], and work towards "establishing the perception within the [European] society that excellent scientific research does not only exist in the USA"[142]. With 20% of the participants being reporters

---

[138] Translated by the author into English from the German original. View the full speech held by Horst Köhler, President of the Federal Republic of Germany on 15 June 2006 in Munich: www.bundespraesident.de/SharedDocs/Reden/DE/Horst-koehler/Reden/2006/07/20060715_Rede.html (accessed on 22.02.2013).

[139] "Zeigen, warum wir für Forschung Steuern ausgehen", Stuttgarter Zeitung, 14.07.2006

[140] "Zeigen, warum wir für Forschung Steuern ausgehen", Stuttgarter Zeitung, 14.07.2006. Translated freely by this author from the following original text: "…die Highlights der europäischen Wissenschaften – und zwar aller Disziplinen – den Menschen darzustellen, damit sie wissen, worum es geht wenn wir Steuergelder für Forschung und Wissenschaft ausgeben".

[141] "Zeigen, warum wir für Forschung Steuern ausgehen", Stuttgarter Zeitung, 14.07.2006.

[142] "Europas Wissenschaft von der Sonnenseite", Stuttgarter Zeitung, 21.07.2006, original quote by Ingrid Wünning Tschol, Robert Bosch Stiftung.

and science communicators in Stockholm and a further increase of this group to almost 30% in Munich (see 4.6. for further statistical data) the primary goal of the meeting, perceived by most as being public impact, had been achieved.[143] The question remained however, whether the second tentative goal to establish interdisciplinary links among European researchers could be achieved as well; this would remain to be seen in the future.[144]

When compared to the meeting in Barcelona two years later, the science and society as well as science communication issues that were so prevalent at ESOF2006 do not constitute such a strong focus and subsequently take up less space in the programme. Indeed, media representatives and science communicators made out merely 12% of the participants while contributors from the private sector amounted to 20% of the delegates[145]. ESOF2008 put a stronger emphasis on bridging the gap between academia and industry by attracting managers and researchers from the private sector, who constitute a significant part of the research community and whose research efforts equally contribute to innovation.[146] This initiative found support in the Government and Region of Catalonia, Spain's industrial powerhouse. Both – but also the central Spanish Government – supported the ESOF meeting with substantial funding and in-kind contributions (among others receptions in honour of the international high-level ESOF guests[147]). They did so publicly and with a vested interest in being associat-

---

[143] "A bis Z: ESOF". Frankfurter Allgemeine Sonntagszeitung, 16.07.2006.

[144] "A bis Z: ESOF". Frankfurter Allgemeine Sonntagszeitung, 16.07.2006.

[145] Since I had no access to exact records of the identities of the individual ESOF2008 participants, I have relied on the statistics of the meeting put together by the professional congress organiser and published on the ESOF2008 website following the meeting. It can be assumed that (at least the majority of) individuals pertaining to the category 'private sector' were representatives of private companies and industry, industrial associations and institutions promoting commercialisation and stronger collaboration between science and industry, as well as technology transfer specialists. It can also be assumed that a significant number of these individuals were also participants in the 'Lab to Business' programme. Finally, some of these institutions also presented themselves at the ESOF2008 Exhibition.

[146] Welcome note by Enric Banda, President of Euroscience / La Seda de Barcelona and Co-Chair of the ESOF2008 Steering Committee in ESOF2008 Programme Book, p. 7. The "ESOF for Business Programme", though still rather small with only four sessions, was attended among others by corporate innovation and design managers, technology transfer agents and patent and intellectual property rights experts (ESOF2008 Final Report: 2).

[147] The Catalan Minister for Innovation, Universities and Enterprise hosted a dinner for European Research Council, Board members, Catalan Universities Rectors, Nobel Prize laureates,

ed with ESOF and what it stood for. Representatives from the respective administration were furthermore either honorary or active members in the ESOF2008 committees. The Opening Ceremony included speeches by the Deputy Mayor of Barcelona, the President of the Catalan Foundation for Research and Innovation (Rafael Espanol), the Spanish Health Minister (Bernat Sorria), the Spanish State Secretary for Research (Carlos Martinez Alonso) and the Catalan Minister for Innovation, Universities and Enterprise. Among them was also the Head of the Directorate General Research of the European Commission. All emphasised the importance of research and technological innovation for Spain, but also for Europe as whole. Though these aspects were also stressed by policy makers and researchers contributing to ESOF2004 and ESOF2006, the presence of the private sector at these meetings was in fact negligible.

4.5.1 ESOF meetings as a sounding board for current developments in research, science policy and society

Though ESOF meetings only take place every two years, they are perceived as and expected to be lively and up-to-date regarding developments in the scientific realm as well as in science policy. At the same time, most ESOF hosts have until now had the ambition to present their countries, their science and education systems and their R&D output at its best within the context of the conference or at least parallel to it. Hence, ESOF has assumed the role of a sounding board for current developments, as different issues resulting from the political and social environment within which the meeting took place or from coincident happenings in Europe or around the world where integrated into the conference programme. Both ESOF2004 and ESOF2008 for instance addressed issues related to the Olympic Games, which took place almost simultaneously with the Forum. During ESOF2004, medical researchers and biologists from Sweden, Denmark and the UK discussed human held presentations on performance in sports (“The limitations of human performance” in ESOF2004 Programme Book: Ss11). In the case of ESOF2008 it was the problem of doping and how to cope with it (“Doping and society: towards the perfect human machine?” in ESOF2008 Programme Book: 67). The session featured physicians, athletes, members of the World

---

ESOF2008 international committee members and ERC Starting Grants holders. The same participants were also invited to a reception by the Mayor of Barcelona in the Town Hall.

Anti-Doping Agency (WADA) and representatives of relevant NGOs and focused on "the concepts of physical endurance, the limits of the human body, the ethics involved in sports and doping as a way not only of making money but also of gaining notability worldwide and 'eternal fame and glory'" (ESOF2008 Programme Book: 67).

With regard to the geographical relevance, the aspect of food (in the case of the Barcelona meeting it was the Mediterranean diet), its origin and production was addressed throughout a number of lectures, sessions, interactive workshops and debates at ESOF2008. Functional food and the parameters for its production, distribution and control were debated for instance in the session "Novel food and functional food: how will they be regulated?" (ESOF2008 Programme Book: 45). Another session focused on food production and meeting the increasing needs of a growing population and specifically highlighted the status of fisheries, an issue also monitored by the European Union ("The future of human nutrition: ocean and land" in ESOF2008 Programme Book: 46).

On a European science policy level, it is interesting to view the development of the European Research Council through the lens of the first three ESOF meetings. Whereas in 2004 it was just a vision of the European research community to promote fundamental research on the basis of merit, in 2006 its key advocates could already present first concepts for the realisation of the undertaking.[148] In Stockholm (2004), it featured as a major science policy issue in the conference programme ("Can Europe become a knowledge-based society without a new support mechanism for basic research? Potential roles of the European Research Council", ESOF2004 Programme Book: Ss20). In spring of the same year, the European Council had confirmed that it "sees merit in enhanced support for basic research of the highest quality [in the context of European Framework Programme for Research and Development]" and that "the case for specific funding [would] be examined". Subsequently, the European Council would "await with interest a proposal from the European Commission which may include the possi-

[148] A session titled "The European Research Council: who are the movers and shakers?" took place at ESOF2006 and attracted a large number of attendees from science and the media. By that time, the European Council had given the green light for the ERC and its seven-year € 7.5 billion budget. Moreover, 22 prominent scientists had been identified and nominated to compose the ERC Scientific Council.

bility of setting up a Research Council" (European Council 2004: 5/25). As ESOF took place, the European Commission was already in the process of developing a concrete proposal for the establishment of what would become the ERC. In a scientific session organised for ESOF2006 by Ernst-Ludwig Winnacker, first Secretary General of the new institution, speakers (including the designated first President of the ERC, Fotis Kafatos, as well as designated members of the ERC Scientific Council, such as Helga Nowotny) reflected on the role this institution was expected to play within the European scientific landscape and the changes it may lead to (The ERC: inducing structural changes to the European research landscape?). Two years later and following the official establishment of the European Research Council in January 2007 as part of the 7th Framework Programme (FP7), ESOF2008 in Barcelona offered a platform not only for the stakeholders but – even more importantly – for the first ERC Starting Grant holders. The latter acted among others as 'testimonials' for aspiring applicants and shared their experience from the application and selection procedure.[149] Representatives from other funding agencies, research performing institutions (both universities and non-university institutes) as well as policy makers discussed the ERC's "structural effects on the conditions and environment for pioneering research in Europe" (ESOF2008 Programme Book: 53). It is of particular interest to note that ERC officials also presented the development of this undertaking as well as its first grantees at the AAAS Annual Meeting, in conjunction with the launch of FP7, but also independently thereof. This was a conscious effort to promote the best and newest the European Union had to offer in funding mechanisms for basic research in the 'backyard' of its main competitor, the United States. The intention was to raise the attractiveness of Europe as a place to do research for the best from all over the world and thus counteract the persistent trend that saw mainly European researchers moving to US institutions rather than vice versa. The ERC symposia at ESOF on the other hand could be viewed as an outreach effort towards the publics who had called for a stronger investment in basic research on a European level, towards the community of scientists who would profit from the new opportunities as well as – in a more general context – towards European taxpayers, who ultimately funded this initiative. Moreover, they

[149] "Funding opportunities for young researchers working or moving to work in Europe", ESOF2008 Programme Book, p. 58.

could be perceived as a 'best-practice' example of a remarkable effort to establish a *European* approach to supporting scientific research, one that represented a "turning point" leading to a "change of perspective and mentality, whereby European research moved from co-operation to competition" (Laget 2011: 2).

Interestingly enough, many stakeholders seemed to see a similar potential effect of the Euroscience Open Forum towards stronger co-operation of the European scientific community. Thomas Östros, Swedish Minister of Science for instance perceived ESOF as a meeting that "manifests a greater European scientific co-operation"[150]. At the same time however, when considering the significant differences between the first three ESOF meetings, which can be attributed to local and national agendas, the Forum also makes a very heterogeneous picture of Europe visible, one of different speeds, different priorities in and most importantly different perceptions of the nature and role of science and technology.

4.5.2 Discussing and developing the research system at ESOF

When observing consecutive ESOF programmes closely one cannot help but notice that a multitude of the featured topics refer to the fabric of the (European) research system. They include for instance the role of women in and contribution to scientific knowledge production or the development of careers in science. However, they also touch upon other important aspects such as quality assurance in science and in particular the accessibility of scientific results and data. Though they have undergone significant changes throughout the past decades, these issues remain 'evergreens' of the scientific milieu. Their 'status quo' is closely monitored and regularly debated, while new times call for adaptation of existing strategies.

One of these 'evergreens' is Open Access, an issue which was addressed during the first three ESOF meetings[151]. In 2004 speakers from Open Access publishers such as the Public Library of Science in the United States and BioMed Central in the UK dis-

---

[150] "Blue Stockholm skies for ESOF", The Scientist online edition, 25 August 2004 http://www.the-scientist.com/?articles.view/articleNo/23036/title/Blue-Stockholm-skies-for-ESOF/ (accessed on 08.03.2013).

[151] This also includes ESOF2010 and ESOF2012, though the programme of these two meetings will not form the focus of this dissertation.

cussed the "Open Access revolution" (ESOF2004 Programme Book: Ss4), the newest developments around this topic as well as how this new way of publishing scientific results could affect traditional peer review, *the* quality assurance system in science. Another aspect that formed part of the issue was the value of science and in particular of scientific results and the question whether this value increases when scientific results are made freely available to peers and other publics (e.g. educators or physicians) or whether it decreases among others because it loses its exclusivity. At the Munich meeting, the topic was put on the agenda by research organisations who asked "[is] Open Access [a] threat or blessing?" and discussed the challenges facing institutions and researchers alike when implementing Open Access (ESOF2006 Programme: 69). At ESOF2008, the same topic was addressed from a quite different perspective, namely in the context of the technical means necessary to achieve Open Access as well as the rules and regulations that underpin the handling of intellectual property.[152]

The role of women in science also represents a recurrent theme and a challenge that the research system (but also other knowledge sectors) continues to face. Numerous studies and statistic representations show that, though the number of female students and PhDs in many areas of research[153] is more or less equal to that of men, one finds a lot less of them as active scientists and academics higher up the academic career ladder.[154] The many aspects and questions surrounding this phenomenon where the topic of numerous debates and workshops held at ESOF: The Stockholm meeting featured three sessions organised by Euroscience, AAAS and the EU Commission respectively.[155] Two sessions also specifically addressed the issue in Munich: Representatives from The Royal Society of Chemistry and the Athena Project for instance presented the

---

[152] "One step further: from free software to free knowledge", ESOF2008 Programme Book: 37-38.

[153] Not in all of them. The field of physics for instance, traditionally features less female students and researchers.

[154] For more details see "She Figures 2012" leaflet at http://ec.europa.eu/research/science-society/document_library/pdf_06/she_figures_2012_en.pdf (accessed on 05.03.2013).

[155] "More women PhDs in science and engineering in Europe?" organised by the AAAS Directorate for Education and Human Resources Program, USA; "Where are the women in science?" organised by Euroscience; "Is there a gender bias in scientific excellence?" organised by the Women and Science Unit, Directorate General Research, European Commission. See ESOF2004 Programme Book for details.

results of their studies on why women leave chemistry in the UK. Their deliberations were accompanied by "examples of good practice and good working environments" in the UK, Spain and Germany.[156] Interestingly enough, the Women in Science Unit of the European Commission again organised a symposium attempting to raise awareness of the lack of women in science and to present what it felt to be 'best-practice' examples for dedicated instruments to counteract the situation.[157] Finally, Barcelona also featured two sessions on the issue: at "Women in science: speeding up change", established scientists from both Europe and the US exchanged thoughts on the measures needed to "ensure equal opportunities and to give equal resources to scientists at all levels regardless of gender" and compared the situation on both sides of the Atlantic. Participants addressed universally valid, top-down initiated regulations linked to funding mechanisms as a quite successful mechanism in the US and criticised the lack of such mechanisms (or their rigorous enforcement) on a Europe-wide level (ESOF2008 Programme Book: 62). The second session "Women in science around the world" featured testimonials by high-profile women scientists from different geographical and cultural backgrounds (for instance one of the speakers was from Syria) on how they progressed in their respective fields despite being in the minority compared to their male colleagues and what they would advise the younger generation of researchers (ESOF2008 Programme Book: 62).

Science journalists reporting on the three first ESOF meetings respectively mention in their articles that, though ESOF is not a conventional research conference, the constructive controversy and debate one would expect given this uniqueness of the setting on the one hand and the fruitful ground provided by the selected topics on the other is not necessarily fulfilled. Notwithstanding, the Euroscience Open Forum was conceived as an "independent arena for open dialogues" where "a broad debate on and about science" could take place (Sundberg 2000). This statement sums up the hopes and expectations placed upon ESOF from the very beginning: to break with the pattern of conventional scientific conferences and science festivals offering 'unidirec-

[156] "More women in university science: realistic target or utopian fantasy?" (ESOF2006 Programme Book: 63).

[157] "Fishing from a bigger pool: excellent science needs women" (ESOF2006 Programme Book: 63).

tional' communication and provide a novel platform for information and exchange. Still, in many cases ESOF seems to have difficulty in fully accepting this unique role and living up to it. Rather, it sometimes appears to cling to established academic standards in an attempt to be perceived as an established *scientific* conference and thus secure credibility and respect primarily in the epistemic world of which it however not really forms a part and which in turn will perhaps never recognise ESOF as 'its own'. This phenomenon – which spans both policy and purely scientific topics – can indeed be observed throughout consecutive ESOF meetings and is often addressed in articles covering them. Therein reporters and science commentators also point out that some intrinsically controversial issues were often missing altogether from the ESOF programme.[158] Interestingly, this coincides with the observation that during the first three ESOF meetings analysed in this thesis, social sciences and humanities were – both in terms of 'slots' in the programme and prominent representatives – considerably underrepresented. Indeed, it is the social sciences and humanities that foster critical reflection on many a phenomenon, which in turn forms the basis for better understanding problems and developing solutions. Europe has a long-standing tradition in this respect. Unfortunately it has not always been sufficiently reflected by the Euroscience Open Forum.

This inevitably leads to the question on how the state of play in scientific research with regard to its disciplines, themes and methods is mirrored in the scientific programme of the meeting. Though it is clear that not everything going on in labs and auditoriums or being published in scientific journals can find its way into the ESOF programme due to simple capacity reasons, a carefully tended-to balance is an essential asset for a meeting that aims at rendering the sheer complexity and multifacetedness of scientific research palpable and addressing its most current and 'burning' issues. Apart from the social sciences and humanities, experimental and combined disciplines such as systems biology, bio-economy or translational research are also hardly present at the first

---

[158] In a long article published in the online version of *DIE ZEIT* with respect to ESOF2004, reporters point out that "really controversial issues, such as cloning or stem cells, are missing from ESOF's programme". They argue further that "the debate on climate change is being conducted on a scientific rather than a political level [and]…the discussion on the future of energy supply also remains quite academic" ("Euroscience Open Forum: Konferenzberichte", *DIE ZEIT*, 26 August 2004.

three ESOF events. This suggests a more traditional or 'mainstream' approach by organisers selecting the programme, which to some extent contradicts ESOF's initial goal to establish interdisciplinary links among European researchers and break with existing disciplinary limitations in both organisation and thinking.

4.6 Statistics on ESOF2004, ESOF2006 and ESOF2008 participants: An evolution in numbers

The statistical overview of the first three ESOF meetings' attendees provided here is intended to support the analysis that will follow in Chapter 5. Though the available data may not reproduce an absolutely accurate picture (nor do I make this claim), they should make the participant constellations of the three ESOF meetings more transparent by providing information among others on their country of origin, their affiliation or area of expertise as well as their role in the respective ESOF meetings.[159]

ESOF managed to attract a considerable amount of attendees from the very beginning, either with an 'active' (speakers, session organisers, exhibitors etc.) or a 'passive' (general attendees) role. The first ESOF meeting of its kind aimed at welcoming roughly 1500 participants including "scientists from all fields, the public, policy makers, teachers, media, industry, students" (PowerPoint Presentation 2002: 11). Though attendance had been initially calculated on a lower scale (600-1200), organisers were encouraged to "aim higher" (Sundberg 2011: 4). This had many reasons, such as to ensure and possibly even increase attractiveness for potential sponsors. It was also a matter of prestige, particularly since the meeting was conceptualised as the European equivalent to the AAAS Annual Meeting as well as a vehicle to promote the implementation of the European Research Area. Especially the latter goal would indeed require

[159] The material was passed on to me by the respective ESOF organising team. As 'Day Passes' where also available as an option, people attending the conference for only one day may have not been included in the comprehensive list. This is unfortunately impossible to review ex post. Also, the attendants' list does not provide any information regarding the actual stay of the individuals at the conference. They may have been present throughout the entire duration of the meeting or only for one day (even if they were holders of passes valid for the entire conference). Only in the case of speakers is it possible to at least extract the day on which they attended though the list also does not consider speakers or participants who registered for ESOF but for different reasons did not show up. Finally, the attendants' lists do not include those participating only in the Outreach Activities, the Science in the City programmes and the ESOF Exhibition (except of course for the organisers themselves).

not only a high number, but also a diverse set of professionals to be reached via this emerging Forum. Finally, the meeting in Stockholm was able to attract 1810 registered participants including speakers. Organisers further claimed the attendance of more than 11.000 individuals (Report from the first Euroscience Open Forum 2005: 4) in the Science in the City activities taking place throughout the city of Stockholm and especially in Kungsträdgarden Park. In Munich approximately 2150 persons attended the meeting, though 1586 registered officially.[160] The Outreach Activities, taking place together with the 'Wissenschaftssommer' in the heart of the City, attracted over 60.000 people, according to reports published by the organisers.[161] The Barcelona event in July 2008 made a significant leap with regard to the number of attendees. Local organisers reported 4115 registered participants, of which 452 were speakers and 511 accredited journalists.[162] According to the final report, roughly 10.000 people attended the Outreach Activities.[163]

Now, when reviewing the lists of registrants for all three ESOF events, one could extract the following conclusions. With regard to geography one can safely say that,

---

[160] This is the result of a policy that applied only during ESOF2006, whereby both the ESOF Exhibition as well as all plenary and keynote lectures taking place in the Aviation Hall of the Deutsches Museum where open to non-registered visitors. The ESOF2006 Exhibition featured stands by the European Commission, research organisations, scientific journals and research performing companies, among others. Numerous events, including debates, demonstrations and award ceremonies took place on the exhibition grounds. Furthermore, since the Deutsches Museum, which acted as a co-host of the meeting, is renowned for its focus on the history and evolution of scientific and technological development, an intrinsically interested public enjoyed free access to ESOF2006 events within its premises throughout the duration of the conference. During the four days of the Forum, the Deutsches Museum also waivered its entry fees thus rendering the lectures even more accessible and attractive for lay and expert participants. A reliable yet (as mentioned already) not absolutely accurate recording provided the number of approximately 560 "non-registered participants attending public plenary lectures and events in the exhibition hall" (ESOF2006 Final Report: 5). However, no records exist on these individuals. Thus, only assumptions can be made regarding their affiliation and subsequently their motivation for attending. Unfortunately, this policy was not repeated throughout ESOF2008 to ESOF2012. During the following events, lectures and the Exhibition remained out of bounds for those not registered for the meeting and in 'official' function (as well as paying the respective fees). Only the Outreach Activities were accessible to all.

[161] http://www.wissenschaft-im-dialog.de/projekte/abgeschlossene-projekte/wissenschaftssommer/ (accessed on 26.01.2013).

[162] http://www.esof2008.org/index.php?section=4-esof2008 (accessed on 26.01.2013).

[163] ESOF2008 Executive Summary Statistics: 2.

apart from some exceptions accounting to approximately 10%, a large majority of the conference participants come from European countries and in particular from EU Member States. This is to be expected when taking into consideration the main parameters of the ESOF undertaking as well as its concept. First and foremost, ESOF was designed as a *European* event focusing (mainly) on *European* issues, reaching out to *European* publics[164] and addressing *European* challenges and problems[165].

In the information material[166] distributed to various institutions and groups during the first years, organisers argued that "Europe needs *independent* arenas for *open* dialogues" (PowerPoint Presentation 2002: 4). Indeed, it was the perception of ESOF founders and supporters that "for too long, Europe was lacking an independent arena for open dialogue on the role of all the sciences, including the humanities, in society. We have it now with the Euroscience Open Forum" (ESOF2006 Programme Book 2006: 4). ESOF was consequently conceived as a "Biennial *European* meeting on Science and Technology" (PowerPoint Presentation 2002: 4), "fostering a European dialogue on

---

[164] In the ESOF2004 Programme Book, Carl Johan Sundberg writes: "The public is a very large contributor to science funding and the results of science are important to us all. Therefore, scientists have to reach out and involve themselves in a true dialogue on and about the sciences. The extensive Science in the City and School Activities Outreach Programmes involve hundreds of people from all over Europe and are expected to attract thousands of participants. In these activities hands-on experimentation and curiosity based questioning are key elements and some activities include art and theatre as communication tools." (ESOF2004 Programme Book 2004: G7).

[165] In the ESOF2004 Programme Book, Carl Johan Sundberg writes in this respect: "Europe has a strong heritage in science. Today, Europe has great abilities and opportunities but its 'scientific system' is not optimised in many ways. Europe should strengthen its lifelong learning systems, facilitate mobility, enhance its efforts in public and industrial R&D and make the research funding system at the European level more focused on quality than anything else. Several sessions in the ESOF2004 Programme deal with what Europe could and should do to reach its potential." (ESOF2004 Programme Book 2004: G7).

Jean Patrick Connerade emphasises in his opening statement for ESOF2006 that organisers "hope that the debates at ESOF2006 contribute to turn Europe into something more than a politicians' club and that being European will appear one day as more than just a mild statement about diversity of cultures." (ESOF2006 Programme Book 2006: 4).

Ingrid Wünning Tschol stresses in the preamble of the ESOF2008 Programme Book that "European science has to make its voice heard – to both the European and the international public. This is one of the key missions of ESOF: to highlight Europe on the world map of science." (ESOF2008 Programme Book 2008: 7).

[166] See for instance the very first PowerPoint presentation and brochure (dating from 2002) sketching the ESOF concept and content as well most of the official print and online material that was produced for ESOF2004, 2006 and 2008 respectively.

science and technology, society and policy by offering a platform for cross-disciplinary interaction and communication on current trends and future roads for science and technology, their interaction with society and policy and the role of the public" (ESOF2006 Programme Book 2006: 9). The Stockholm Forum and the meetings that followed also promised to address inherently European issues within the conference programme, such as "promoting growth in Europe" (lecture by André Sapir, Professor of Economics at the Université Libre de Bruxelles held on 27 August 2004 during ESOF2004) or Europe's position in pharmaceutical research and development (lecture held by Didier de Chaffoy de Courcelles, then Senior Vice President Drug Discovery Europe at Johnson & Johnson Pharmaceutical R&D on 27 August 2004).[167]

Moreover, one should not forget that ESOF is intended to only take place in European cities, where it aims to mobilise the local and national researcher community and draw its attention to techno-scientific developments occurring elsewhere in Europe. This leads to a geographical but also to a thematic concentration of the meeting on Europe. As a result, publics from scientific communities in other continents may view ESOF neither as an easily accessible nor thematically relevant destination for them. What is more, statistics reveal a particularly high participation of nationals from the country where ESOF is being held. In Stockholm and Barcelona the respective participants from the host country amounted to an average of 25% of total attendees, which shows that ESOF does attract a part of the regional or local scientific community and also acts as a meeting point for its members. In Munich, the amount of German participants even exceeded 40%, which may also raise some questions with regard to just how 'European' the meeting and its scope actually were.

The distribution of attending nationalities mainly across Europe (including Baltic and Balkan countries) could also be attributed to the committee members' own descent and 'sphere of influence'. It should be mentioned at this point that committee members were not only expected to provide advice and contribute ideas and content to

[167] Colin Berry, Chairman of the ESOF2008 Programme Committee states in an introductory note to the Barcelona meeting that "the programme is also meant to celebrate the achievements of those who work in the various fields we will discuss and to give those joining us from other parts of the world a better perspective of how science in Europe is managed." (ESOF2008 Programme Book 2008: 20)

ESOF, but also act as ambassadors for the meeting within their professional domains nationally and on a European level. They effectively engaged in marketing activities, such as speaking publicly about the meeting and inviting peers, students and colleagues to attend or establishing contact between ESOF organisers and potential sponsors as well as prestigious supporters. Thus, all ESOF meetings comprise an Advisory Board consisting of highly regarded researchers and research managers or policy makers. A Local Organising Committee brings together those actors in the respective host city, whose contribution or support is necessary for a successful organisation of the meeting. The implementation in this case varies. For ESOF2004 and ESOF2006 the Local Organising Committees consisted of professionals actively contributing to an effective marketing and organisation of the meeting, such as museum communicators and science centre representatives. In Barcelona the respective committee consisted of 37 individuals, including high level representatives from the regional (Catalan) government as well as from several Catalan ministries, from the municipality of Barcelona and from national research organisations. As a consequence, the number of committee members 'recruited' for each ESOF meeting has been particularly high: In 2004, it amounted to 49 individuals (ESOF2004 Programme Book: G15), in 2006 to 55 and in 2008 to a remarkable 97 individuals.[168]

Now, when looking at the general profile of those participating in the first three ESOF meetings, one notices that, by default, ESOF anticipates and to some extent also predetermines a specific set of participant types for which (thus organisers claim) the structure and content of the Forum have been developed. These groups are expected to both experience the event as participants, but also 'co-construct' and form ESOF through their contribution to the content of the meeting. One therefore detects a duality of purpose for the publics addressed by ESOF. On the one hand they are all, with their respective functions, members of a regional, national and ultimately of a broadly defined European scientific community. On the other hand, at ESOF they are 'assigned' to certain categories reflecting their perceived roles within the meeting.

[168] Since AAAS features a large full-time administration, numerous bodies as well as regional and local sections, no further committees are necessary in order to organise the Annual Meeting.

Hence, in the registration form and the fee[169] structure of the conference we mostly encounter the following categories[170]: 'speakers [and organisers]', 'press' (and in the case of ESOF2006 separately 'PR-officers'), 'exhibitors', 'committee members', 'partners/sponsors'[171], '[students and] young scientists'[172]. ESOF2006 also included 'high-school teachers' who received free access to the meeting provided that they attended together with their classes. Furthermore, ESOF2004 and 2008 relied on volunteers to act as guides and assistants during the meeting. These were mostly young people, who also received a free pass to the meeting if they devoted a particular amount of time to assisting the organisers. AAAS also uses volunteers (mostly young students) as assistants and provides them with free access to the meeting. Finally, though not explicitly defined as a category in itself, 'Euroscience members' were entitled to lower fees (or could become members there and then to receive them) paired with an invitation to attend the Euroscience General Assembly taking place parallel to ESOF. Graph 1 provides an overview of the distribution of participants among the fee categories featured in the registration process. It should be noted that throughout the first three ESOF meetings, a small number of participants were registered with multiple 'memberships' (e.g. 'speaker' and 'committee member'). In these cases, only one affiliation has been taken into account in the statistical representation.

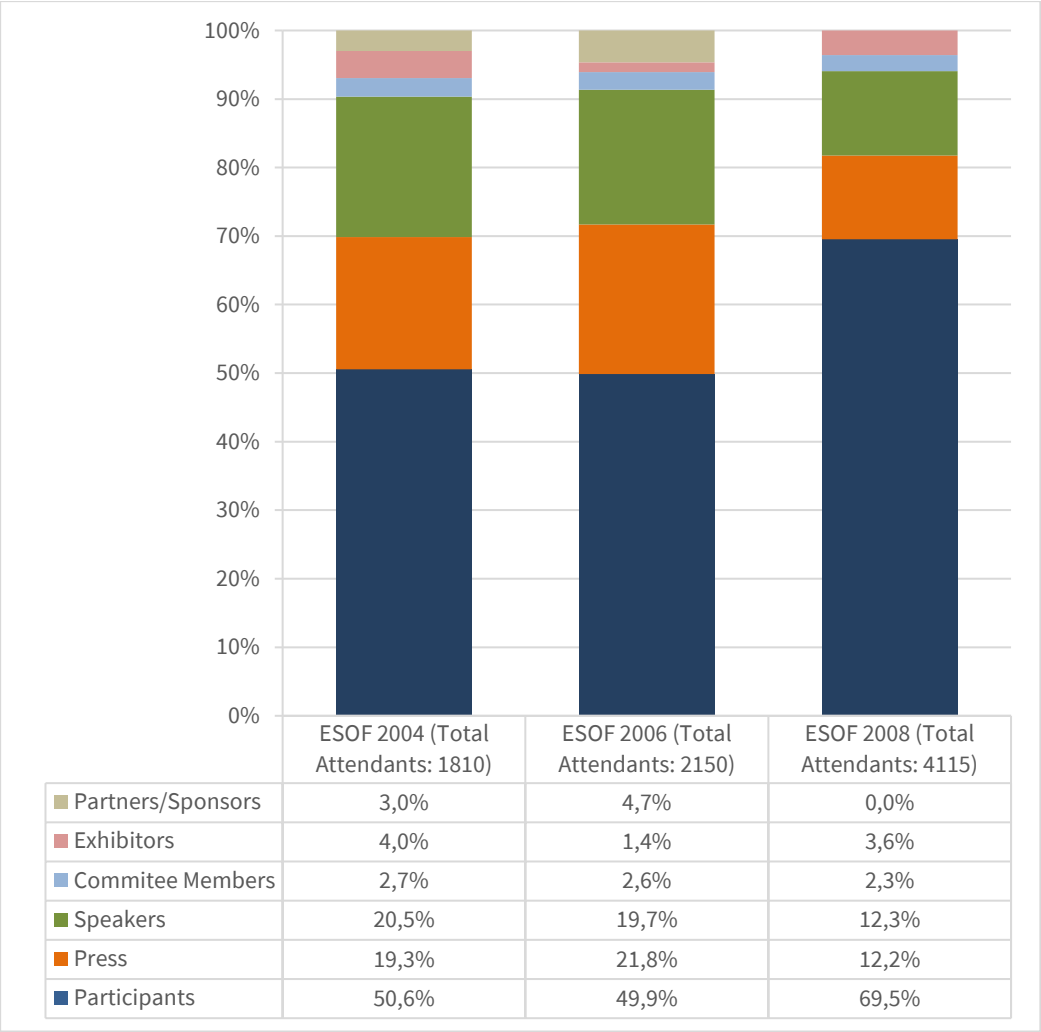
---

[169] Indeed, at least throughout the first ESOF meetings, the definition of registration categories served primarily the respective calculation of fees as well as the regulation of access to specific areas of the conference venue (e.g. Press Room or Exhibition). There is therefore a clear discrepancy between registration categories and the actual profiles of the ESOF attendees.

[170] Though the registration categories may have been harmonised later on, during the first three ESOF meetings they were not identical. This partial lack of correspondence between certain registration categories and thus of comparability makes a numerically accurate representation of participants' statistics hardly possible.

[171] ESOF2008 did not feature a category 'partners' or 'sponsors'.

[172] The category 'young scientists/students' was gradually introduced. At ESOF2004, only holders of travel grants for young scientists were documented. At ESOF2006 all participants under 33 were entitled to a reduced fee, researchers were not separately documented.



	ESOF 2004 (Total Attendants: 1810)	ESOF 2006 (Total Attendants: 2150)	ESOF 2008 (Total Attendants: 4115)
Partners/Sponsors	3,0%	4,7%	0,0%
Exhibitors	4,0%	1,4%	3,6%
Commitee Members	2,7%	2,6%	2,3%
Speakers	20,5%	19,7%	12,3%
Press	19,3%	21,8%	12,2%
Participants	50,6%	49,9%	69,5%

Graph 1: Distribution of attendees among main registration categories at ESOF2004, ESOF2006 and ESOF2008.

However, an analysis of the actual affiliations of ESOF participants reveals a more differentiated picture.[173] These 'closed' and somewhat generic categories open up to reveal a richness and diversity in professional backgrounds and roles within the research system as well as some assumptions regarding the motivation for participation. This 'bouquet' of participants' identities represents a major attribute of the Euroscience Open Forum that sets it apart from the classic disciplinary scientific congress on the one hand and a broad science communication event on the other. Here, I will attempt to break down some of the categories proposed by the organisers. Concretely, I

[173] This analysis is only possible with a detailed list of all registered participants and their personal information. Such a list was not available in the case of ESOF2008, which is why a full-fledged comparison is hardly possible in this thesis.

will draw attention to four particular groups or publics that can be found in every ESOF meeting and which according to my observation assume a particular role within it. These are researchers, young scientists, media representatives and policy makers and administrators. Though the number of industry representatives rose somewhat during ESOF2008 because of a strong effort to attract the private sector through a dedicated programme[174], it was almost negligible during ESOF2004 and ESOF2006.

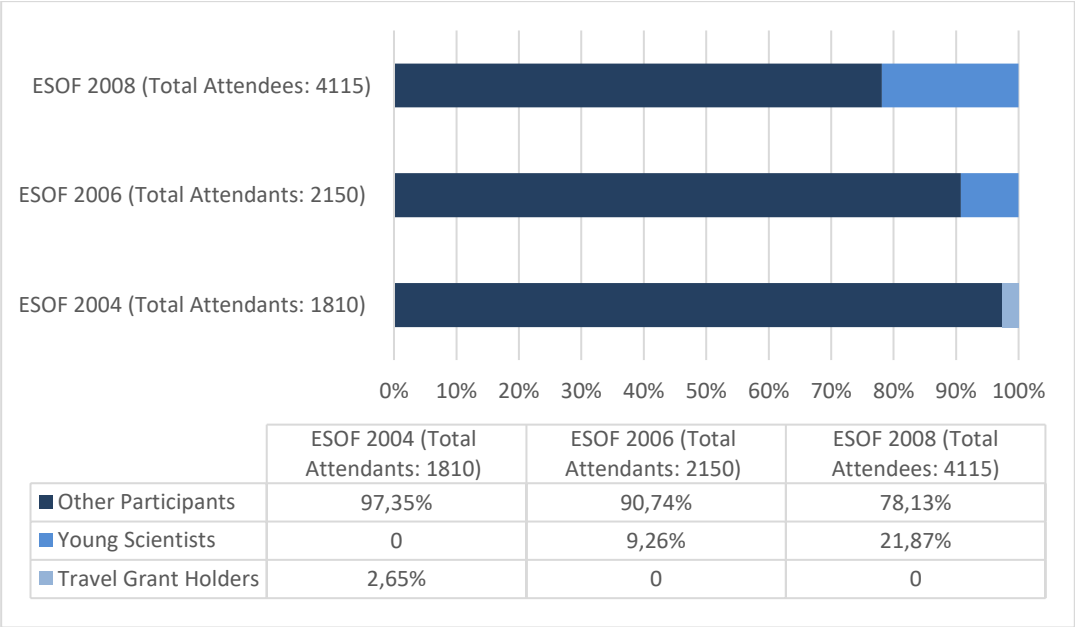
From the outset, one of the key challenges facing ESOF has been to attract enough scientists. Efforts have been made to put forward plausible arguments on why this meeting can be beneficial and rewarding for researchers – and especially the more successful among them, who have practically no time to waste. For ESOF, at least in its initial phase, did not represent a compelling 'entry' in a researcher's curriculum vitae, as is the case with established disciplinary conferences, where the latest in a discipline is officially announced, its 'ownership' secured. Moreover, attending ESOF was not likely to advance one's specialised scientific work as exchange among peers was not to be expected and the scientific fields otherwise represented were far away from one's own. In short, at ESOF there is hardly any provision for peers meeting peers, no 'disciplinary clusters'. As organisers put it, ESOF is thus "not an ordinary scientific conference, but a totally new concept. It consists of a Forum for discussion of topical issues, an embedded conference (with an exhibition) to showcase European achievements right across the scientific and technological spectrum and an outreach programme" (ESOF2006 Programme Book: 9). Consequently, considering the sheer size of the researcher community in Europe, ESOF has seen rather small amounts of researchers attending the meeting, while the majority of them were speakers. In turn, another group has indeed become quite a regular and appreciative ESOF attendee: young scientists.

Tellingly, organisers argue in this respect that ESOF "serves as a young scientists forum, encouraging especially PhD-students and post-docs to share their experience and participate in debates about such subjects as the European Charter for Researchers, how to motivate young people to engage in scientific careers, and how the con-

[174] The Science to Business Programme comprised four sessions. However, a number of companies were represented in the Exhibition and/or held sponsored events. The exact figures are unfortunately not available.

struction of the European Research Area enhances the prospects of young scientists" (ESOF2006 Programme Book: 9). ESOF officials went out of their way to attract early stage researchers, to encourage them to follow the 'stony path' of academic research but also to point out alternatives. Apart from allowing this group free entrance or a significantly reduced fee (the policy varied slightly from one ESOF meeting to the next), a whole set of events were organised to accommodate the perceived needs of these individuals. Every ESOF meeting comprised a dedicated Career Programme featuring among others job interview trainings, seminars on peer review and scientific publishing as well as 'hands-on' workshops on science communication and dealing with the media.[175] Numerous sessions were furthermore dedicated to career perspectives for researchers in Europe, also highlighting options outside the scientific realm. One format which was first introduced at the Munich meeting and characteristically dubbed 'Pretzel with the Prof', included informal vis-à-vis encounters between senior scientists and young researchers and students during which the latter could enquire about the former's career paths and experiences and also receive advice regarding their own professional development. The format played upon the notion of mentoring, which has by now become quite established in the scientific world. However, it fell short of going in more depth or addressing each individual's needs comprehensively due to the shortage of time and the 10:1 ratio (10 young scientists to one senior) in average. The messages conveyed to attending youngsters also varied largely depending on the "renowned scientist" (ESOF2006 Programme Book: 82) they addressed their questions to. Finally, ESOF served as a networking platform for young researchers not only in the direction of scientific peers but also with a view to other relevant professionals whom they are likely to encounter during their career. At ESOF, young scientists were hence introduced to the research system, its main parameters and representatives within a somewhat more protected environment. If this argument truly applies to the majority of the young scientists attending ESOF, than they may be considered as the public which mostly profits from this event.

[175] The AAAS Annual Meeting also offers workshops and talks that cover similar aspects and requirements of scientific careers.



	ESOF 2004 (Total Attendants: 1810)	ESOF 2006 (Total Attendants: 2150)	ESOF 2008 (Total Attendees: 4115)
Other Participants	97,35%	90,74%	78,13%
Young Scientists	0	9,26%	21,87%
Travel Grant Holders	2,65%	0	0

Graph 2: Young scientists at ESOF2004[176], ESOF2006[177] and ESOF2008[178].

The participation of numerous media representatives, science journalists and science communication experts represents a further element of interest in this thesis. These groups form a significant part of the ESOF attendees, both numerically but also with regard to their role. As opposed to scientists for instance, science journalists are 'receivers' rather than 'senders' as they attend ESOF to pick up ideas and topics for their next article and to conduct interviews with experts. Since the Forum's success is also measured by the echo it generates in the local, national and European press, every ESOF event runs an elaborate 'press operation' to secure visibility in the media. This includes a dedicated area for registered media representatives and communicators on the conference premises featuring, among others, computer and interview rooms. Moreover, selected scientific sessions that are expected by organisers to draw the me-

[176] ESOF2004 did not feature a 'Young Scientists' registration category. The accurate number of early stage researchers attending the meeting can therefore not be re-constructed. The percentage indicated here refers to the holders of travel grants (47 in total), who were indeed young researchers.

[177] ESOF2006 introduced for the first time the registration category 'Young Scientists'. A total of 164 persons registered under this category. However, it cannot be excluded that more early career researchers attended the meeting, for instance as speakers or as attendees of the freely accessible Plenary Lectures in the Deutsches Museum.

[178] According to the ESOF2008 Final Report, of approximately 900 young scientists participating, 40% were below 35 years old.

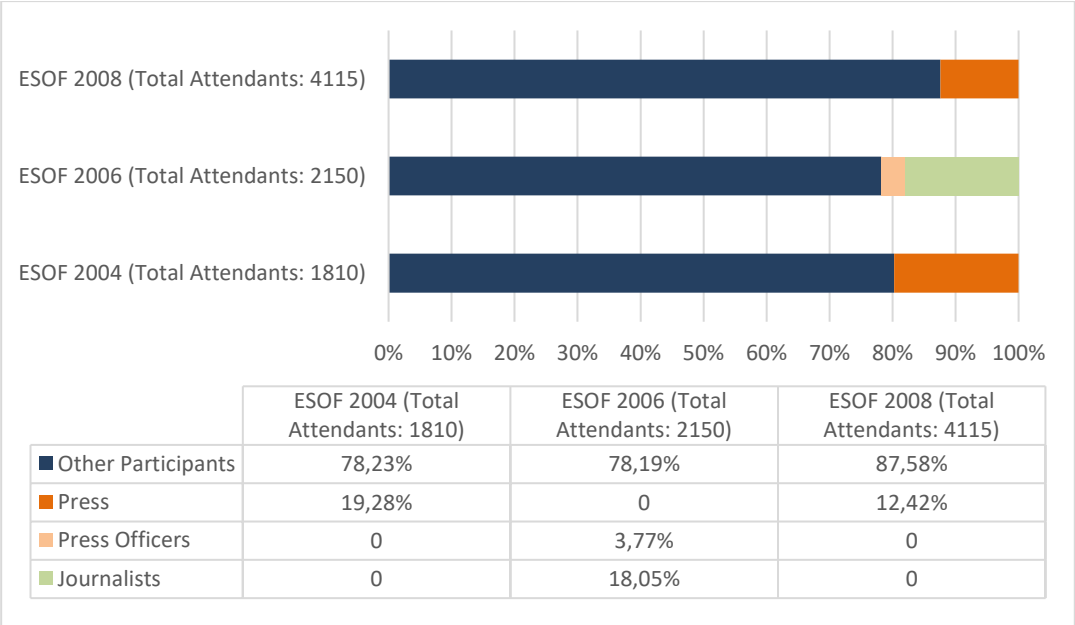
dia's attention are exclusively presented to newsroom registrants in short press briefings, during which journalists have the chance to directly engage with speakers. Journalists are assisted in their efforts by a group of professionals who run the Press Room and make sure comprehensive background information on the science presented at ESOF as well as on the speakers themselves is made available to journalists who want to report on the meeting.

Therefore, though there are also a few sessions dedicated to science communication (for instance as an alternative profession for scientists or, as already mentioned, as training sessions for scientists vis-à-vis the media), one can argue that the vast majority of this group attends ESOF due to a vested interest in the meeting as a relevant professional event. Interestingly enough, Wolfgang M. Heckl, ESOF2006 'Champion', researcher and prize-winning science communicator turned museum director, stressed in his welcome statement that "building on its outstanding success in Stockholm, ESOF is now established on the agenda of European science communication" (ESOF2006 Programme Book: 5). Indeed, he was not the only one who perceived ESOF more as a science communication event than a (multidisciplinary) *scientific* conference. "Organisers claim success for Stockholm science jamboree" titled an article in Nature referring to the Stockholm meeting and pointing out that "many attendees complained of too many sessions on media and policy and too few on science" (Abbott 2004: 5). However, when one compares the amount of 'real' science sessions to others, one does find that the programme is more or less fairly balanced. It is perhaps the percentage these scientific sessions constitute in the context of the entire ESOF activities that may indeed create the impression that science is rather the 'topping' than the foundation at ESOF.

Though science communicators are in most cases not writing journalists, they could be considered to be the 'alter ego' of the latter.[179] Indeed, many press officers have been journalists in the past or at least have had a journalistic training that allows them

[179] This approach contradicts the policy followed at some ESOF meetings (for instance at ESOF2006) to clearly separate writing journalists from press officers, both technically e.g. in the context of registration (the participation fee for instance was wavered only for reporters, while communicators had to pay a reduced price) as well as when communicating the amount of press room registrants.

to write on behalf of their employing institution. They may act as 'lobbyists' towards the press in their effort to promote news from their home institution but are at the same time the counterparts or first contact persons for the media. At ESOF, press officers usually come on their own account but also accompany 'their' speakers and assist them in their interaction with reporters. During the past decades, following the public understanding and public engagement movements in Europe these professionals have become increasingly important. Together with the AAAS Annual Meeting and perhaps also the Annual Meeting of the British Association, ESOF was very soon viewed as an event which could serve their professional needs.



	ESOF 2004 (Total Attendants: 1810)	ESOF 2006 (Total Attendants: 2150)	ESOF 2008 (Total Attendants: 4115)
Other Participants	78,23%	78,19%	87,58%
Press	19,28%	0	12,42%
Press Officers	0	3,77%	0
Journalists	0	18,05%	0

Graph 3: Journalists and Press Officers at ESOF2004, ESOF2006 and ESOF2008.

Finally, I argue that public science administrators and policy makers, who make out a rather large group at most ESOF events, could perhaps also be viewed as two sides of the same coin. This is because these groups heavily depend on each other and intensively collaborate to 'manage' the research system. For this reason, they are also often called 'research managers'. As is also the case with journalists and science communicators, they too may change sides during their career joining either the administrative apparatus of research institutions or ministries and political entities and even advancing to political posts on a national or European level (e.g. within the EU bodies). As I will show later on, research managers can be seen as proof of the increasing professionalisation of the research system. Unlike the other participants portrayed here, the

numbers of policy makers and administrators cannot be reproduced as there were no separate registration categories for these groups of professionals. Indeed they could be found amongst speakers, organisers, sponsors, exhibitors or form 'normal' registrants paying the full participation fee. Notwithstanding, their role in the research enterprise is crucial and their attendance palpable.[180]

By briefly presenting what I consider the 'core' groups that 'inhabit' the Euroscience Open Forum – und presumably the research system itself – and underpinning these categories with numbers from the first three ESOF meetings, I have delivered a first glimpse into what I will define as 'inner-scientific publics' in the context of this European forum and thus prepared the ground for the in-depth analysis which will follow in Chapter 5.

[180] The respective programme books (were many of them feature as speakers or organisers of sessions), the participants' lists (available only for ESOF2004 and ESOF2006) as well as personal observation (at ESOF2006 and ESOF2008) deliver proof of their presence and contribution.

5 ESOF AS AN ARENA FOR NEW ACTOR CONSTELLATIONS

The previous chapter gave an overview of the ESOF founding history and the first three meetings in Stockholm, Munich and Barcelona respectively. The intention was to provide the reader with an overview of the rationale and perceived needs that led to the conceptualisation of the meeting, with a glimpse into the socio-political framework conditions that nurtured an event of this kind, as well as with some tangible data on the outcomes of ESOF2004, 2006 and 2008 in terms of attendees. I now take a closer look inside and across the Euroscience Open Forum and focus on the publics that emerge within and 'inhabit' the meeting. In this context, I consciously exclude the Outreach Activities component from my analysis. The reason for this is that I believe the publics I want to focus on in this thesis to be neither significantly present nor addressed by this part of the meeting. Indeed, the communication efforts taking place in the Outreach Activities adhere to a largely classic (if not to say conservative) model of science communication largely employing the 'sender-receiver' model, whereby predominantly young researchers and science communicators present their institutions and their respective scientific activities to school classes or passers-by. I will thus rather focus on the core part of the Euroscience Open Forum which I consider to be a space, where what I will define in more detail as 'inner-scientific publics' and their respective roles in an extended and pluralistic research system emerge and are nurtured. What is more, I will argue that ESOF fosters an intense interaction and exchange between these publics on numerous scientific themes, but also on the role of science in society and society in science. In the context of my analysis I will enquire, whether what we observe in the ESOF 'microcosm' is restricted to this specific environment and the way it attempts to perform 'actors and stakeholders into publics or whether it actually reveals an overarching impression of the communities now inhabiting the broader scientific realm, of their respective roles, identities and preoccupations. If we assume, based on our observations of the first three Fora, that the communities in question and their respective spheres of influence and action are interlocking circles, then what does our case study reveal about the specific characteristics of the individual circles as well as their respective intersections? ESOF helps visualise the notion that scientific communities in Europe are not just growing in numbers and expanding geographically, but also becoming more differentiated by gradually admitting new

groups of professionals, in addition to active researchers. In the following pages I will attempt to illustrate how this process concretely takes place within the ESOF space by making the case for what I consider a direct consequence of the changes the European scientific realm is undergoing: the emergence of a set of what I will refer to as 'inner-scientific publics'. The empirical analysis has already pointed to four groups of professionals (researchers, young scientists, media representatives, policy makers and administrators) who are particularly active in this new scientific sphere and at ESOF. This chapter will argue for the emergence of a fifth public, which has come to play an important role in this new socio-scientific constellation: knowledge brokers. This group of professionals may perhaps not only be seen as representing the missing puzzle piece in an expanding science sphere. I will rather also attempt to show how it contributes to linking the remaining 'inner-scientific publics' together and performing them into European knowledge societies.

5.1 Spelling out the concept of 'inner-scientific publics' (at ESOF)

In his address at the opening ceremony of ESOF2010 in Turin Giorgio Napolitano, then President of the Italian Republic said that "what makes ESOF unique in the international landscape is its capability of putting in touch different research worlds and actors" (Napolitano 2010). He furthermore argued that this is exactly what is needed "if we want to create the conditions for extracting from the growth of knowledge its full potential for social development".[181] With this statement Napolitano reflected on two important points. First on the notion of a knowledge (or rather knowledgeable) society, one which is educated enough to contribute to and appreciate scientifically induced knowledge, while at the same time consciously and systematically deploying it in order to achieve economic growth and social prosperity. In this context, he alludes to a 'fertilisation' across epistemic fields and enrichment with socio-political elements as key benefits of a pluralistic – both in terms of actors and methods – creation of

[181] Napolitano also stressed that in order to succeed in creating social and economic value out of scientifically produced knowledge, it will be vital to involve the "European civil society" in the process (Napolitano 2010). In this context, he referred to the Outreach Activities organised at ESOF. Though this thesis does not focus on this particular programme component of ESOF, it is worth referring to the idea of a European society and its active, rather than passive contribution to scientific knowledge production.

knowledge. These two latter aspects lead to the second point, namely that of the actors themselves. Today the production and utilisation of scientific knowledge depends on a number of parties. Increasingly, these stem from both the scientific and the social realm, which in turn come closer together engaging in a constant exchange and allowing for an ever stronger influence on each other. The growing interconnectedness and interdependence between these two spheres resulting in a blurring of their respective boundaries represents the cornerstone of my theoretical argument, which is otherwise beautifully summed up in the notion of co-production.

I consider the overarching observation that science and society, the social and knowledge order are co-produced to be fundamental for my argument and view it as the explanatory framework for the encounter and collaboration of both scientific and social actors within the extended boundaries of the scientific realm. One could assume that co-production represents a long-standing and to an extent established process, whereby the science of any given era has been reflected in its respective societal structures and characteristics and in turn society has sought to mould and steer scientific endeavours. Within this construct, the publics involved act both as senders and receivers of information and values. However, a number of developments in recent years point to a diversification of this state. Fragmentation and specialisation of the scientific sphere, a change in the process of scientific knowledge production described as Mode 2, the science and society movement and the increasing medialisation of science have tipped the 'balance of power' between the scientific and the social realm, blurred their boundaries and led to their respective 'infiltration' by new publics assuming functions and identities reflecting this modified landscape. In other words, these new settings foster the creation and performance of what I define as 'inner-scientific publics'. By this term, I refer to fractions of publics, which in addition to their 'assigned' roles take on new functions that reflect the changing nature and structure of these two realms. The strands of debates put forward in Chapter 2 have shed light upon an increasingly inter- and transdisciplinary mode of research involving various practitioners engaging in ad hoc settings. At the same time they have suggested how the very advancement of science and technology requires increasingly specialised knowledge, which in turn to an extent results in a gradual drifting apart of epistemic fields. Moreover, a growing need for accountability vis-à-vis society has strengthened the role of the

media, of professional science administrators and of policy makers. While the former have increasingly used selection and simplification to relay the results of the scientific endeavour, the latter two have become actively involved in research design and funding as well as in quality assurance. These three publics are described as 'inner' due to their dual role that expects them to maintain their original membership and affiliation while at the same time operating within the 'inner' circles of the scientific enterprise and engaging in its core workings. Their mere ability to transcend these boundaries with relative ease in turn points to a hybridisation and enlargement of the science system, which can also be viewed as an explanation for the involvement of other science professionals in the process of scientific knowledge production. Though their share in this process cannot always be measured in numbers, their involvement and function has become indispensable and represents the element that binds them together into a 'community' of and for science. Notwithstanding, the above mentioned disruptions have also affected the scientific profession itself, its values as well as the mechanisms it uses to set its priorities and ensure quality.

The notion of co-production sustains that there is a reciprocal existence, an intrinsic need for mutual collaboration as well as a reflection of content between science and society, where the publics inhabiting each realm are in a constant form of exchange and interdependence (Jasanoff 2004). However, the notion of co-production alone does not presuppose or justify the thematically oriented build-up of specific audiences. Rather, it is particular circumstances within this framework that have the power to polarise and assemble. These often rest on certain *issues* acting as 'nuclei' or magnets attracting and constructing publics (Marres 2005: 209). Therefore, when looking at the framework conditions that foster the formation of inner-scientific publics', I suggest that it is the issues at hand that determine their functions and roles. To be sure, these issues can be quite specific or specialised. Or they can be more overarching, such as the notion that science needs to be more integrated into society for society to sustain it appropriately. I argue that the latter is at the core of the Euroscience Open Forum and that it has to a considerable extent been the guiding principle of the meeting. Consequently, the Forum can be viewed as a space where work is performed in order to implicitly consider and reflect upon the identity and characteristics of the publics revolving around and pertaining to the research system today, with a particular focus

on the European sphere. What is more, the 'stimuli' ESOF offers in the form of its programme, activities and rhetoric help 'inscribe' new constellations of publics.

Indeed, a study of the programme structure and its components, coupled with discussions and interviews with functionaries and participants of the meeting leads one to distinguish five communities being formed both bottom-up and top-down throughout the meeting and representing its core set of publics. These are of different size and composition, pursue diverse goals and have a number of shared interests. At ESOF, participants arrive with specific intentions and are at the same time assigned specific spaces according to their perceived functions. However, one notes that they do not only move within these spaces, but also transcend them to encounter other publics they consider relevant and interesting. It is the character of these spaces and the imaginations and narratives behind them on the one hand as well as the process of crossing and overlapping of the respective platforms on the other that is intriguing. For ESOF aims to construct and perform specific publics by among others attempting to canalise relevant parts of the participants towards specific activities as well as to create respective environments to fulfil their expected needs. These groups of participants are implicitly or explicitly encouraged to respectively form a homogeneous entity within the space they are assigned and through the activities they are engaged in. The flow of the individual participants into these spaces, though not rigid, is believed by organisers to be a matter of course, occurring almost automatically, for it is designed as a reflection of a perceived reality.

Thus, at ESOF one expects to encounter the categories of publics also found in funding agencies' application guidelines or in government strategy papers defining the structure and function of national and international research systems. Researchers are split into the more or less universally applicable career stages of senior and junior, defined mainly through levels of academic accomplishment and age. The process of defining science professionals, who are not active researchers, more closely can be challenging, for it needs to take into consideration national and European particularities, traditions and practices. Science communication, as a by now established practice, features prominently in the conference programme and represents a key feature of the

ESOF concept as a whole.[182] Consequently, it represents an ample arena to which several types of professionals are assigned: its most obvious public are science reporters working for media outlets (as employees or freelancers), followed by a less 'clear-cut' group of people subsumed as science communicators. Interestingly enough, the entire group is defined in ESOF statistics as "press", thereby implicitly emphasising even more the significance of visibility in the media for ESOF itself, for its themes, its participants as well as for science in general. Looking further, we encounter a perhaps even more diverse set of publics defined in the ESOF language as "policy makers". Though I will go into this later in more detail, it is interesting to note the expectation raised indirectly by this definition with regard to these professionals' role within national and European research systems: they are viewed as those who make the policies or rules and are at the same time entrusted with their implementation on different institutional levels.

In addition to the above however, new expert publics appear to have emerged and found a space for exchange at ESOF: knowledge brokers seem to have become an important component of today's knowledge societies and thus also sought-after actors in the scientific realm. Their activities very nicely incorporate the European discourse introduced by the Lisbon Strategy (European Commission 2000b) and continued with Innovation Union (European Commission 2010b), that being the notion of bringing knowledge to market and ultimately to society. At ESOF, they seem to succeed in delineating their own spaces, for due to their multiple roles they cannot be limited to conventional memberships and affiliations, but rather fulfil borderline functions. Hence, it appears that in the context of ESOF out of individual professionals involved one way or the other in the process of scientific research crystallise what are defined here as inner-scientific publics. This crystallisation process takes place over and over, whereby the boundaries of the scientific realm are constantly dismantled and erected

[182] This is manifested in a number of elements. First, this public has a dedicated registration category at the conference, for which in most cases fees are waivered to make attendance for science communication professionals and especially science reporters more attractive. Second a well-organised Press Room ensures optimal working conditions for these groups and provides them with extended sets of information as well as with privileged access to the conference speakers. Third, science communication implicitly or explicitly features as a conference theme, under which session proposals can be submitted. As a result, sessions on this topic feature prominently in the conference programme.

anew to reveal new constellations and identities. What all these publics seem to have in common is that they can be viewed as pertaining to one enlarged system and acting either at its core or at the periphery. However, the roles 'inner-scientific publics' fulfil at any given time are by no means rigid or constant in their form and function, but rather represent a fluid process which is constantly negotiated anew. In the course of the Forum these publics reveal different facets, thus temporarily allowing alternating interests and pursuits to dominate, only to return to their initial roles once again when the circumstances call for it. The individuals we encounter at ESOF moreover seem to feature multiple memberships. Some are ascribed to them by other groups, who see them for instance as collaborators or as an audience. Other memberships they subscribe to themselves, according to their perception of their own skills and capabilities (in some cases due to previous occupations) and of their role within a given field. We thus see a constant intermingling of identities. ESOF represents a performative space, where this process becomes visible and is institutionalised. In the following chapters, I will attempt to capture these elusive publics and their frontier crossing as well as reflect on the different identities they assume in this process and illuminate their implications.

5.2 Senior researchers: Indispensable public, but minority

If we consider the composition of ESOF participants as reflecting the delicate balance of functionalities forming an enlarged, hybrid research system, then scientists, being the primary contributors to the pool of scientific knowledge, should represent an indispensable part of the equation. A closer look at attendees' affiliations in the first three ESOF events however, points to a rather uneven distribution in terms of numbers. Taking into account that ESOF is predominantly a *science* conference, individuals who can predominantly be assigned to the group of senior scientists build only a small portion of the overall participants. Among the thousands of professionals flocking to ESOF, established researchers represent a minority. Though the reasons for this phenomenon cannot be defined with absolute certainty unless a considerable number of researchers are consulted, there are some indications which may help explain it to a certain extent. Even more interestingly, an examination of the characteristics of this minority suggests a fluidity and continuous shift between different roles, identities

and arenas, thus making it more diverse than generally perceived. An analysis of the ESOF programmes from ESOF2004 through ESOF2008 shows that senior scientists are meant to assume a number of roles during the meeting. The majority have an active part in the programme either as invited speakers, as organisers or moderators in one or more sessions[183] or as the protagonists of one-man or woman keynote and plenary lectures prominently positioned within the programme and attended by large numbers of ESOF participants. Given their often international reputation and achievements, it is hoped that they will also function as 'pulling horses' attracting even more attendees to the meeting. For, though consensus exists that ESOF neither is nor aims to be a purely scientific conference, presenting a number of (preferably new) scientific results and breakthroughs to its audience does represent a key aim of the Forum.[184] Furthermore, senior researchers also fulfil certain functions in a number of additional activities. They are valued interlocutors for media representatives, for instance at press conferences or in bilateral interviews.[185] Moreover, senior researchers can implicitly or explicitly act as lobbyists vis-à-vis attending policy makers either in the interest of a broader epistemic field or a particular issue, for instance of financial or regulatory nature. Thus, through their talks or in informal conversations, senior researchers may also function as the 'window' to the scientific world in general and their respective field in particular both for the press (und ultimately for society) as well as for policy makers, by providing insight into its workings, its developments at any given time, its strengths and perhaps also its weaknesses. In addition, their involvement in specially conceptualised formats, such as for instance 'Pretzel with the Prof' in Munich and 'Tapas with the Prof' in Barcelona, points to an expectation on behalf of organis-

---

[183] The ESOF Scientific Programme consists of sessions contributed both 'bottom-up' and 'top-down'. The former are submitted during an open call for proposals published roughly six months before the conference takes place and selected by a Programme Committee. The latter are sessions contributed by sponsors of the meeting. They can also be proposed by members of the Programme or Steering Committee in order to fill a thematic gap not covered by the bottom up sessions or touch upon a 'hot' topic.

[184] This claim is formulated throughout the first three meetings, in the presentations by ESOF organisers and founders and in the Programme Books.

[185] The 'press operation' at ESOF involves a number of daily press conferences, usually taking place before the actual session so that reporters have enough time to produce their stories and the opportunity to directly ask questions and get speakers' comments.

ers and attendees alike to act as 'role-models' for the young generation of academics. Throughout these activities, their academic credentials lend them the necessary credibility. A rough analysis of the academic backgrounds of senior researchers at ESOF reveals that they represent a variety of epistemic fields, though initially with a stronger presence of the natural sciences as opposed to social sciences and humanities.

Coupled with the different themes[186] featured in the scientific programme, this suggests an effort on the part of the organisers to project the diversity (and perhaps also fragmentation) of the research system onto ESOF. Consequently, established researchers are to a certain extent expected to literally embody the overarching scientific community they are affiliated with and act as a 'sparring partners' for those attending ESOF. With respect to the geographical distribution, the vast majority of senior researchers are Europeans. A large number is based in countries with rather strong and productive research systems.[187] At the same time, we notice a strong representation among nationals of the country, where ESOF is taking place.[188] Depending on the structure and geographical distribution of a country's science landscape, there may also be a regional concentration of the scientific community.[189] A further aspect is a certain predominance of male versus female scientists. In recent years, efforts have been made by organisers to increase the number of female senior researchers (e.g. among the keynote and plenary lecturers) as well as to include more practitioners from the social sciences and humanities.

However, at this point it may be quite interesting to look beyond the seemingly well-defined, 'textbook' roles and identities assigned to this group at ESOF and attempt to examine the boundaries for nuances, self-perceptions and self-ascriptions. Observa-

[186] ESOF Themes are overarching issues aimed at helping participants navigate the topics presented at ESOF, while also guiding bottom-up session submissions. Interestingly, most are interdisciplinary in their nature, thus implicitly encouraging respective compositions of the sessions' panels as well as of the debate expected to take place in their context.

[187] The top six countries represented through their participants at ESOF2004, 2006 and 2008 respectively were Sweden, Germany, United Kingdom, Spain, Italy and France.

[188] In average, the percentage reaches approximately one fourth of the total number of speakers. Barcelona formed an exception with 12% speakers from Spain. At this point it should be stressed that ESOF participants register with their country of residence, not origin.

[189] This was for instance the case in Turin, where northern Italian research institutions were more strongly represented.

tion of attendees at ESOF reveals an intermingling of identities and a constant variation between constellations of actors and publics. Though referred to as a rather clear-cut group in the ESOF narrative, senior scientists may indeed feature a number of identities. For instance, one must ask if they can be characterised exclusively as 'scientists'. Indeed a number of them no longer actively performs research or has significantly reduced the time they dedicate to purely academic work. Rather, they see themselves as custodians and at the same time as facilitators of this work. In the course of the Forum, be it in formal or informal settings, they recall their own career history and share their professional experience with younger peers, the media or policy makers. In the course of these interactions, they assume a number of roles. Vis-à-vis the younger generation of researchers, which is traditionally strongly represented at ESOF, they perceive themselves as teachers and mentors. Furthermore some senior researchers can be observed engaging with policy makers and – for instance in view of their positions as managers and representatives of research funding or performing institutions, but not exclusively – informally serving as science policy advisors.[190] In the context of ESOF meetings, senior scientists are, together with a small number of high-level politicians, also public figures. Their names and topics of work form a prominent part of the Forum's advertising efforts, featuring in newsletters, press releases and on the website. During the meeting, they act as science communicators and expert interlocutors for the media and for society. This is not necessarily a temporary occupation, since a number of them actually engage in outreach and communication activities quite often and perhaps even consider it an important part of their work. With increasing reputation, the demand for making regular public appearances increases as well. Some researchers oblige either because they enjoy being in the limelight and because they feel they can contribute to a better understanding of science in society or policy. Most, if not all, recognise the importance for their careers of presenting their work (and themselves) to the media.

---

[190] In view of crises requiring concise scientific expertise to inform political decision-making, this role has gained importance and momentum in the recent years, with a number of countries introducing the post of Chief Scientific Advisor to government. Examples of such crises include the BP oil-spill in the Gulf of Mexico and the Icelandic volcano eruption in 2012 (see *Nature* 512, 360–363, 28 August 2014).

In the course of these interactions we see numerous overlaps in the intersecting circles which the core publics at ESOF resemble. However, this overlapping is by no means confined to the ESOF microcosm. The opening up and hybridisation of the research system I argue for in this thesis does not only occur through the admittance of new actors with different specialities; this phenomenon also involves the questioning and ultimately opening-up of certain 'rigid' roles in the system (Hanft et al. 2008). Thus, on the one hand senior researchers attending ESOF share common values, follow similar practices of knowledge production and have each contributed to the knowledge pool of one or perhaps even several scientific communities. On the other hand, they seem prepared and willing to transgress the boundaries of their own epistemic field (as is often expected of them), to reach out and share their knowledge with science professionals and society. This stance could indeed be viewed as a motivation for attending (meetings such as) ESOF. Another incentive would be the inspiration and new ideas an occasional change of scenery may lead to. Indeed, in an editorial appealing to its readership to participate, *Nature* noted that "like the AAAS meeting, [ESOF] offers the chance for researchers who are usually narrowly focused on their next paper to broaden their horizons" (Editorial 2010a: 8). With regard to policy, the same article stressed that though it "can be a turn-off for researchers, […] it has a big impact on research in the longer term. Thus the chance to listen to, and engage with speakers from political assemblies, funding agencies, the European Commission and researchers involved in policy development represents an opportunity on that front too" (Editorial 2010a: 8). Notwithstanding, this practice requires a great deal of time and effort on the part of the scientists, which may come into clash with the demands of a researcher profession at any level. By not being a disciplinary conference, where recognition from peers for research work presented can be expected, attending and speaking at ESOF may (still) not necessarily be an activity from which a certain gain for one's scientific career can be expected. It is therefore not a coincidence that a considerable number of these senior researchers is of a certain age and status that allows them the luxury to devote considerable time to other communities. For even if science communication and outreach as well as engaging in 'the commons' with regard to science have become in-

creasingly important and in some constellations even mandatory activities[191] for instance for reasons of accountability vis-à-vis government and society, they still do not represent the core occupation (and preoccupation) of full-time researchers well in their productive years.

Senior researchers coming to ESOF are consequently a minority compared to the overall participants. In addition, a rather large number of the researchers attending assume an active role during the conference. They speak about their current research, their career and the path they followed to become a scientist in the first place. However, they also join ESOF to discuss general and overarching issues such as "models for technology transfer, best practice in science communication, how to bring science into policy, which brings the whole field forward" (Sundberg 2011: 7). Asked why he thinks it is that only a relatively small number of full-time investigators attend and contribute to ESOF, one of the meeting's founders, Carl Johan Sundberg, pointed out that it is not surprising considering that the Euroscience Open Forum is "outside the daily musts of most researchers in whatever field they are" (Sundberg 2011: 4). Indeed, these 'daily musts' are subject to a quite different set of criteria focusing on output rather than input. Still, scientists (but also other professionals) attending ESOF "go out of their way" to attend and "talk about generalities and the 'big things'" (Sundberg 2011: 7). A reason for that may be that the opportunity to meet people from other walks of life within and outside science face to face and to engage in dialogue can lead to intriguing new projects and ideas, whereby providing 'input' of equal value to the constantly expected 'output' in researcher careers[192]. In a globalised research system, membership in scientific communities cannot be tracked or defined in detail. Not all researchers of a certain field find themselves at one particular congress or event and there is no one instance where they all register or of which they all become members (Gläser 2012: 151). At the same time, the demands placed upon researchers place a strain onto the time they can dedicate to further aspects of their multi-layered profession. The Euroscience Open Forum thus potentially offers a rather seldom opportunity

[191] One example for this development is the requirement of science communication and outreach activities as part of EU funded research projects, introduced in Framework Programme 6 and enhanced in FP7 and Horizon2020.

[192] This is a view shared by all ESOF stakeholders interviewed in the course of the thesis.

to capture, make visible and perhaps also promote debate on these multiple identities and roles fulfilled by researchers, even if through a very small sample of practitioners.

5.3 The ESOF Career Programme: Breeding the next generation of investigators

In a *Naturejobs* special issue in August 2002, one of ESOF's founders, Claude Kordon, argued that "there are two important trends in European science employment: career paths are changing, and European scientists aren't fully prepared for these changes." (Smaglik 2002: 3). He anticipated a further increase in interdisciplinary research and exchange among epistemic fields and also predicted an even higher number of short-term employment conditions for researchers in Europe, a situation affecting mainly the younger generation. Finally, though there may be many job opportunities in industry (in some countries perhaps even more than in academia) as well as respectable career alternatives in fields such as law, finance or marketing, European scientists are neither aware nor prepared for them (Smaglik 2002: 3).[193]

Kordon's conclusions nicely sum up the issues that the Euroscience Open Forum, introduced only two years later, took upon itself to address. To many observers, it had become clear that a whole new generation pouring out of universities in Europe had to be suitably addressed and engaged, if the scientific realm were to deliver on the high expectations placed upon it by politics and society. The research system would indeed need to adapt its structures to fulfil increased output requirements and as a result also alter its stance towards employment (Müller 2012). It could hardly remain a selected 'caste', but rather had to compete for the best minds with other branches of the economy, which in many cases offered better employment and career development opportunities. In addition, it had to adapt its education and training practices in order to secure the kind of professionals it required for its highly specialised and complex practices. These developments put the research system into a challenging position: how to secure 'new blood' with the appropriate training? How to canalise it into the system

[193] Kordon also argued that "the information currently available on the Internet about European career opportunities tends to be of limited use" since the existing databases "are local and fragmented". (Smaglik 2002: 3)

strategically and effectively in order to deliver on the promises made to funders (i.e. policy makers and society), while at the same time preserving important systemic elements such as quality assurance and scientific method? In a few words, how to balance tradition and renewal?

Considering its purpose and aims, ESOF seemed to provide an ideal platform for debate on these challenges. Indeed, when studying ESOF meetings, their rhetoric and programme, from the beginning until today one notices that the question of scientific careers in Europe features very prominently in formal and informal settings of the Forum. With an 'awakening' taking place on a European level regarding the political and economic importance of scientific research (see among others European Commission 2000a, 2000b, 2002b) and the subsequent need to establish a "single European market" for it, it is not surprising that "the first pan-European general science meeting highlighting science, technology and innovation in Europe" (ESOF2004 Programme Book: Cover) aimed to become a space for discussions on the course and future of the scientific profession. Only a couple of years before the first Euroscience Open Forum took place in Stockholm, the Lisbon Strategy had put researchers and their expected output at the forefront of the European knowledge society (European Commission 2000b). Moreover, within a European Research Area, their profession was expected to receive additional support and attention among others through more flexible and above all more homogeneous regulations on recruitment, working conditions and collaboration among institutions and individuals in Europe (European Commission 2000a). The goal, as formulated by policy makers, was to create a single labour market for all researchers. Subsequently, key issues revolving around the parameters and potential of scientific careers on the one hand as well as the sheer number of those pursuing them on the other feature prominently at ESOF. In a number of sessions as well as in the course of discussions taking place throughout the meeting, as part of the 'official' programme and during the countless participants' encounters, questions such as funding and availability of positions, mobility of researchers, of their grants, their social benefits and pensions, compatibility with family life and gender balance in the scientific profession are 'ventilated'.

From the first ESOF meeting onwards we furthermore witness efforts to close perceived gaps in young researchers' knowledge of the market and its requirements as

well as in their training and skills.[194] It is interesting to note that this 'deficiency' was diagnosed mainly on the part of the students and early stage investigators and less as a general shortcoming of the European research system as not being permeable and flexible enough to allow, both culturally and practically, the possibility for its members to cross over to other realms without difficulties or penalties (Kordon 2008). Still, the Career Programmes of the second and third ESOF meetings did feature sessions highlighting alternative career paths for trained scientists and students.[195] Moreover, collaboration with *Naturejobs,* the career portal of the established European science journal *Nature*, during ESOF2004 and ESOF2006 attempted to guide interested participants through the 'maze' of job opportunities by means of orientation workshops, personal coaching, free subscriptions to the *Naturejobs* database, as well as a science Career Fair.

The question of scientific careers and alternative options for trained investigators, vividly and repeatedly discussed at ESOF meetings, persists in many European countries (de Lange 2013; European Commission 2011). Interestingly, stakeholders directly involved in defining standards and requirements on the EU level or in some EU Member States and thus potentially in a position to tackle the challenges young investigators face, have also participated in ESOF meetings. One attempt to systematically bring these stakeholders in contact with the concerned researchers is the programme point first introduced in 2006 in Munich as "Pretzl with the Prof" and continued at every meeting since.[196] It involved intensive discussions in small groups (of maximum ten persons per group) with a senior researcher or science administrator. The intention was to openly pose questions on all aspects and stages of scientific training and career development and ultimately profit from the main interlocutor's knowledge and experience. Now, when observing the identities of the "Profs" more closely, one reaches some interesting conclusions. With regard to their own careers, the majority was or is

---

[194] See the ESOF2004, ESOF2006 and ESOF2008 Career Programmes.

[195] For instance: "Top five scientific career paths" (ESOF2006 Programme Book: 84), "Working in science or politics - or both? Young scientists' success stories" (ESOF2008 Programme Book: 82).

[196] The title of this scheme is adapted according to a gastronomic specialty of the respective country/region, where ESOF is held. The concept remains more or less the same.

mainly active in the natural and life sciences. Representatives of the social sciences and humanities rather form the exception, especially at the first ESOF meetings. Furthermore, of the active researchers present, most work in academia rather than in the private sector. An increase in representatives from research performing industry can be noted from 2010 onwards, alongside a more general opening towards the private sector applying to the entire meeting.[197] Another aspect is gender: during the first versions of this activity, male "Profs" prevailed. This lack of balance in the epistemic orientation, gender and personal experience of these individuals can be problematic when considering that in this particular constellation they are viewed as mentors who can inspire and encourage students to pursue academic or science-related careers or young investigators to remain in the field. What is more, early stage researchers are faced with new kinds of challenges the research system has been rather slow in providing answers to. To a large extent, it is also these questions young academics bring to ESOF (Kordon 2008).

However, a closer look at ESOF Career Programmes reveals two rather opposite approaches with which participants are addressed. On the one hand, they are strongly urged to pursue impressive scientific careers by working at top-level institutions, publishing intensively and always being a step ahead of the competition. Respectively, there is an effort to provide a 'guide' to the research system, its structure and mode of functioning. The importance of senior researchers as role-models and teachers, whose excellence could one day be achieved or even surpassed by their young peers, is emphasised.[198] Furthermore, we see sessions on peer review, on funding opportunities in Europe, as well as workshops on writing grant applications.[199] Notwithstanding, it is

---

[197] Here it should be noted that it was the Barcelona meeting that first introduced a separate programme entity dedicated to collaboration with industry and technology transfer (see ESOF2008 Programme Book: 76 ff.). However, it is at ESOF2010 that we first see representatives from the private sector featuring as "Profs".

[198] See for instance "From slaves to masters - the long and winding road to independence" (ESOF2004 Programme Book: CP4) and "Standing on the shoulder of giants: mentor-inspired genius" (ESOF2006 Programme Book: 84).

[199] See for instance "Peer review: the process unveiled" (ESOF2006 Programme Book: 82), "What's up with peer review? The future of peer review in policy, research and public debates" (ESOF2010 Programme Book: 78) "Funding opportunities for young researchers working or moving to work in Europe" (ESOF2008 Programme Book: 85).

clear that such events represent only a very small portion of the overall ESOF programme. Moreover, due to its overarching scope, ESOF is for many young scientists not necessarily the place to retrieve this information. Indeed this kind of knowledge is increasingly becoming an important element of scientific training. In-house vocational skills courses (e.g. presentation and interview skills, advanced knowledge of computer software, fundraising, project management etc.) have gained ground, often as official parts of the science curriculum. In addition, as for almost every other profession, networking and mobility is also considered to be of vital importance for researchers and especially those entering the field. Throughout ESOF, this is strongly encouraged and there are indeed a number of formal and informal opportunities to engage in conversation and exchange with different stakeholders and groups as well as explore new opportunities for international careers. The Career Programme itself also offers structured approaches for instance via events organised by associations of young scientists in Europe and beyond[200] or science journalists' associations. The Marie Curie Fellowship Association for instance, has for years organised a one-day conference, inviting Fellows to join, network with each other and discuss current issues of interest.

On the other hand, recognising the difficulties many peers face due to shrinking public research budgets, short-term contracts and few positions for mid to high-level researchers, sessions and workshops are organised pointing to alternative careers. These 'opting-out' or alternative scenarios for researchers are often presented as being of equal value and providing equal recognition to an academic researcher career, even though in reality their perception within the scientific realm may by quite different. One characteristic example is science communication. Researchers are often required by funding and employment regulations to increase their efforts in this field and engage in communication and popularisation activities (Bucchi/Trench 2008). Interestingly enough, though these activities are by now to a significant extent 'inscribed' into the research system, they do not necessarily represent an accepted option for the more established and older generation of researchers. A reason for this may be the increased specialisation and professionalisation of science in the 20th cen-

[200] Among them the Marie Curie Fellowship Association, the World Association of Young Scientists and the European Council of Doctoral Candidates and Junior Researchers (Eurodoc).

tury as well as the new 'social contract' between the scientific realm and governments in developed countries which left scientists little time to engage in popularisation efforts and even made them obsolete and unnecessary (Dunwoody 2008: 16). One thus notices that the mentors and teachers of this young generation have in their majority remained rather distant towards popularisation efforts, seeking visibility and recognition in their respective scientific communities instead (Bucchi 2008). Still, ESOF also paid tribute to how important popularisation of the results *and* the process of scientific knowledge production has become. Consequently, sessions dedicated to the art of communicating science abound at every Forum. The majority is dedicated to the exchange with reporters, as 'middlemen' in the communication with society.[201] However, young investigators are also encouraged to take the initiative, speak to editors or directly to the public, network and lobby for their research and, of course, its funding (ESOF2008 Programme Book: 84). From there, it is not a long way to presenting science journalism and science communication as alternative career paths (ESOF2006 Programme Book: 83) alongside industry, entrepreneurship, law and finance (ESOF2006: 84).[202] Increasingly, research administration and science policy also feature as an alternative career for early stage researchers. As of ESOF2010 we witness a gradual change in the "Prof" scheme, which begins to involve more administrators in academia and industry as well as science policy makers from both national and EU levels.

This oscillation between what are considered to be two opposite professional directions points to a certain ambivalence as to how the younger generation should be addressed and guided. This phenomenon is not just confined to ESOF, but in some cases even characterises research systems on a national and European level. Especially at the time when ESOF was conceptualised, it was clear that 'fresh blood' was needed to

---

[201] See for instance "Fun and games with media communication" (ESOF2006 Programme Book: 84), "The journalists got my message wrong, again! How to minimise mistakes in media coverage" or "Get proactive! – An interactive session on taking the initiative in public communication" (ESOF2008 Programme Book: 83-84).

[202] A session organised by *Naturejobs* as a guide to career alternatives (characteristically entitled "Should I stay or should I go?") also referred to "teaching, running sponsored programme departments, starting your own small business, lobbying, science policy, conference planning, regulatory affairs, clinical trial support, industry or management" (ESOF2008 Programme Book:83).

continue the work done by the post-war generation of researchers and take it to a new level while employing all the technological means developed in recent times.[203] However, it would take time and effort for these developments to set in and for the administrative 'machinery' to come into motion. The first step was to closely analyse the human capital available. Thus, gradually a differentiation took place with regard to the publics subsumed under 'young scientists' – until then an entity without a clear form and identity – leading to more specific categories in terms of knowledge, skills and experience and subsequently potential and needs (European Commission 2011).[204] This process is perhaps epitomised in the introduction of so-called European Research Council (ERC) Starting Grants, for which researchers two to twelve years after completing their PhD would compete. Indeed, this period of time involves a rather steep learning curve as well as a maturing process indispensable for a scientific career. Experts agree that there are considerable differences in knowledge and expertise between investigators a couple of years after their PhD and more than ten years later, not to mention the natural process of personal – apart from professional – maturity sheer age brings. It was among others this realisation which also led to the introduction of Consolidator Grants as a follow-up to Starting Grants, thus differentiating even more and implicitly introducing a new 'sub-public' with a well-defined profile and capabilities.

In addition to the developments with regard to scientific qualification, the research system is today also required to respond to and provide solutions for further challenges. For instance, a once male dominated realm has become attractive for a large number of qualified and well-trained women. Not least because of reasons of gender equality, but also due to demographic change and the sometimes faltering attractiveness of academia as a prime career choice, recruiting personnel of both sexes can be viewed as having become an imperative (European Commission 2005b). However, this societal development has also brought with it significant changes in work vs. family

---

[203] See for instance European Commission 2003b.

[204] Following the recommendation formulated in the Europe 2020 Flagship Initiative 'Innovation Union' to establish "comparable research career structures", the European Commission set out in 2011 to formulate a European Framework for Research Careers and define the different stages of a researcher career more closely.

patterns, which in turn require adaptation on the side of employers in order to accommodate these new realities in academic structures. Aspects such as women in leading academic positions, dual career, childcare, flexible working conditions and reliable career planning consequently became 'buzz words' and featured regularly in the programmes of numerous events and discussion panels – also at ESOF.[205]

Another challenge is the one Kordon refers to (Smaglik 2002): through the strengthening of industry's contribution to research and development on the one hand and the limited availability of positions in academia on the other, the question of researcher careers outside academia has become important and needs to be addressed. Taking this thought even further, the modern knowledge society requires professionals with advanced scientific education in many more functions than before.[206] Academia is thus required not just to train 'its own', but also to become a 'breeding house' for experts required in other fields. This process however also involves adapting the set of skills imparted to students to the requirements of these 'external' fields and at the same time informing them of the available options. This process would in turn most probably require further analysis, differentiation and specification of the publics subsumed under 'early-stage investigators'. To some extent, we can indeed observe this taking place in the context of the Euroscience Open Forum. Increasingly more PhD candidates and postdocs are addressed through the ESOF Career Programme and constructed into a certain type of young investigator public. Judging by the programme components of ESOF as well as by a number of discussions held with attendees of the first three meetings, this public as perceived at ESOF seems to carry the following characteristics: it is exposed to tremendous competition, expected to be mobile and in the best sense embody the ideal European scientific citizen, while at the same time experiencing insecure and unsteady employment conditions and as a result difficulty in balancing professional with family life. At the same time however, in this

---

[205] See for instance "Where are the women in science?", "Are scientists allowed to have children?" and "'Family life' and 'research career' – a contradiction in terms?" (ESOF2004 Programme); "More women in university science: Realistic target or utopian fantasy?" and "Fishing from a bigger pool: Excellent science needs women" (ESOF2006 Programme); "Women in science: Speeding up change" (ESOF2008 Programme).

[206] See chapter 2.2 for an extensive analysis of the concept of the knowledge society.

public rests tremendous potential for society and the economy, as its capabilities and qualities are setting the standard for a whole generation of young professionals.

5.4 Policy makers: Testing the grounds and making the mould of scientific research

In the analysis of the prominent debates setting the frame for ESOF, I referred to the notion of an increasing transition from a 'Mode 1' to a 'Mode 2' knowledge production put forward by Gibbons et al. (1994). This proposition encompasses among others the observation of a diminishing role for institutions in the process of scientific knowledge production with practitioners from different epistemic fields, as well as outside academia, gathering to perform transdisciplinary research (Gibbons 1994). Notwithstanding, though the existence of such a trend alluding to a more pluralistic knowledge production cannot be entirely denied, scientific research continues to rely heavily on institutions for its funding, its infrastructure, the training of its practitioners as well as its management and ultimately output. Doing research within or 'under the auspices' of a reputable university or non-university organisation or acquiring (highly) competitive external funding from grant awarding councils are elements that increasingly form part of a successful scientific career (Müller 2012). It turn, the respective institutions (be they funders or research performers) are in competition with each other for funds, personnel and ultimately, reputation. Those depending on public means moreover lobby government for both their allocation as well as for a research-friendly regulatory framework.

To succeed in these efforts, institutions have enhanced their capacity and expertise in effective and efficient administration As a result, observers have pointed to the emergence of a number of professional fields situated at the 'threshold' of scientific research entrusted with managing and marketing its outcomes (Hanft et al. 2008). Gradually, these tasks have also become a priority for those holding the top positions, who thus often take on the role of high-level managers and promoters of their institutions' interests.[207] As such, they engage among others in advocating and lobbying issues vis-

[207] See for instance the article "Wie viel Manager will ich sein?" in *DIE ZEIT* (2014/21) http://www.zeit.de/2014/21/wissenschaftsmanager-faq-beruf (accessed on 30.04.2017)

à-vis government and society – as well as in some cases also towards industry – both formally and informally, yet increasingly also publicly. What is more, their roles have also become political, for they claim a stake in the process of policy making traditionally undertaken by politicians themselves (Simon 2010).

An analysis of the identities of those publics attending ESOF subsumed under the term 'policy makers' in the Forum's narrative indeed suggests a blurring of boundaries between high-level managers from academia and industry on the one hand and politicians on the other. Though they may be portrayed as such, they are not necessarily a homogeneous public. However, through the years, they have established closer ties with one another and developed a stronger interest and contribution to each other's efforts (Winter 2011). Their respective motivations and goals may vary; still, in order to fulfil them they need to understand the other's work better, anticipate trends and proactively put forward solutions and strategies to counter perceived problems or challenges. The borderlines between these groups are indeed quite fluid. What is more, their relationship seems to oscillate between collaboration and competition. Though both sides are in principle seeking to serve their respective 'constituents', they ultimately also aim to serve science by preserving its assets and its framework, while at the same time attempting to guide it towards new fields and dimensions. These include for instance the establishment of new institutions and funding programmes or the introduction of new policies governing science (Hanft et al. 2008). Such processes do not occur exclusively top-down, but are often the result of consultations, negotiations and consensus between academia and policy.

The creation of the European Research Council represents a characteristic example of a strong involvement and interaction of both the European scientific community and EU governments and institutions (Gerold 2011). It is perhaps not a coincidence that at a crucial stage of its development, following its endorsement by EU Member States in 2006 resulting among others from years of lobby work from the researcher community, the ERC featured prominently in the ESOF2006 programme. Interestingly, the title of the respective session points to a particular emphasis on its stakeholders.[208] Speak-

[208] The session was called "The European Research Council: Who are the movers and shakers?" (ESOF2006 Programme Book: 69).

ers included members of the Scientific Council of the ERC, European Commission officials as well as representatives of private funding bodies. This selection could be viewed as alluding to the involvement of both the academic and political world in this undertaking as well as to the joint effort that had been necessary to reach this stage.

Still, there are cases of policy making where a tension between the European and the national level can be observed and the respective interests are not necessarily aligned. It is interesting to note that both national and European 'parties' are also present at ESOF, where they form each other's key audiences. They are there to be seen as well as to meet, but also monitor, partners and also competitors. For instance, the ERC session was attended by other high-level administrators from research and funding institutions keen on finding out more about this new opportunity for their researchers and how it will compete with national funding programmes. Government officials were also present presumably adding this development to their considerations on existing structures in their countries and the potential of these to respond. However, this framework provided the opportunity for policy makers to also encounter a number of other publics: Media representatives sought to report on the ERC as an important development for the scientific world and interview its key figures. Press officers in institutions and universities assessed the impact of this new instrument upon their internal and external communication efforts (such as including the ranking of organisations according to ERC Grants achieved). Finally, representatives of the main 'target groups' of the ERC were also present: early-stage researchers and (later on) senior researchers would be the ones 'pitching' for the attractive grants with high-level basic science concepts in all epistemic fields.

Indeed, the ESOF programme 'boasts' numerous settings where policy makers can engage with their perceived audiences (Gerold 2011). These take into account the identities and needs of the former: on the one hand we have Heads of universities, of research performing and research funding organisations and councils, senior officials from EU Commission Directorates, from industry[209] or from foundations and chari-

[209] Even if high-level managers from research performing industry amount to a very small quota in ESOF2004, ESOF2006 and a slightly larger one in ESOF2008, is it important to include them in policy making considerations for their influence is all but negligible. Their contribution to setting the course of research and research policy on a national and European level

ties.[210] Individuals in these positions have become extremely important, as they highly influence an institution's or company's positioning within its respective national system, but also internationally (Simon 2010). Many of them look back onto a rewarding researcher career either in academia or industry. Though their engagement in research management often signals the end of their work as full-time researchers, they tend to maintain their ties to their 'own' community, while being at the same time required to represent a broader array of epistemic fields and their interests. This move suggests an increase in permeability and mobility between researcher and manager professions, even though a reverse switch is only seldom possible. Moreover we notice that we cannot have one without the other: in today's scientific enterprise the management of complex research organisations requires a thorough understanding of the process of scientific knowledge production (Gläser 2012: 159; Groß/Arnold 2007). At the same time, management practices previously found mainly in the private sector have established themselves in publicly funded institutions as well. What is more, managerial work also forms a considerable part of researchers' daily work and tends to increase with seniority (Torca 2012: 338). Finally, due to their multifaceted track-records, their public presence and increasing influence, high-level research managers have also become public figures with close ties to the political world (Gerold 2011). Indeed, a number of them later go on to assume political positions, for instance as science ministers or scientific advisors to government.

On the other hand we observe local, regional, national and European holders of political offices, such as mayors, ministers, Heads of State as well as EU parliamentarians and Commissioners.[211] Their relation with science, and thus the reason they contrib-

---

is significant. In turn, they have a vested interest in understanding how academic research functions and how policy is designed as well as to be informed on the state of play in both areas. This is why there have been efforts on the part of ESOF to attract a larger number of such companies and their managers. The meetings in Turin, Dublin and Copenhagen were indeed more successful in this undertaking.

[210] At this point it should be noted that ESOF is also attended by mid-level administrators from the same institutions, often accompanying their Heads (and preparing their contributions). I will not be referring to these individuals in detail, but rather focusing on their superiors as representatives of institutions and their interests.

[211] An analysis of the Programme Books and the participants' lists of ESOF2004, 2006 and 2008 respectively confirms this observation.

ute to ESOF, could be either because they hold a science related portfolio (for instance as science and innovation, education or environment ministers, government scientific advisors etc.) or because they run the city, region or country where ESOF takes place. Of course, it can also be both.[212] Their role is often that of a host welcoming participants of the Forum and promoting their city,region and country with an emphasis on its knowledge, research and innovation infrastructure. A number of high-level politicians inaugurating ESOF or addressing its attendees on other occasions throughout the meeting have given thoughtful insights into the importance of education, science and innovation for society and the economy in their country (or any country for that matter).[213] While some of these individuals have acquired a respect for science, its prerequisites, implications and applications in the course of their political careers, others formed these convictions during an academic engagement prior to taking political office. Indeed, an increasing number of senior politicians hold postgraduate academic degrees, an asset that enables them to grasp the process of science, its needs and its contribution even better. Their take on science may vary; some may emphasise the aspect of education and scientific literacy or rather that of technological development and innovation. Some may perceive the local character of ESOF as relevant for their portfolios and goals, others the European one. Their motivation to appear at the Forum could thus be attributed to a number of reasons. One may be sheer duty: it is part of their job description to act as hosts, ambassadors, patrons and catalysers. Alternatively, it may be the pursuit of a politically led goal involving for instance issues of research and development funding, of competitiveness or employment (Simon et al. 2010). In any of these cases, high visibility, preferably in local and national media can be viewed as constituting an important element of these individuals' activities and perhaps even a prerequisite for their effort (Laget 2011). As science diplomats, they are given a number of opportunities to interact with interested parties as well as a 'stage' on which to perform their duties. For instance, the respective national science minister

[212] Furthermore, there have also been cases of senior politicians from other European countries attending ESOF with the purpose of observing the meeting and perhaps even encountering some of their peers. For instance, Croatia's newly appointed Science Minister attended ESOF2008.

[213] See for instance the speeches by Horst Köhler or Giorgio Napolitano at the Opening Ceremonies of ESOF2006 and ESOF2010 respectively.

has, until now, both financially and politically supported the ESOF meeting taking place in his or her country. In some cases, the local or regional governments and municipalities have also made financial and in-kind contributions (such as holding receptions for ESOF committee members and keynote lecturers and allowing ESOF events in public spaces) and subsequently also acted as hosts of the meeting either in person or in writing, for instance in the ESOF Programme Book[214] distributed to every participant of the meeting. On an even higher level, Heads of Governments[215], EU Commissioners or the President of the Commission have expressed their support for ESOF and what they perceive it as: an opportunity to place research and technology as well as those pursuing it into the limelight, emphasise the importance of their contribution and invite the young generation to 'join the cause'.[216] The statements of these personalities have been picked up by the media present and appeared on headlines in Europe and beyond making a case for scientific research as vital for society.[217] Though perhaps only for a short while, these 'plaidoyers' of Heads of State or Commission Presidents made on the occasion of ESOF help draw attention to issues affecting science.

An analysis of the ESOF programmes suggests that most 'policy makers' attending the meeting also have active roles, either as session hosts , as speakers in one of the numerous science policy workshops or in keynote lectures. As public figures, they present their institutions' or governments' views of the research system and propose steps and measures necessary for its advancement.[218] At the same time, they act as interlocutors and often recipients of lobbying efforts from attending publics. As men-

---

[214] See for instance a foreword by Thomas Östros, then Minister of Education and Science in Sweden, in the ESOF2004 Programme Book (G9).

[215] At ESOF2006, the President of the Federal Republic spoke alongside the Federal Minister for Education and Research at the Opening Ceremony of the meeting. In 2010, Giorgio Napolitano, the Italian President of the Republic, sent a video message broadcasted also during the opening ceremony.

[216] See for instance Barroso 2014, Köhler 2006, Napolitano 2010.

[217] For instance, a considerable number of newspaper articles, radio and television reports referred to Horst Köhler's speech at ESOF2006

[218] See for instance the ESOF2006 session "What do you expect from science?" (Programme Book: 60) or the ESOF2010 session "The European Research Area: an ERA addressing the "Grand Challenges" (Programme Book: 50).

tors, especially to early stage or aspiring researchers, they convey their opinions on the (ideal) course of scientific or science-related professions. Their articulations (be they on science, society or Europe) often have a political character and, through publicity, an impact. They are thus perceived as significantly contributing to ESOF's attempt to "highlight Europe on the world map of science" (ESOF2008 Programme Book: 7), just as the AAAS Annual Meeting is seen as doing for the United States and the country's research output. For it is a long-standing practice of the AAAS to invite eminent science managers and politicians to its meetings. Its aim is on the one hand to give these personalities the right 'take-home messages' regarding the state of scientific research in the country (compared to key competitors) and at the same time canalise the interest of the media in their presence and statements towards specific issues important to the future of the scientific enterprise. Furthermore, it is hoped that these personalities will attract a larger number of attendees. This strategy can also be observed at ESOF with the interesting difference that issues spanning the European scientific realm seem to prevail in the rhetoric of both guests and organisers. Indeed, though we also have national policy makers on the podium, who of course refer to their own country, its state of the art in science and its achievements, many seem to recognise the need to set their thoughts, arguments and requests into a European context. This observation to a certain extent underscores the self-perception of ESOF as a platform of European scope and impact.

All in all, high-level personalities from research institutions, the public and the private sector are thus allocated significant space and time at the Forum, which offers a number of ways to present and market the activities of their institutions, exercise their lobbying efforts as well as fulfil their representation responsibilities. More importantly however, it is within these settings where ideas and 'products' 'in the making' are communicated and discussed. Apart from the conference programme itself, with its numerous policy sessions, and the usual social events, the ESOF Exhibition also represents a space for encounters, demonstrations and exchange. There, we find a diverse set of 'exhibitors' including the European Commission (as of 2008 also hosting the

European Research Council), the Joint Research Centres, EIROforum[219], national research councils, foundations and charities[220], funding agencies, professional associations, as well as intermediary bodies (such as the European Science Foundation). The marketing and lobby work performed by the high-level representatives of these entities is also carried into the ESOF Exhibition and flanked by a sponsored parallel programme, which includes special presentations and cocktail receptions. However, one asks who these activities are addressed to. Though from the outset open to the general public without entry cost and advertised widely, in reality ESOF Exhibitions are conceptualised to predominantly address interested and well-informed science professionals and especially early-stage researchers and students. Subsequently, exhibiting institutions directly or indirectly promote academic, career, publishing and funding opportunities mainly in Europe, for instance through recruiting exercises, talks by high-level representatives or the awarding of prizes to selected representatives of scientific or science-related professions. More importantly however, they also use this space (as well as ESOF as whole) to directly or indirectly put forward issues of political relevance. This is a process in which all attending publics are involved in – some more, others less – and one in which policy makers are given a central role: they are expected to 'set the tone' in current debates while at the same time being open for and responsive to arguments and suggestions 'from the field' (Laget 2011; Lestienne 2009). This is not surprising considering that, as high-level managers at systemically relevant institutions and bodies, these individuals carry significant responsibility and also have access to privileged information. Still, though many of them carry years of experience in the field, some also as researchers, and therefore often enjoy the respect of the scientific community, they are at the same time often considered to be far away from the everyday practices of research. ESOF could thus provide an opportunity for policy, academia and industry to interact and become more aware of the conditions and mind-sets prevailing in the respective arenas. The Forum can furthermore serve as a

[219] "EIROforum is a collaboration between the seven European intergovernmental scientific research organisations: CERN, EFDA, EMBL, ESA, ESO, ESRF and ILL." (ESOF2004 Programme Book: Ex4)

[220] Here a rather strong concentration of national institutions in the respective country, where ESOF takes place, can be observed. See ESOF Programme Books for more information.

'barometer' for current issues of socio-scientific and techno-scientific relevance, thereby allowing politicians and science managers to capture the attention and 'feel the pulse' of the scientific community, from the student to the Nobel Laureate. Similar to a 'laboratory', ESOF and in particular the programme components designed to accommodate policy makers, provide these publics with the rare opportunity to 'proof test' their policy 'products' and ideas in terms of feasibility and acceptance and at the same time position and market them vis-à-vis a representative selection of audiences. Within this exploratory space (or test-field) policy makers attempt to make their 'pitch' towards their constituents, while implicitly or explicitly consulting them. In turn, the former become the audiences of the latter, who scrutinise their proposals and engage in negotiations on their contents.

In this sense, the ESOF Exhibition, but also the aforementioned ESOF components, can be viewed as performative spaces, as issue advocacy arenas, where points of view are proposed to relevant addressees. The chance to subject policy initiatives to 'stress-tests' in a relevant, yet dynamic setting may feature as a strong motivation for policy makers of different types to attend ESOF. Moreover, through the high number of media attending this process of open debate and exchange could be extended to include parts of society and public opinion, mainly locally or nationally, though in some cases also on a European level.

5.5 Science journalists and science communicators: The hybrid publics

In an article featured in a Science Communication Handbook, one of ESOF's founders and key stakeholders emphasised that an important motivation for introducing ESOF was to establish "a communication forum for European research and science policy, which is truly independent from politics and funders" (Wünning Tschol 2012: 91). The Euroscience Open Forum was intended to become a place, where scientific results and successes – presented in the science programme considered the core of the meeting – would be celebrated and communicated across the globe. Science communicators and science journalists would assume a key role in this process. In addition to contributing as participants to a broader debate on science policy issues and an interdisciplinary scientific exchange envisioned in the context of ESOF, press officers and media representatives would be the ones 'pre- and post-packaging' information from the

meeting, including the trends, opportunities and concerns formulated in numerous discussions, sessions and events.

As was expected and intended by the meeting's design, this group of people, tellingly subsumed as "press" in ESOF statistics, has formed from the very beginning an important public both in terms of numbers and function.[221] This elevated role can be attributed to a number of reasons. One is rooted in the public outreach and later public engagement culture introduced and nourished by the Science and Society and Science in Society movements: ESOF, designed as a pluralistic and 'open' science meeting, seemed destined to become an arena where what was propagated by these initiatives could become reality.[222] In this context, communicators and especially journalists assumed the role of 'gatekeepers', to a large extent defining the information that went in and out. At the same time, in the context of the ESOF conference[223], where broader societal participation was not foreseen, they became a substitute for society, implicitly acting as representatives of 'non-scientific' publics. As such, they transported what they perceived as society's queries, doubts and expectations to their interlocutors, thus acting as a mouthpiece and implicitly advocating for citizens' interests vis-à-vis science practitioners and decision-makers. I argue that this 'dual' role renders press officers and journalists a 'hybrid public'.

The notion of 'hybrid' is defined here as the ability to cross boundaries and oscillate between spheres, in this case the social and the scientific realm. It often goes hand in hand with a positioning at the outer spheres of these realms rather than at their centre. Consequently, communicators and reporters resemble satellites orbiting around their objects of study (be that science or society), monitoring and recording their activities, their thoughts and decisions. Now, as citizens they are automatically members of civil society, even though their frequently good knowledge of the scientific enterprise

---

[221] See 4.6 for more details.

[222] The Science in the City programme also played an important role in this context, as it involved public understanding and engagement activities. However, as mentioned earlier, the Science in the City programme and the participating publics will not represent a focus of this thesis.

[223] Until today there has been only one exception to this fact: all keynote and plenary lectures at ESOF2006 were open and free for the public. Again, the Outreach Activities taking place as a separate element of the conference programme have not been considered here.

and its workings sets them apart from the average layperson. Through their effort to view science, its structures and output through the eyes of non-scientists as well as transport the latter's concerns [back] into the scientific realm and challenge scientific interlocutors on these concerns and questions, they attempt to close the perceived gap between the social and the scientific realm. However, their membership in the extended research system is not a given. On the contrary: in a number of science cultures and traditions, they are still considered to merely 'belong' to the social rather than also to the scientific realm. This perception often exists alongside a limited acceptance of communication as important or even as an intrinsic part of the process of scientific knowledge production. Still, press officers' and journalists' increased interest in and understanding of scientific research, its methods and outcomes, often owing to a training in one of its epistemic fields[224], has gradually granted them access to the scientific realm – even if at times to its 'outer circle' – thus making them an 'inner-scientific public'.

Within ESOF – but also in a wider context –communicators' dual membership and oscillation between the social and scientific serves a vital purpose: it helps fulfil the need for visibility in both realms that the scientific enterprise, its knowledge producers and their institutions have. Ultimately, this practice is probably also intended to serve the reputation of the Forum itself by making it known across professional realms and geographical boundaries. The need for visibility and public recognition is fuelled among others by a growing expectation for transparency and accountability throughout the scientific realm. Yet, for researchers a strong presence in the media may also lead to a higher degree of credibility and argumentative weight on issues resulting from scientific research, but also on those with science policy relevance. In turn, credibility represents an indispensable attribute for researchers, significantly increases their chances for funding and can also be translated into a broader acceptance (of themselves and of their work) on the part of society. In this process, communicators thus become researchers' mouthpieces towards society. Conversely, the media and their outlets (be

[224] Many science communicators and journalists have indeed undergone scientific training before deciding to pursue an 'alternative' career.

that print, online, radio or television) become the 'windows' through which society may look into science.

What takes place between communicators on the one hand and their 'clientele' on the other could however also be described as a negotiation and transformation process. Media representatives do not just disseminate the results of the research process. Though they largely respect the science system's rules when doing so (Dunwoody 2008: 19), they aim to transform the content into something more tangible, where out of theoretical issues become topics of everyday life. Consequently, reporters' reproduction of the knowledge presented at ESOF thus has an impact upon the way this knowledge is perceived by its recipients. For this reason, efforts are made on the part of the scientific realm, yet in some cases also science policy makers, to influence journalists' and communicators' selection and diffusion of information. To do so, it has become a widely established practice of using so called 'pegs' to attract and channel the media's attention.[225] This method can be observed within ESOF's 'press operation', involving, among others, a series of press conferences on different issues from the Forum's programme. These topics, selected on the basis of their news potential, often carry an 'embargo' until the moment they are officially presented by their authors. Attending journalists are thus given exclusive access to research outcomes or other key information on the research system and on policy initiatives.

At this point, it should be mentioned that the AAAS Annual Meeting looks back on a long history (much longer than ESOF) of successfully 'selling science' (Nelkin 1995) to communicators, to funders and to society. Indeed popularisation has always been an important element of AAAS and its members (Teich 2011). In the early days of the Association end of the 19th century, the majority of its members were "not only distinguished researchers but also authors who had published in one or more of the popular science magazines of the day" (Dunwoody 2008: 16). As the stance towards popularisation changed within the scientific community, this role was gradually adopted by science reporters and communicators. A very large number (several hundred) of these professionals attend the AAAS Annual Meeting each year in search of exclusive news

[225] Dunwoody views "timeliness, conflict and novelty" as key pegs (Dunwoody 2008: 19).

(Lestienne 2009). Though their expectations are not always fulfilled to the maximum in terms of novelty or exclusivity, the meeting continues to feature as a well-respected source of information for popular media outlets.

The increasingly complex role its practitioners are required to fulfil, as well as the subsequent need to consider the conditions and implications of their work, has contributed to a professionalisation of science communication (Bucchi/Trench 2008). This process has also gone hand in hand with a call for a better definition of professional standards and a further development of the 'guild's' set of skills.[226] This effort is also reflected in the gradual development of a dedicated 'infrastructure' for this new field, including journals, societies and conferences, where representatives present their views and findings as well as network among each other (Bucchi/Trench 2008: 2). Interestingly, both ESOF and the AAAS Annual Meeting have attempted to, at least partially, cover the need for a 'self-development' of this new field and its practitioners. Communication professionals on the other hand have used the venues as opportunities to also reflect upon and advance their field of expertise and with it their own careers. From the very first ESOF meeting in Stockholm we witness a number of sessions dedicated to science communication and journalism as a profession.[227] This 'inward' look and reflection takes place at ESOF and the AAAS Annual Meeting also through a number of satellite events organised by the local Science Journalists' Associations to welcome their colleagues, paired with meetings of the US, European and World Federations of Science Journalists respectively. Apart from being networking platforms, these meetings allow for discussion over the strengths and weaknesses as well as op-

---

[226] In their Handbook of Public Communication of Science and Technology, Bucchi and Trench (2008) note that, in its early days, science communication was mostly performed by "converted" scientists with a background mainly in natural sciences. Gradually however, aided also by the emerging field of science journalism, which largely reflected "the scientific communities' perspectives on the issues in science communication", the latter developed as a distinct field claiming an independent existence from the natural sciences as a result of a "growing maturity and reflexivity" (Bucchi/Trench 2008: 2). Consequently, professional development opportunities, such as science communication degrees in universities, emerged.

[227] See for instance session "Science journalists: loudspeakers, storytellers or critics?", "Science and the media: how does science become headline news?" (ESOF2004 Programme Book: Ss4+Ss7).

portunities and threats to the profession[228], which has taken on a number of forms and shades.

Indeed, at the Euroscience Open Forum, we find reporters from mostly public[229] radio and television broadcasters, producing interviews or whole shows for dedicated science programmes (e.g. nano by 3sat at ESOF2006). The majority however, contribute to print and online press including news agencies, newspapers, magazines (*Spiegel*, *Focus*), popular science magazines (*Science&Vie*, *Scientific American*, *Spektrum der Wissenschaft*, *Forskning & Framsteg*), technology magazines as well as scientific journals (*Nature*, *Science*), in-house publications of learned societies and research organisations and more recently also science news blogs. We also encounter many freelance journalists, either commissioned to produce articles on ESOF or aiming to acquire new customers for future projects. Interestingly enough, communication officers who are also present in the ESOF Media Room are often the ones hiring freelance writers to produce feature articles for their employers' websites, brochures, podcasts and promotional films. At the time of ESOF's inception, press officers working for universities, research performing and funding organisations, science museums, foundations, ministries, EU bodies and research performing industry unlike their journalist colleagues rather lacked established European or international professional associations and dedicated, recurrent conferences where they could meet their peers and debate on their own profession.[230] Judging by its programme components, ESOF made efforts to fill this gap, which is perhaps why science communicators so strongly contributed to and participated in ESOF from the outset.

Notwithstanding, its increased presence and stronger role in 'canalising' the results of scientific knowledge production towards society has made science communication and journalism more attractive not merely for trained professionals seeking a speciali-

---

[228] Such issues included for instance the consolidation of staff taking place in many countries or the 'invasion' of the internet and social media into classic journalism as a whole.

[229] It is an interesting phenomenon that high-quality science shows and documentaries tend to be produced by public rather than private broadcasters. This is for instance the case in Germany with television shows such as "Nano" (3Sat) or "Leschs Kosmos" (ZDF) or broadcasters such as DeutschlandRadio.

[230] This situation has gradually changed with science communication conferences emerging in different countries in Europe and beyond.

sation, but also for investigators looking for career options outside the laboratory. This development is also reflected in ESOF's Career Programme, which presented science communication as an alternative career path worthy of researchers' consideration.[231] Students and early stage investigators represented key addressees for such activities. Faced with increasing uncertainty in light of limited academic positions, but also curious about the exciting opportunities emerging in sectors outside research, these young professionals were equally eager to explore science communication as one possible career option. At the same time, the ESOF Career Programme and the AAAS Annual Meeting catered for those investigators, junior and senior, who sought to acquire a better understanding of how the media function, to improve their ability to interact with members of the press and to advance their communication skills, be they written or oral.[232] Such activities should help researchers not only build a good relationship to the media, but also deliver on the requirement for communication attached to most public and private funding schemes.

Whereas early stage investigators mainly represented a group to train or 'court', high-level administrators and policy makers were the groups to 'tap' and consult in order to gain information on on-going research and systemic developments. Consequently, ESOF organisers made a serious effort to stage and encourage opportunities for encounter and exchange between the latter and reporters. These took the form of panel discussions, press conferences, bilateral interviews and specially designed social events, to name the most prevalent, but also involved informal encounters during the meeting. These spaces represent a "shared culture", where "both journalists and sources come equipped to interact, with their own needs and motivations for shaping their public images". "Each group understands the norms governing the behaviour of the other, and they sometimes construct a few rules of their own for the shared space that they both inhabit." (Dunwoody 2008: 23). These cultures can also be affected by

---

[231] Starting in 2006 at the Munich meeting, we see the first sessions on science journalism as an alternative career option for scientists (see for instance "Bringing science to the people", ESOF2006 Programme Book: 83).

[232] E.g. "How to write a best seller" and "Science and the media: How does science become headline news?" (ESOF2004 Programme Book: Ss5-Ss6) or "The journalists got my message wrong, again! How to minimise mistakes in media coverage" (ESOF2008 Programme Book: 83).

traditions drawing from geographic-historical particularities. Due to the multinational identity of its participants however and an increasing internationalisation of science communication, national characteristics seem to fade or become less influential at ESOF meetings.

Throughout these encounters, press officers often accompanying senior scientists and administrators act as facilitators arranging the meetings, providing reporters with background information and sometimes even negotiating the outcome (be that for instance an interview or an article) on behalf and in the interest of their employers. Press officers also take on an important function as managers and co-ordinators of the press services offered by academic journals. In view of the fact that – due to time constraints and the search for novel and verified (through peer-review) news – journalists often refer to established journals for their stories, major academic publishers have established press bureaus informing reporters in advance about upcoming publications and acting as intermediaries between them and the authors. Representatives of these bureaus also attend ESOF and the AAAS Annual Meetings, where they liaise with their colleagues from the authors' home institutions on the one hand and attending journalists on the other. The existence and interaction of all these publics serves as an example and perhaps also delivers proof for the hybridisation of the scientific system and the phenomenon of medialisation of research mentioned earlier in this thesis.

5.6 Knowledge brokers: A new group to look out for

In the previous chapters I have referred to the more visible publics 'inhabiting' ESOF and engaging within it. However, a closer look at participants' lists as well as personal observation of consecutive ESOF meetings point to a new, independent group that is slowly emerging and setting itself apart from more 'obvious' publics. Its emergence represents more a differentiation rather than a creation process, for the interests of these individuals are not inherently foreign to the workings of the scientific community. They themselves often have an academic background or even scientific training. However, they are taking on tasks and pursuing activities that are complementary to the process of scientific knowledge production – yet also of increasing importance to it. They have, to some extent, moved away from the 'mainstream' and identified niches from which they can operate in order to fill a perceived gap: to bridge institutions

and individual actors as well as translate and transform knowledge to serve new purposes. The individuals pertaining to this group occupy spaces at the periphery of the scientific enterprise (Meyer 2010: 122), though these spaces – as their identities – are not fixed, but rather quite fluid. I will employ the term 'knowledge brokers' to describe them.

Knowledge brokers indeed represent a 'niche public'. They build neither a rigid nor a homogeneous group. Given their particular role which involves "moving and making things flow across boundaries", confining themselves to boundaries narrowly defining their own practices would be counterproductive (Meyer 2010: 123). Their success often depends on their ability to act as neutral partners, as "honest brokers" (Pielke 2007), able to "resist the dogmas" of the domains they are eventually meant to bridge (Hargadon 2002: 77, as cited in Meyer 2010: 123). This state allows them to move with ease between epistemic fields, institutions and groups of professionals acting as invisible agents, translators and mediators. Notwithstanding, however fluid, they can gradually be identified as a distinct guild thus doing credit to their title, which is often [perhaps erroneously] applied to the majority of post-modern knowledge workers. Often helped by their own experience in science-related surroundings, they have recognised the challenge faced by former peers, their institutions, politics, industry and society to make the best of an increasing volume of scientific knowledge, by creating 'shortcuts', extrapolating novel or disruptive information and synthesising it to produce results of value to their clients. Consequently, knowledge brokers do not merely identify, but also redistribute, disseminate, translate and ultimately transform knowledge (Meyer 2010: 120). They thus transcend the boundaries (and barriers) of knowledge and its application, by attempting to link these practices and facilitate transactions between them (Wenger 1998: 109, as cited in Meyer 2010).

Now, when considering what may attract this public to the Euroscience Open Forum, one should perhaps look at the needs and particularities of their profession. Indeed, as in any commercial enterprise, they need to acquire customers and projects. However, perhaps unlike other businesses, they live off their ability to link information, concepts and people in new ways in order to produce new value. To do so they need to be well-informed and well-connected. Thus, though they perceive the Euroscience Open Forum as a space that "privileges the brokering of knowledge across boundaries" (Meyer

2010: 119) and consequently as a potential marketplace for their acquisition efforts, they also aim to inform themselves on current and future developments and fields of activity and seek inspiration for their proposals and 'pitches'. For this public the different sessions and events represent an opportunity to gain insight into a number of topics, listen to the views and arguments of stakeholders, pick up new trends and identify emerging areas of activity. In some cases however, knowledge brokers may also actively contribute to the ESOF programme and thus share their knowledge with others. Finally, ESOF meetings offer a number of very good opportunities for networking (as do AAAS Annuals Meetings) and for directly or indirectly 'selling' their brokerage services. But where exactly do we encounter knowledge brokers at ESOF, who are they and which are their fields of action? An analysis of available information and data from the first three meetings points to three wider fields, in which most knowledge brokers become active in the course of the meetings: technology transfer, science communication and career development.[233] These themes are also reflected in the conference programme as well as in the numerous side activities and satellite events, which in turn offer opportunities for targeted engagement.

The notion of bringing scientific knowledge to market was visibly introduced into the conference programme in 2008. However, we already see technology transfer officers working for universities, research institutions or as free agents attending ESOF from the outset, though initially in rather small numbers.[234] During the first two meetings, such professionals attended as normal participants or, in some cases, as speakers.[235] In Barcelona a dedicated ESOF Business Programme called "From Lab to Market" was established aiming "to bridge the gap between industry and academia" (ESOF2008 Programme Book: 76). The business programme has since grown in breadth and varie-

---

[233] Though there are also professionals and firms engaging in somewhat different activities, such as strategic consulting and business analytics, they are significantly less in numbers compared to those focusing on technology transfer, science communication and career development. Furthermore, their areas of expertise are only marginally represented in the conference programme. I will thus not be referring to them in my analysis.

[234] This observation is based on the analysis of participants' lists.

[235] See for instance the sessions "Technology transfer in emerging countries" at ESOF2004 organised by the Euroscience Working Group for Technology Transfer (Programme Book: Ss17) and "What needs to be fixed in the European patent system?" at ESOF2006 (Programme Book: 76).

ty[236] and so has the community participating in it[237]. Gradually, these technology brokers are not merely attending ESOF for inspiration or in the pursuit of new projects; they are also meeting their peers and audiences who consist, among others, of representatives from research performing companies and consultancy firms as well as of entrepreneurs and venture capitalists, whose purpose is to bring different people and stakeholders together. Technology brokers represent a new form of intermediaries, who spot expertise and knowledge and transport it across communities, bringing it to the appropriate recipients. They do so for instance by helping translate scientific knowledge into patents, later on into business cases and, ultimately, into new companies providing products and services. They assist researchers and their institutions to find the right partners and funding and guide them through the regulations and challenges that this process entails. In many cases, their strongest asset is their ability to access networks of information and people and seek and establish the appropriate links, thus enabling or facilitating exchange among stakeholders.[238]

In its scientific programme, the 'Lab to Market' stream as well as in the Exhibition and its networking events ESOF has gradually provided all these professionals more 'manoeuvring ground'. Though it may not be a meeting with an exclusive focus on entrepreneurship, it has acknowledged the need to respond to respective socio-political and technological developments. Technology transfer has become a key process in the scientific value chain, as it helps research results from the lab to become products or services with an economic value. Increasingly, this is regarded as a 'return on investment' to those providing the initial funding for the research. This development and the increase in importance of the professionals providing the services in question could be seen as representing a consequence of the 'triple helix' notion (Etz-

---

[236] ESOF2010 featured dedicated key-note sessions on "Building the entrepreneurial economy" as well as no less than 36 sessions (vs. 4 in 2008) and a "European Research and Business Speed Dating international Brokerage Event" (ESOF2010 Programme Book: 96 ff.). Business and innovation featured as a key theme in the ESOF2012 programme aiming at "transforming the outputs of publicly-funded research into successful business innovations" http://esof2012.org/programme/science-2-business-programme/ (accessed on 18.11.2014).

[237] Observation based on participants' lists, statistics and conference programme information.

[238] Apart from these marketing, translation and communication activities, consultancy companies focusing on promoting 'innovation' often provide also analytical services.

kowitz 2002), which advocates among others a stronger focus of universities and research institutions on effectively managing and utilising scientific knowledge. It is also prevalent both on a national and on a European level, culminating into innovation strategies and funding programmes[239] to stimulate economic growth, counter unemployment and foster social prosperity.

Notwithstanding, technology transfer represents one important component of a broader knowledge transfer taking place in a number of fields, via diverse channels and in multiple directions in today's knowledge society. A further component is the communication of scientifically induced knowledge towards society, which has gained considerable significance and attention over the past decades. The media feature as the main vehicles for this translation process. Using mass media effectively to transport one's messages to selected audiences has become a challenge for public and private organisations and for governments, especially in the face of a dramatic increase in the variety and character of communication channels as well as in the speed with which they operate. This development has enhanced the need for professional translators to successfully navigate institutions and individuals through the media maze. Consequently, increased demand has led to the crystallisation of a new professional group focusing on communication consulting. Such services take on different forms with the activities ranging from the conceptualisation, design and content development for publications, to press relations, to social media management. Thus, science communication professionals advise their customers on how to make sure that both their efforts and the fruits thereof become visible to selected audiences through the media, but increasingly also directly, for instance through public engagement. They not only guide the movement of knowledge (by planning its trajectory), but often also form or polish its content, making it easily accessible and 'digestible' by the publics targeted. The Science and Society movement, mentioned earlier in this thesis, can be viewed as having strengthened the case for the existence of these pro-

[239] A number of European countries (including for instance Germany with its Hightech-Strategie) as well as the EU itself with Innovation Union, a flagship initiative of the Europe 2020 strategy "for smart, sustainable and inclusive growth", have launched innovation strategies coupled with funding schemes aimed among others at engaging the private sector more strongly and promoting 'use inspired' research. In the case of the EU, such efforts represent a particular focus of Horizon2020 and its funding instruments.

fessionals and the services they provide. In turn, the phenomenon of the medialisation of science could be to an extent also perceived as the outcome – or consequence – of this work.

As with their technology counterparts, we also encounter these science communication professionals at the Euroscience Open Forum from the very beginning. Indeed, ESOF is often perceived by some observers as being to a large extent a science communication event; for the meeting has always featured numerous sessions on science communication[240] attracted a lot of journalists[241] and generated considerable media attention[242]. Even if this perception can be challenged when comparing the amount of dedicated science communication sessions to the overall programme, the Forum did appeal to this guild, who saw it as an opportunity for professional exchange and peer learning, as well as as a new marketplace for its services. Not only did these professionals aim at potentially acquiring new customers, for instance among the many foundations, research institutions, universities and company representatives attending ESOF or contributing to its Exhibition.[243] They also attempted to expand their contacts to writing journalists, with which they need a good working relationship if they are to deliver on their contractors' expectations. This may be one of the reasons that in the available data, we mostly see these professionals registered as "press", which in turn makes it rather hard to tell them apart from press officers and reporters. Indeed, personal observation has led to the realisation that a number or hired press officers or journalists also work as freelance communicators in their spare time and even own their own firms. This phenomenon reinforces the assumption that knowledge brokers

---

[240] Under the theme "Communicating Science" we see 14 sessions taking place in Stockholm. While there was no dedicated theme in Munich, roughly seven sessions on science journalism and communication took place. In Barcelona, the topic represented again a programme theme featuring 12 sessions. In Turin, Dublin and Copenhagen this trend was continued.

[241] See 4.6.

[242] According to an analysis of media clippings available for ESOF2004, 2006, 2008 and 2010.

[243] At this point it should be mentioned that the ESOF Outreach Activities may also have represented an interesting field for inspiration and networking. Knowledge brokers specialising in science communication may potentially also have contributed to the conceptualisation of these activities in the first place, acting on behalf of institutions. However, as mentioned earlier, the Outreach Activities will not form an object of study in this thesis.

represent a public with very fluid boundaries, operating where the aforementioned[244] spheres of publics overlap. They have multiple identities constantly oscillating between them, even if, as I am arguing here, certain general directions or specialities can be discerned. It could furthermore be argued that this particular aspect of knowledge brokering, namely translation between producers and supporters of scientific knowledge (e.g. researchers, funding organisations or foundations) and their audiences (e.g. society, policy makers) using mainly – yet not exclusively – the media, is to some extent also reflected in the main ESOF programme[245] and in some cases also in the context of its parallel programmes.[246] Key issues include risk communication, the use of new media and the ethics of communication, which are discussed in what has also become a meeting of peers. This can be perceived as evidence for an increasingly reflective field with growing membership and an even greater overlap with other specialities.

Indeed a further area, where the spheres described in this chapter overlap is vocational alongside scientific training, which has gained significant ground in the last years and of which communication skills also form part. For today's knowledge society also requires a new generation of knowledge workers to be deployed not only in academia, but also in other professionals fields. These may acquire their training within the academic sphere, but increasingly choose careers outside it. This is a development that the scientific community has gradually acknowledged, yet one which needs to be addressed through appropriate information, counselling and additional skills. This per-

---

[244] See introduction to chapter 5.

[245] Characteristic examples include sessions such as "Lost in translation: media, science and politics" featuring a number of such professionals as well as the session "How to write a best seller" and "Science and the media: how does science become headline news?" (ESOF2004 Programme Book: Ss5-Ss6), "Drug development, communication and the media" (ESOF2006 Programme Book: 62) and "Myths of science: glowing monkeys, wonder dogs and more" (ESOF2006 Programme Book: 68). Finally, in the Barcelona meeting we see the sessions "Food risk communication: bridging theory and practice" (ESOF2008 Programme Book: 69), "The pressures on reporting research" (ESOF2008 Programme Book: 71) and "The journalists got my message wrong, again! How to minimise mistakes in media coverage" (ESOF2008 Programme Book: 83).

[246] The ESOF2008 Exhibition Programme, which consisted of sponsored sessions by exhibitors, featured the workshop "Science = Communication: the mass media care for research – if you care" (ESOF2008 Programme Book: 133) organised by idw online, a German science media outlet.

ceived gap is increasingly filled by professionals and institutions offering career or vocational training, consulting and coaching. At ESOF, we see such individuals also in the Career Programme (e.g. coaches), for instance in the context of workshops run by Naturejobs, the career portal of the top scientific journal Nature.[247] It is worth noting that scientific journals have and continue to be a particular form of knowledge brokers. This is an intriguing phenomenon for we see one of the 'pillars' of the research world fulfilling a dual role. Interestingly enough, the journal Science also has a career service and portal called ScienceCareers, which runs similar workshops during the AAAS Annual Meetings. Following their PhD, many young researchers are faced with the dilemma of whether to continue as scientists or choose from a wide selection of alternatives including science administration and management, technology transfer, science policy and science journalism. Professionals with the necessary knowledge in one of these fields, as well as career coaches with a good overview of all these options and the requirements they entail are providing services for which there is growing demand. We see these professionals mainly attending the Career Programmes at ESOF and the AAAS Annual Meeting and in some cases also contributing as speakers to sessions reflecting on the changing scientific profession. As with communicators, knowledge brokers focusing on education and career advice additionally often work as 'in-house' coaches or human resources specialists. Indeed, a number of institutions are now developing their own bespoke training programmes, targeted not exclusively to their young scientific personnel, but increasingly also to their administrators. This observed trend rests on the assumption that a skill is not merely an expertise on a very particular issue or process. Much rather, increased specialisation has rendered the quality of a global overview and knowledge as well as the ability to assess a broad set of specialised information particularly valuable. Knowledge societies today thus increasingly need individuals with the capacity to select, combine and transfer knowledge giving it new potential or even producing new knowledge altogether. Though I am not arguing that the recipients of knowledge brokers' services will even-

[247] See ESOF2004 Programme Book CP6, ESOF2006 Programme Book: 84 and ESOF2008 Programme Book: 82.

tually become knowledge brokers themselves, at some stage of their activity these specialists implicitly or explicitly pass on their expertise to other publics.

Scientific knowledge brokering thus translates and disseminates the outcomes of scientific enquiry as well its process and structure to relevant, lay or expert recipients (Bucchi 2013). In contrast to traditional science communication however, it is intended to meet an increased need for tailored information provided to specific audiences, taking account of how they retrieve, process and use information (Bielak et al. 2008). Building on the premise that knowledge – and in particular scientific knowledge – is valuable only insofar as it is communicated (Bucchi 2013: 909), brokering goes beyond large-scale, non-differentiated publication and dissemination of information and rather focuses on "rescaling and transformation" information ultimately leading to what has been characterised as "brokered knowledge" (Meyer 2010: 120/123). Consequently, those engaged in this activity inevitably dwell in the professional spheres of more well-defined specialities. They incorporate a number of competencies found in neighbouring fields, subsequently deploying them creatively to enhance their knowledge and advance their services and ultimately their roles within and at the boundaries of the scientific enterprise.

6 CONCLUSIONS

> *Science is an intrinsically social and cultural activity, the ultimate manifestation of what human creativity can achieve. There is still enormous potential to be tapped and fruitfully deployed. Unprecedented in history, the level of education of the population is higher than ever. Are we aware how crucial it is to produce the scientific knowledge that will prepare the next generation for the uncertainties of the future? Will it be transmitted in a socially robust way? Will science and society listen to what each has to say?*
>
> *The time has come to re-assess the place of science in society and the societal dimension within science. It should allow us to build on the excellent science base that Europe has in order to meet the challenges ahead, while remaining open to societal expectations.*
>
> *Helga Nowotny, Chair of the ESOF2010 Programme Committee*
> *(ESOF2010 Programme Book: 3)*

There is no doubt that we live in an era where science and technological development strongly affect society. Science exercises its influence on everyday life through technological achievements seen as a motor for societal change and as stabilising elements, but also through the explanations it delivers, which in turn shape the way we see the world. Society's investment in science and technology has significantly risen with time and so have the expectations towards its practitioners. In turn, the scientific realm has been called upon to become even more productive, as well as more open and accountable towards those who support it. Today, more than ever, the scientific realm is expected to collaborate with societal actors in order to produce answers to pressing questions and find solutions to the so called 'grand challenges'. In this context, knowledge transfer – or better yet, knowledge circulation – has become a central part of the 'value chain' of scientific research expanding into and sourcing information from society. The close intertwinement between science and society inevitably leads to a strong mutual impact on each other's workings as well as to a process of moulding and alteration of each other's fabric; both engage in deconstructing and constructing each other anew and both are constantly re-thinking each other. This mutual and concurrent 're-ordering' or co-production – as referred to extensively in STS and its related fields – of "the social" and "the scientific" (Jasanoff 2004) forms the basis of my considerations in this thesis. I have argued that it also represents a key aspect to consider in the process of defining the state of the relationship between science and Europe today. Throughout this thesis, I have attempted to answer the question of whether the focus of science policy efforts in Europe is one of promoting science in Europe, of producing a distinctly European science or of building a scientific Europe.

The assumption of an extended and increasingly permeable scientific realm with a diversified membership has formed the underlying element of this effort. For, as I have argued, not only do we see societal actors entering the scientific enterprise or scientists assuming new roles in government and the public sphere, we indeed observe a new public emerging altogether in the form of so called knowledge brokers. Yet, what are the effects and implications of these structural changes of the research system and where can they best be observed?

This thesis has drawn on the Euroscience Open Forum as a case study to examine the evolving relationship between science and Europe especially from a societal point of view, meaning the actor constellations active within this context. Established to bring "people involved in science and technology from all over Europe to one meeting" (ESOF2004 Presentation), ESOF represents an institutional boundary space where heterogeneous groups from the European sphere meet and interact around scientific and technological issues. There, these groups of actors with their individual identities, the institutions that foster them as well as the discourses and representations justifying them can be regarded as 'inner-scientific publics'. Why 'inner-scientific'? And why publics? Depending on the exact situation of communication and engagement, groups of scientists from often radically different domains, journalists, policy makers or other societal actors start to take a role similar to the one of publics in the context of classical science communication. They need to be addressed as being outside the close expert circle, researchers need to present their research accordingly and they need to convince of the interest and importance of specific kinds of research. They are 'inner-scientific' as most of them play an active role in the extended peer community. The membership of any actor group participating in ESOF is hence fluid, can take different forms in different situations, and remains often implicit and hard to capture and portray. Yet, these publics increasingly constitute relevant and indispensable actors in the scientific enterprise and at its borders. We are thus manifesting the crystallisation of hybrid publics that inhabit both the scientific and the societal realm and constantly move across them, while taking on important roles within boundary spaces and institutions. They are both audiences and actors who have become constructive interlocutors and fellow campaigners in the knowledge production process. Still, though their

influence is growing and their contribution becoming invaluable, their role in the workings of science is by no means fully understood, accepted or evident.

As the title of this thesis suggests, I have attempted to explore whether, and if so how, the Euroscience Open Forum contributes to constructing and performing European knowledge societies. The following four overarching conclusions sum up the results of my enquiry. The first relays my observations with regard to the membership in the research system today and how this is perceived and performed through ESOF. The second argues that ESOF is a boundary space, which is open for new kinds of publics. In the third conclusion I make the point that ESOF tries to foster a new generation of knowledge workers expected to assume an important role in a changing research system in Europe. The fourth conclusion delivers a reflection on how I believe ESOF contributes to shaping the relationship between European science and Europe as a community.

6.1 (Re-)defining membership to the scientific endeavour

The emergence of the Euroscience Open Forum draws attention to the perceived need for spaces, which allow stakeholders from the scientific and societal realm to come together and engage in an intensive dialogue on and about science. The analysis performed in this thesis delivers insight into how this exchange takes place and is fostered by ESOF. What is more, it points to the crystallisation of highly specialised collectives, who, though they do not perform research themselves, have become indispensable for the scientific endeavour. I termed them 'inner-scientific publics' to capture the fact that they are simultaneously outside and within the science system. Constructing and performing these 'inner-scientific publics' is a key accomplishment of ESOF, which sets it apart from other meetings in Europe adhering either to solely discipline-intern exchanges or to the 'classic' model of science communication. The existence of such publics – and ultimately of spaces such as ESOF – can be in turn seen as both a clear outcome of structural changes in the research system and a reconsideration of society's role in science.

In his presentation to potential ESOF contributors and future stakeholders in 2002, Carl Johan Sundberg emphasised that "Europe needs independent arenas for open dialogues" and that the "science and technology field needs to communicate with society".[248] He further argued that the aim of ESOF is to "enhance the European public's awareness of and interest in science and technology" as well as "scientists' awareness of the public's righteous role". His 'plaidoyer' was successful: a few months later the European Commission called for a "European Convention for Science" aimed at "establishing a dialogue at the European level" through the involvement of "a wide range of stakeholders from research organisations, public authorities, media, citizens, civil society [to] enterprises". The scientific community's role would be to present "issues of interest to the public at large and contribute to the debate" (European Commission 2002a: 14). Consequently, ESOF's emergence was among others based on the assumption that interaction and exchange among all publics pertaining to the process of scientific knowledge production is – still – largely unsystematic and irregular. I have argued in this thesis that ESOF has indeed succeeded in providing a space for communication and exchange on science and its relationship to society, especially in the European context.

[248] ESOF PowerPoint Presentation (2002): 2.

The study of this exchange has however also revealed, that ESOF contributes to bringing to life new constellations of actors who, though not performing research themselves, have become indispensable to the process of scientific knowledge production and thus important interlocutors for scientists. I have defined these actors as 'inner-scientific publics' because I perceive them to be both inside and yet also outside the scientific realm. Quite often, they also operate at the borders between the social and the scientific. ESOF attempts to bring these publics to life by creating space for and facilitating discussion on their roles and making their membership in the scientific sphere visible. The meeting allows certain 'zones' or 'dedicated areas' to form, where these groups are provided with relevant content tailored to address their perceived needs and where they constitute themselves as actors. The Euroscience Open Forum therefore not only "brings all those interested in science and technology to one place"; it constructs and deconstructs groups of interest by unveiling or attributing particular roles and identities to them. They may, for instance, fulfil the function of mediators, translators or brokers, a complex and at the same time challenging activity. They are furthermore audiences and consumers, as well as collaborators in the scientific undertaking and the production of knowledge. Tacitly, they also value and evaluate the kind of research that is done and what it might mean for European society. Hence, ESOF represents an effort to foster interaction between scientific knowledge producers on the one hand and people or institutions acting as catalysers for or utilising this knowledge on the other. One could characterise these institutions (e.g. foundations and charities, research funders, communications agencies and media outlets) and actors (science journalists, knowledge brokers, science managers and policy makers) as 'para-scientific', for they operate alongside science. Or one could, as I have done in this thesis, refer to them as 'inner-scientific' publics, thus emphasising their role in advancing and promoting the positioning of science in the social realm on the one hand, as well as in raising awareness of the role and increasing influence of society on the scientific enterprise on the other.

What the existence of such publics also shows quite clearly is that the process of science communication, which is frequently reduced to the political and societal space alone, has many more facets and dimensions. The one argued for here – for which the dissertation has hopefully raised awareness – is directed towards an inner-scientific

sphere. In other words, it represents an 'inreach'.[249] Hence, though ESOF's initial rhetoric bore strong references to the Science and Society movement and also profited both politically and financially from respective national and EU initiatives, I have argued that the Forum has mostly remained a meeting for science and technology professionals. Society at large is mainly addressed through the Outreach Activities, which however represent a separate entity, detached from the core event and its intentions both in terms of content and space. Their programme is furthermore quite selective and could be seen as being largely devoid of any controversy or political implication. Interestingly, an analysis of the AAAS Annual Meeting performed throughout this thesis has shown among others that, as opposed to ESOF, it does not necessarily make the claim of directly interacting with society and involving it in its workings. Instead, it relies on the large numbers of attending journalists to fulfil this task.

Consequently, we observe the formation of a different type of public sphere, one which sets itself apart from society at large and the average citizen with no stakes in the scientifically induced knowledge production and fills the boundary space between the social and the scientific realm. Societal actors are 'brought into' this sphere in novel ways. As the notion of 'Mode 2' suggests, scientific research has become transdisciplinary and more problem-oriented in its scope and implementation.[250] It thus increasingly requires the contribution of diverse actors stemming, in addition to academic science, also from industry, policy, NGOs or the media. ESOF has attempted and somehow succeeded in institutionalising a joining of these inner and outer cores of the scientific endeavour through their respective actors. The establishment of institutions such as ESOF can thus be seen as evidence of the structural changes the research system is undergoing as well as of the increasingly important role that society assumes in the scientific endeavour. In turn, ESOF also drives this shift by assuming the role of an extended lab where open dialogue and opinion formation on the process of scientific knowledge production in Europe is fostered and European knowledge societies are imagined and performed.

---

[249] As opposed to the classic perception of science outreach which is mostly perceived as the unidirectional communication of simplified information on science towards society at large.

[250] See chapter 2.

6.2 ESOF as a boundary space

ESOF can be viewed as a space which is both inter- and transdisciplinary, i.e. where exchanges between present actors cross disciplinary boundaries as well as the boundaries between science and society. It succeeds in becoming a zone, where new kinds of interactions can take place, but also where the possibilities and limits of such boundary crossing exercises become palpable. Possibilities are opened up by accommodating interests and needs of different stakeholders active within an extended research system, by 'activating' and drawing upon their individual expertise and by fostering translation and negotiation work between them. Ultimately they collectively perform what it would mean to be part of a knowledge society. In that sense, ESOF allows to perform different sciences and their intersection with society in a way so that different audiences can make sense of them. Through the different formats of interaction both European science and European society can be made "plastic enough to adapt to specific needs" to use Star and Griesemers expression, "and robust enough to retain a common identity across" different actor groups (1989: 393). Both can have different meanings in different settings and at different moments and retain nevertheless some coherence. These multiple formats and actor constellations through which they are performed "makes them [the notions of European science and society] a recognisable means of translation of interests" (Star/Griesemer 1989: 393).

ESOF does justice to its claim of being a 'forum' by fostering both transdisciplinary and interdisciplinary exchange among a diverse set of publics pertaining both to the scientific and societal realm in Europe. On the one hand, it aims to increase awareness of and further circulate the knowledge available within the different scientific disciplines. On the other hand, it invites to thinking about European science and European society from different perspectives, while accommodating the expertise and interests of those contributing to the process of scientific research today. Thus, in the context of ESOF, work is being performed to intersect the sciences with society against the background of the European sphere. The meeting can furthermore be viewed as having succeeded in becoming an undertaking which incorporates and satisfies the needs and expectations of different publics, among others through a set of "boundary objects" (Star/Griesemer 1989: 393). In their essay, Star and Griesemer defined "boundary objects" as "both adaptable to different viewpoints and robust enough to maintain identity across them" (1989: 393). The authors furthermore identified them as "an analytic concept of those scientific objects which both inhabit several intersecting social worlds and satisfy the informational requirements of each of them". Whereas Europe

is an overarching, unifying element at ESOF, I argue that the notions of European science and Europe as a community can be viewed as boundary objects. Both are performed through ESOF and the publics attracted by and involved in it. They become "object[s] which live in multiple social worlds and which [have] different identities in each" (Star/Griesemer 1989: 409) or in other words they are open and flexible enough to accommodate and satisfy the expectations of each actor constellation. At ESOF, they translate into structures, standards and procedures of the meeting to some extent forming 'common denominators' and ideals. The overall concentration on Europe, its societal, political and scientific elements is manifested in a number of ESOF characteristics, most notably its name, the fact that it is only meant to take place on the European Continent and that it strongly performs Europeanness in its discursive elements. The notion of Europe as a community becomes palpable with every new ESOF meeting taking place in a different European city. It is also reflected in the participants themselves since the vast majority (with only very few exceptions) come from European countries and represent European institutions[251]. A keen interest in science in all its dimensions as well as in the potential and challenges associated therewith is a common characteristic of the actors contributing to the Forum, who are directly or directly also professionally affiliated with the European research system. European science is manifested and articulated among others in the numerous presentations within the conference programme, which discuss issues regarding the organisation and development of the European research system, its strengths and weaknesses as well the human resources, institutions and infrastructures that constitute it.

One could therefore argue further that a key achievement of ESOF is to demonstrate that it takes an extremely diverse set of actors carrying very different types of expertise to perform high-level research today. In turn, the scientific endeavour should not be seen as a process spatially limited to the scientific realm. ESOF's contribution could thus be defined as promoting better communication between the publics engaged in the process of scientific knowledge production by providing a platform where mutual

[251] As mentioned earlier in this thesis the European Commission contributed to the foundation and development of the Forum by providing funds and organisational support during the initial efforts to implement and establish this undertaking. Policy developments at the EU level furthermore formed ESOF as an event as well as influenced its programmes.

awareness of each other's expertise can be raised and where a process of "translating, negotiating, debating, triangulating and simplifying" (Star/Griesemer 1989: 389) can take place. Consequently, ESOF attempts to emphasise the heterogeneity characterising scientific work by allowing all those who contribute to it – who, as I have argued, are not limited to researchers – to articulate their viewpoints and knowledge, while achieving a better understanding of each other's role in the process of scientific knowledge production.

6.3 Fostering a new generation of scientific knowledge workers at ESOF

ESOF tries to contribute to fostering a new generation of researchers who are more receptive to the notion of an extended research system as well as to an intensive engagement with other publics in the process of scientific knowledge production. The meeting and particularly the ESOF Career Programme features as a space, where young knowledge producers can meet and interact with peers and potential collaborators and experience first-hand the different dimensions and workings of such a system. They are also encouraged to reflect on their own roles and career paths in science and beyond. The diversity of the European context in terms of geography, culture and values, but also with regard to the structures, framework conditions and opportunities provided to young scientists (e.g. through the different realisations of the ERA) assumes an important role and implicitly features as the broader framework for these considerations. For this new generation is expected to identify the 'common ground' between the different elements characterising science in Europe and Europe as a community and ultimately contribute to constructing European knowledge societies.

With the research system, its framework conditions and membership changing so rapidly, open debate on the future of the research profession and the considerable shifts it is undergoing as a result has become vital. I have argued that ESOF provides an opportunity especially for the young generation of aspiring scientists and knowledge workers to openly discuss about existing education practices, potential career paths for science graduates within and outside academia, as well as about the skills and competences needed to succeed in an increasingly complex system of knowledge production and deployment. With its hybrid as well as to a certain extent 'non-conformist' structure, ESOF and especially the Career Programme stream provide a space with the necessary flexibility and openness to accommodate this new generation and its needs and to allow it to develop common visions and imaginations of the research system and its future development.

Tellingly, the offered programme components during the first three ESOF events did not assume the classical academic researcher career as the only option for trained scientists, but rather openly addressed alternative paths such as science journalism, science management, science policy and entrepreneurship.[252] These options reflect

[252] See for instance "Bringing science to the people" and "Top five scientific career paths" (ESOF2006 Programme Book: 83-84), "Working in science or politics - or both? Young scien-

quite nicely – and indeed emphasise – the societal dimension of science and implicitly or explicitly acknowledge the existence of an extended research system. They also illustrate the role that society has come to play in the workings of the scientific enterprise, not least through the need for transparency and accountability. In the context of ESOF, young scientists are thus performed into a public, which will hopefully form the future 'raw material' not only of the academic research system, but of knowledge societies altogether. In Europe, but also in other places of the world, these individuals are today the addressees of numerous initiatives, campaigns and mechanisms aiming to produce well-educated and informed citizens and highly-skilled employees. Moreover, they form part of a generation which is systematically and more intensively exposed to societal and political developments as well as to the so-called 'grand challenges' and increasingly called upon to develop solutions which require a diverse set of expertise as well as an inherent openness to alternative sources of knowledge. This 'ideal type' of investigator is open to performing both interdisciplinary and transdisciplinary research, thereby reaching out to and engaging with other epistemic fields, but also with different types of specialists outside the laboratory. In other words, he or she has 'internalised' the methods and characteristics of what has become known as 'Mode 2' scientific knowledge production, while at the same time forming his or her own opinion of how the workings of the research system should develop in the future. ESOF provides a space with good conditions for observation, critical reflection and exchange with a very diverse set of actors. The programme elements for young researchers – be they career workshops or discussions with potential mentors – are designed as learning experiences, often providing first contact to unexplored communities.

Thus, ESOF does not only raise awareness of these significant changes in the research system among those who will form its new generation, inhabit it and fill its important positions; on a meta-level, ESOF also highlights the different types of expertise needed to produce scientific knowledge, hence making an effort to illustrate the composition of knowledge societies today, while placing young scientists at their core. It further

---

tists' success stories" and "Should I stay or should I go?" (ESOF2008 Programme Book: 82-83).

draws attention to the important role of Europe in this 'equation', an element which features strongly throughout the first three Career Programmes analysed here. Whereas the emphasis of the sessions themselves was on the opportunities these young individuals have on the Continent, both as scientists as well as professionals outside the scientific realm, implicitly Europe features as the geographical, structural and cultural framework in the context of which most questions addressed in the programme as well as in informal settings are discussed. Young academics and their future careers are for instance particularly considered when it comes to the fulfilment of the European Research Area, and ultimately of an 'ideal' European knowledge society (European Commission 2003b). Thus, tremendous potential for society and the economy[253] in Europe, yet also high expectations rest in this public.

This thesis has shown that young and aspiring researchers and students are a key strength of the ESOF meeting. With every Forum, they have gradually reached a 'critical mass' in terms of numbers as well as with regard to their contribution to the character and dynamics of the meeting. In turn, ESOF provides this 'inner-scientific public' with a space for orientation and information as well as with fertile ground for debating different perceptions of the European scientific enterprise, its membership as well as the 'deliverables' attached to it. Implicitly or explicitly, ESOF thus allows the future generation of R&D professionals to design and construct 'their' research system within the geographical, cultural and knowledge borders of the European Continent and ultimately perform the relationship between science and Europe.

[253] In the years following the formulation of the Lisbon Strategy until today, securing the next generation of R&D workers was considered by the European Commission an essential prerequisite to fulfilling the European Research Area and achieving the 3% goal in R&D spending by 2010 agreed upon at the March 2002 Barcelona European Council (European Commission 2002b).

6.4 Building a scientific Europe?

ESOF assumes a new and important role as a laboratory and testing ground for clarifying the relation between science in Europe, European science and the making of a scientific Europe[254]. It makes visible the potential, yet also the tensions characterising the experiment of European integration. Concretely, we could observe the struggles of engaging in more intense exchange relations between researchers, science policy makers and societal actors. While, within the space ESOF opened up, we encountered many different actors at work in this extended research system (e.g. industrial players, funders) a specific 'public' within the system seems to form and gain momentum: knowledge brokers. They are kind of frontier workers, meant to connect across borders between national and European research systems, between scientific and societal realms, between funding and knowledge making. Large-scale, interdisciplinary and societally open meetings such as ESOF therefore offer an important space well beyond the moment of encounter. ESOF, in a long-term perspective, might become an important place where knowledge on what and how we know is created and exchanged, thus contributing to the European integration project in important ways – at least for science.

In an article on ESOF2006 the German newspaper *DIE ZEIT* asked "How imaginative and full of ideas is Europe after all? Is there a distinctly European science?" (Sentker 2006) Within a scientifically rich and diverse, yet fragmented public sphere such as the European, asking, but also providing answers to these questions has become quite important. As the analysis has shown, there have been significant initiatives in the past decades to promote a better co-ordination of research efforts among members of the European Community and later on the European Union. Funding instruments such as the European Framework Programmes have attempted to underpin these efforts. Yet, the stronger consideration and engagement of societal aspects and actors in the scientific undertaking (e.g. through policy papers, such as the Lisbon Strategy and the ERA Communication) can be seen as having considerably advanced and perhaps even accelerated the process of integration between the realms of science and society in Europe. Following these strategic developments, the last step needed towards building a scientific Europe was made: a space was conceived and created, which aimed to foster new ways of communication and exchange between the main actors from both the scientific and societal realms contributing to the process of scientific knowledge

[254] Nordmann 2009: 278-302.

production in Europe. This novel type of exchange between publics not often gathering at one place and one point in time made the potential, yet also the limits of European integration palpable, while at the same time revealed valuable information on the relationship between the three states of integration portrayed here. Indeed, one cannot speak of completely separate states, or of a linear development. Rather, science in Europe, European science and a scientific Europe somehow co-exist and find themselves in a state of constant tension and struggle.

Hence, this thesis has attempted to assess just how far the process of integration between Europe and science has come by asking: Is science in Europe the norm? Can we speak of a European science? Is building a scientific Europe a realistic pursuit? The examination of these states as well as of the tensions existing between them has been performed through the lens of a case study: the Euroscience Open Forum. I have argued that ESOF can be viewed as a laboratory and testing ground for exploring the relationship between science and Europe. From the outset, ESOF's structure and concept paid tribute to both the national *and* the European components and characteristics of the scientific enterprise and science itself. In addition to providing a platform for showcasing scientific developments, the Euroscience Open Forum was created as a space for reflection and debate on the fabric of science, its methods and practices, as well as on its relation to the social realm. This reflection occurs between a diverse set of actors, who today significantly contribute to the process of scientific knowledge production in an extended research system. These actors are increasingly in need of spaces, where thematically focused, yet also overarching issues on the relationship between science and society or the nature and use of scientifically induced knowledge, can be discussed. ESOF can be seen as having successfully met this need by attempting to institutionalise the meeting and exchange of an otherwise disjointed set of publics. It does so by not only providing the actual 'occasion' and the time and place, but also by co-performing the relationship between science and Europe and co-shaping the knowledge on how and what we know. Perhaps a direct effect of this role that ESOF seems to assume as well as the processes it sets into motion is the emergence of a new public: knowledge brokers. These actors in a sense embody the tension and constant oscillation between science and society and attempt to build bridges between them. They can be viewed as a kind of frontier workers and translators be-

tween science and society, European and national research systems, as well as between the process of knowledge production on the one hand and the creation of the necessary framework conditions for it to occur on the other.

What do we therefore learn from the analysis performed in this thesis and what developments does it point to? Through the ESOF case study I have delivered a view into the interaction taking place within an extended science sphere. ESOF meetings represent a moment where these phenomena and processes become palpable and visible. This is not to say that these developments occur without resistance and friction. Neither can one speak of a perfectly balanced intermingling of the scientific and the social sphere. In that sense, ESOF can be perceived as a space, where Europe is constituted and where it simultaneously falls apart, as well as where a constant interchange between the national and the European can be observed. It can also be seen as a political space, one which has an impact beyond the moment of encounter. If we assume that Europe is "a privileged space, a unique laboratory where diverse models of society, cultural values, valuation practices, political traditions and histories co-exist, with different national ideals being realised through science and technology" (Felt 2015: 131), it is also a place where distinctly European knowledge societies can emerge and develop – always allowing space for diversity of expressions.

Notwithstanding, the element of nations, national systems and nationalities has not ceased to play a significant role in general and in the scientific enterprise in particular. On the contrary, in many cases it is explicitly fostered, reinforced and appealed to. This contradiction is an inherent part of the European discourse. It is also reflected in science and the research system and subsequently also in ESOF**.** On the one hand, the local element plays a very important role and forms the character and 'flavour' of each ESOF event respectively. This is perhaps less the case with the AAAS Annual Meetings, with activities driven by local partners being rather negligible compared to the size and content of the meeting itself. Nor do the venues, surroundings or contents of the AAAS Annual Meetings always bear a perceptible local 'flavour'. On the other hand, ESOF attempts to incorporate and reflect all that is European: the institutions, the networks, the policy, but also a number of stakeholders. Consequently, ESOF's take on science is at the same time a local and a European one.

In other words, we simultaneously see a localisation and 'Europeanisation' of science, its system and content. However, this is not surprising, as being truly European is an elusive goal and the understanding and definition of it varies from place to place and from community to community. Rather, by creating a space and moments for reflection that capture at least part of the diversity existing on the Continent and highlight local cultures, as well by institutionalising a Europe-wide scientific exchange, ESOF attempts and to some extent also succeeds in building a scientific Europe.

7 BIBLIOGRAPHY

7.1 Literature

Abbott, Alison (1999): “Scientists urged to raise lobbying efforts”, in *Nature*, Vol. 398, 22 April 1999, 646.

Abbott, Alison (2004): “Organizers claim success for Stockholm science jamboree”, in *Nature*, Vol. 431, 2 September 2004, 5.

Aho, Esko (2006): Creating an innovative Europe. Report of the Independent Expert Group on R&D and innovation appointed following the Hampton Court Summit, Brussels: European Commission.

Anderson, Alun (1992): “European unity, inch by centimeter”, in *Science*, Vol. 256, 24 April 1992, 458-460.

Article (2014): “Wie viel Manager will ich sein?”, in *DIE ZEIT*, 2014/21 http://www.zeit.de/2014/21/wissenschaftsmanager-faq-beruf (accessed on 30.04.2017)

Barry, Andrew (2001): Political machines. Governing a technological society, London/New York: The Athlone Press.

Barry, Andrew (2006): “Technological Zones”, in *European Journal of Social Theory* 9(2), 239–253.

Beer, John J. / Lewis, David W. (1963): “Aspects of the professionalization of science”, in *Daedalus*, Vol. 92, No. 4, Fall 1963, 764-784.

Beguet, Bruno (1990): La science pour tous 1850-1914, Paris: Bibliotheque du Conservatoire National des Arts et Metiers (CNAM).

Bell, Daniel (1968): “The measurement of knowledge and technology”, in Sheldon, Eleanor B. / Moore, Wilbert E. (eds.): Indicators of social change: Concepts and measurements, New York: Russell Sage Foundation, 145-246.

Bell, Daniel (1976): The coming of the post-industrial society: A venture in social forecasting, New York: Basic Books.

Bielak, Alex T. / Campbell, Andrew / Pope, Shealagh / Schaefer, Karl / Shaxson, Louise (2008): “From science communication to knowledge brokering: The shift from ‘science push’ to ‘policy pull’”, in Cheng, Donghong / Claessens, Michael / Gascoigne, Toss / Metcalfe, Jenni / Schiele, Bernard / Shi, Shunke (eds.): Communicating science in social contexts: New models, new practices, Amsterdam: Springer, 201-226.

Bijker, Wiebe / Law, John (eds.) (1992): Shaping Technology / Building Society: Studies in sociotechnical change, Cambridge MA: MIT Press.

Blondel, Danièle (2006): “L’émergence des ‘knowledge brokers’ (courtiers de science) et des KIBS: Knowledge-intensive business service”, presented at *Au Carrefour de la science, de la technologie, de l’économie, de la culture et de la société: Les métiers ouverts aux docteurs par le besoin d’expertise*, in Institut Henri Poincaré, Paris, France.

Bucchi, Massimiano (2008): “Of deficits, deviations and dialogues: Theories of public communication of science”, in Bucchi, Massimiano / Trench, Brian: Handbook of public communication of science and technology, Abingdon: Routledge, 57-76.

Bucchi, Massimiano / Trench, Brian (2008): Handbook of public communication of science and technology, Abingdon: Routledge.

Burnham, James C. (1987): How superstition won and science lost: Popularizing science and health in the United States, New Brunswick, NJ: Rutgers University Press.

Busquin, Philippe (2007): “The ERA – seven years on: A personal perspective”, in Euroscience next objective: 100 years, Anniversary Publication, Strasbourg, 50-56.

Buysse, Didier (2009): “Draw me the ERA!”, in *Research*EU*, Special Issue, November 2009, 15-17.

Callagher, Lisa / Husted, Kenneth (2010): “Science medialisation in a reluctant knowledge-based economy: The case of biotechnology in New Zealand”, in *International Journal of Knowledge-Based Development,* 2010, Vol. 1, No.3, 222-241.

Callon, Michel / Latour, Bruno (1992): “‘Don’t throw the baby out with the bath school’: A reply to Collins and Yearley”, in Pickering, Andrew (ed.): Science as practice and culture, Chicago: University of Chicago Press, 343-368.

Callon, Michel (1994): “Is science a public good?” Fifth Mullins Lecture, Virginia Polytechnic Institute, 23 March 1993, in *Science Technology Human Values,* 1994, Volume 19, 395-424.

Carnap, Rudolf / Frank, Philipp / Joergensen, Joergen / Morris, Charles W. / Neurath, Otto / Rougier, Louis (1937): “Special Correspondence: International Encyclopedia of Unified Science”, in *Science*, Vol. 86, No. 2235, 29 October 1937, 400-401.

Czarniawska, Barbara (2004): Narratives in social science research, London: Sage.

Cat, Jordi (2010): “The Unity of Science”, in *The Stanford Encyclopaedia of Philosophy* (Fall 2010 Edition) http://plato.stanford.edu/archives/fall2010/entries/scientific-unity/ (accessed on 25.07.2011).

Cat, Jordi / Chang, H. / Cartwright, N. (1996): “Otto Neurath: Politics and the Unity of Science”, in Galison, Peter / Stump, David J (eds.) (1996): The Disunity of Science: Boundaries, contexts, and power, Stanford, California: Stanford University Press, 346-369.

Charmaz, Kathy (2006): Constructing Grounded Theory. A practical guide through qualitative analysis, London: Sage.

Charmaz, Kathy (2008): Constructionism and the Grounded Theory method, in Holstein, J. A. / Gubrium, J. F. (eds.): Handbook of constructionist research, New York: Guilford Press, 397-412.

Clarke, Adele E. (2005): Situational analysis. Grounded Theory after the postmodern turn, Thousand Oaks: Sage.

Collins, Harry M. (1988): “Public experiments and displays of virtuosity: The core-set revisited”, in *Social Studies of Science*, Vol. 18, No. 4, November 1988, 725-748.

Collins, Harry M. / Yearley, Steven (1992): “Epistemological Chicken”, in Pickering, Andrew (ed.): Science as practice and culture, Chicago: University of Chicago Press, 301-326.

Commission of the European Communities (1990): Industrial policy in an open and competitive environment - Guidelines for a Community approach, Communication from the Commission to the Council and the European Parliament, COM(90) 556 final, Brussels, 16 November 1990.

Copeland, Paul / Papadimitriou, Dimitris (eds.) (2012): The EU’s Lisbon Strategy: Evaluating success, understanding failure. Palgrave Macmillan, London.

Cressey, Daniel (2016): “Scientists say ‘no’ to UK exit from Europe in *Nature* poll”, in *Nature* 531, 31 March 2016, 559.

Curtis, Ron (1994): “Narrative form and normative force: Baconian story-telling in popular science”, in *Social Studies of Science*, Vol. 24, No. 3, August 1994, 419-461.

De Lange, Catherine (2013): “Careers for scientists away from the bench”, in *Naturejobs Blog*, posted on 21 May 2013, 15:04 BST. http://blogs.nature.com/naturejobs/2013/05/21/careers-for-scientists-away-from-the-bench/ (accessed on 28.04.2017).

Deutscher Bundestag (2006): “Kompetenzerhalt auf dem Gebiet der Reaktorsicherheit”, Antwort der Bundesregierung auf die Kleine Anfrage der Abgeordneten Birgit Homburger, Angelika Brunkhorst, Cornelia Pieper, weiterer Abgeordneter und der Fraktion der FDP, Drucksache 16/3072, 29.11.2006 http://dipbt.bundestag.de/dip21/btd/16/036/1603602.pdf (accessed on 07.05.2011).

De Vaus, David A. (2001): Research design in social research, London: Sage

Dewey, John (1927): The public and its problems: An essay in political enquiry, London: Allen & Unwin.

Dewey, John (1938): Experience and education, New York: Macmillan.

Drucker, Peter F. (1957): Landmarks of tomorrow: A report on the new ‘post-modern’ world, New York: Harper & Row.

Drucker, Peter F. (1969): The age of discontinuity: Guidelines to our changing society, New York: Harper & Row.

Drucker, Peter F. (1994): “The age of social transformation”, in *The Atlantic Monthly,* Volume 274, No. 5, November 1994, 53-80 http://www.theatlantic.com/past/docs/issues/95dec/chilearn/drucker.htm (accessed on 20.04.2010).

Durant, John R. / Evans, Geoffrey A. / Thomas, Geoffrey P. (1989): “The public understanding of science”, in *Nature* 340, No 62286, 06 July 1989, 11-14.

Dyson, Freeman (1988): Infinite in all directions, New York: Harper & Row.

Editorial (2003): “A meeting for Europe’s scientists and publics”, in *Nature*, Vol. 423, 5 June 2003, 571.

Editorial (2008): “Europe’s science forum”, in *Nature*, Vol. 454, 31 July 2008, 552.

Editorial (2010a): “The bigger picture”, in *Nature*, Vol. 464, 4 March 2010, 8.

Editorial (2010b): “Europe’s research future”, in *Nature*, Vol. 464, 11 March 2010, 142.

Editorial (2010c): “The innovation game”, in *Nature*, Vol. 467, 28 October 2010, 1005.

Editorial (2015), in *Horizon Magazine Special Issue*, Luxembourg: Publications Office of the European Union.

Eikenberg, Henning (2011), in Grabitz, Eberhard / Hilf, Meinhard / Nettesheim, Martin (May 2011), Das Recht der Europäischen Union, Munich: Beck Verlag.

Enserlink, Martin (2004): “Europe clones U.S. science festival”, in *Science,* Vol. 305, 3 September 2004, 1387.

Etzkowitz, Henry (2002): “The Triple Helix: Impetus to innovation”, in *Technology Access Report*, December 2002.

Eurobarometer (2001): “Europeans, science and technology”, Brussels, European Commission, Research Directorate-General.

European Commission (1993): Growth, competitiveness, employment: The challenges and ways forward into the 21st century, White Paper, COM (93) 700, 5 December 1993.

European Commission (1994): An Industrial Competitiveness Policy for the European Union, Communication from the Commission to the Council, COM (94) 319 final, 14. September 199, Brussels: European Communities.

European Commission (1995): Green Paper on Innovation, COM (95) 688 final, 20 December 1995. [Bulletin of the European Union Supplement 5/95], Brussels: European Communities.

European Commission (2000a): Towards a European Research Area, Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions, Brussels, 18.1.2000 COM(2000) 6 final, Brussels: European Communities.

European Commission (2000b): The Lisbon European Council – An agenda of economic and social renewal for Europe, Contribution of the European Commission to the Special European Council in Lisbon, 23rd-24th March 2000. DOC/00/7, Brussels: European Communities.

European Commission (2000c): Science, society and the citizen in Europe. Brussels, 14.11.2000, SEC (2000) 1973, Brussels: European Communities.

European Commission (2001): European Governance: A White Paper. Brussels, 25 July 2001: COM (2001) 428 final, Brussels: European Communities.

European Commission (2002a): Science and Society – Action Plan. Luxemburg: European Communities.

European Commission (2002b): More research for Europe: Towards 3% of GDP. Brussels, 11.9.2002 COM (2002) 499 final, Brussels: European Communities.

European Commission (2002c): The Sixth Framework Programme in brief. Brussels, European Commission, Brussels: European Communities

European Commission (2003a): Raising public awareness of science and technology: Projects financed under 5th Framework Programme, Brussels: European Communities

European Commission (2003b): Researchers in the European Research Area: One profession, multiple careers, Brussels, July 2003, COM (2003) 436 final, Brussels: European Communities.

European Commission (2005a): Europeans, Science and Technology. Special Eurobarometer 224/Wave 631, Brussels: European Communities.

European Commission (2005b): Women and Science: Excellence and innovation – Gender equality in science, SEC (2005) 260, Brussels: European Communities

European Commission (2007): Green Paper: The European Research Area – New Perspectives, SDME 09/50, Brussels: European Communities.

European Commission (2010a): Commission Staff Working Document: Lisbon Strategy Evaluation Document, SEC (2010) 114 final, Brussels: European Communities.

European Commission (2010b): Europe 2020: A strategy for smart, sustainable and inclusive growth, COM. (2010) 2020 final, Brussels: European Communities.

European Commission (2011): Towards a European framework for research careers, Brussels: European Communities.

European Council (2000): Presidency Conclusions, Lisbon European Council, 23-24 March 2000.

European Council (2002): Presidency Conclusions, Barcelona European Council, 15-16 March 2000.

European Council (2003): "Council Resolution of 10 November 2003 on the profession and the career of researchers within the European Research Area (ERA)", (2003/C 282/01), Brussels: European Communities.

European Council (2004): Presidency Conclusions, Brussels European Council, 25-26 March 2004.

European Parliament (2010): The Lisbon Strategy 2000-2010: An analysis and evaluation of the methods used and results achieved. Brussels, European Parliament.

Ezrahi, Yaron (2004): "Science and the political imagination in contemporary democracies", in Jasanoff, Sheila: States of knowledge: The co-production of science and social order, London: Routledge, 254-273.

Felt, Ulrike (1996): "'Offentliche' Wissenschaft. Zur Beziehung von Naturwissenschaft und Gesellschaft in Wien von der Jahrhundertwende bis zum Ende der Ersten Republik", in *Osterreichische Zeitschrift für Geschichtswissenschaften*, 1, 45-66.

Felt, Ulrike / Nowotny, Helga (eds.) (1993): “Science meets the public - A new look at an old problem”, in *Public Understanding of Science*, 2, 285-290.

Felt, Ulrike (2000): “Why should the public ‘understand’ science? A historical perspective on aspects of the public understanding of science”, in Dierkes, Meinolf / von Grote, Claudia (2000): Between understanding and trust: The public, science and technology, London: Routledge.

Felt, Ulrike (2002): “Sciences, science studies and their publics: Speculating on future relations”, in Nowotny, Helga / Joerges, Bernand (eds.): Social Studies of Science and Technology: Looking back ahead, Dordrecht: Kluwer Academic Publishers, 11-31.

Felt, Ulrike (ed.) (2003): Optimizing Public Understanding of Science, Network in the 5th Framework Programme / Raising Public Awareness of Science and Technology. Wien: Institut für Wissenschaftsforschung, Universität Wien.

Felt, Ulrike / Fochler, Maximilian / Strassnig, Michael (2003): Evaluierung des ‘Diskurstag Gendiagnostik’: Analyse der dialogischen Wechselwirkung zwischen Wissenschaft und verschiedenen Öffentlichkeiten. Evaluierungsbericht, Wien: Institut für Wissenschaftsforschung, Universität Wien.

Felt, Ulrike / Fochler, Maximilian / Müller, Annina (2006): “Sozial robuste Wissenspolitik? Analyse partizipativ orientierter Interaktionen zwischen Wissenschaft, Politik und Öffentlichkeit im österreichischen Kontext”, in *Österreichische Zeitschrift für Soziologie*, Sonderband Wissenschaft- und Technikforschung, 103-130.

Felt, Ulrike (2007): “Epistemische Lebensräume: Multiple Artikulationen von Wissen, Institutionen und Geschlecht – Ein erster Reisebericht aus Epistemien”, Paper presented at Essener Kolleg für Geschlechterforschung, Essen, 05 July 2008.

Felt, Ulrike / Wynne, Brian et al. (2007): Science and governance: Taking European knowledge society seriously, Report 2007.

Felt, Ulrike (ed.) (2009): Knowing and living in academic research. Convergence and heterogeneity in research cultures in the European context, Prague: Institute of Sociology of the Academy of Sciences of the Czech Republic.

Felt, Ulrike / Fochler, Maximilian (2012): “Re-ordering epistemic living spaces: On the tacit governance effects of the public communication of science”, in Rödder, Simone / Franzen, Martina / Weingart, Peter (eds.): The sciences’ media connection: Communication to the public and its repercussions, Sociology of the Sciences Yearbook 28 (133–154), Dordrecht: Springer.

Felt, Ulrike (2013): “Keeping technologies out: Sociotechnical imaginaries and the formation of national technopolitical identity”. Manuscript for the edited volume Jasanoff, Sheila / Kim, Sang-Hyun: Dreamscapes of modernity: sociotechnical imaginaries and the fabrication of power. Preprint available at http://sciencestudies.univie.ac.at/publikationen

Felt, Ulrike et al. (2013): Science in society: Caring for our futures in turbulent times, Science Policy Briefing, European Science Foundation.

Felt, Ulrike / Fochler, Maximilian (2013): “What science stories do: Re-thinking the multiple consequences of intensified science communication”, in Baranger, Patrick / Schiele, Bernard (eds.): Science Communication Today. International perspectives, Issues and Strategies, Paris: CNRS Editions, 75-90.

Felt, Ulrike (2015): “Social science expertise in European innovation policy”, in Wilsdon, James / Doubleday, Robert (eds.): Future directions for scientific advice in Europe. Cambridge: Centre for Science and Policy, 125-134.

Finnegan, Gary (2015): “The ‘perfect storm’ to create ERA: How an idea became a policy priority in just six months”, in *Horizon Magazine Special Issue*, Luxembourg: Publications Office of the European Union, 2015: 22-23.

Fleck, Ludwik (1980 [1935]): Entstehung und Entwicklung einer wissenschaftlichen Tatsache. Einführung in die Lehre vom Denkstil und Denkkollektiv. Frankfurt/M.: Suhrkamp.

Fleck, Ludwik (1983 [1947]): “Schauen, sehen, wissen”, in Fleck, Ludwig: Erfahrung und Tatsache: Gesammelte Aufsätze, Frankfurt/M.: Suhrkamp, 147-174.

Fleck, Ludwik (2011): Denkstile und Tatsachen. Gesammelte Schriften und Zeugnisse. Frankfurt/M.: Suhrkamp.

Fochler, Maximilian / Müller, Annina (2006): Vom Defizit zum Dialog? Zum Verhältnis von Wissenschaft und Öffentlichkeit in der europäischen und österreichischen Forschungspolitik. Institut Für Technikfolgen-Abschätzung Manuskript (ITA-06-04), Wien, November 2006.

Foucault, Michel (1991 [1972]): Die Ordnung des Diskurses. Aus dem Französischen von Walter Seitter, Frankfurt/Main: Fischer.

Foucault, Michel (1983 [1976]): Sexualität und Wahrheit, Erster Band. Der Wille zum Wissen. Aus dem Französischen von Ulrich Raulf und Walter Seitter, Frankfurt/M.: Suhrkamp.

Foucault, Michel (1994 [1982]): “Das Subjekt und die Macht. Nachwort und Interview”, in Dreyfus, Hubert L. / Rabinow, Paul: Michel Foucault. Jenseits von Strukturalismus und Hermeneutik. Aus dem Amerikanischen von Claus Rath und Ulrich Raulff, Weinheim: Beltz Athenäum, 240-292.

Foucault, Michel (2005 [1984]): “Was ist Aufklärung?" Aus dem Französischen von Hans-Dieter Gondek, in: Foucault, Michel: Schriften in vier Bänden, Band IV, Frankfurt/M.: Suhrkamp, 687-707.

Franzen, Martina / Rödder, Simone / Weingart, Peter (2012): “Wissenschaft und Massenmedien: Von Popularisierung zu Medialisierung”, in Maasen, Sabine / Kaiser, Mario / Reinhart, Martin / Sutter, Barbara (eds.) (2012): Handbuch Wissenschaftssoziologie, Wiesbaden: Springer, 355-364.

Galison, Peter / Stump, David J. (eds.) (1996): The disunity of science: Boundaries, contexts and power, Stanford, California: Stanford University Press.

Gibbons, Michael / Limoges, Camille / Nowotny, Helga / Schwartzman, Simon / Scott, Peter / Trow, Martin (1994): The new production of knowledge: The dynamics of science and research in contemporary societies, London: Sage.

Gieryn, Thomas F. (1995): “Boundaries of science”, in Jasanoff, Sheila et al. (eds.): Handbook of science and technology studies, Thousand Oaks: Sage, 393-443.

Gläser, Jochen (2006): Wissenschaftliche Produktionsgemeinschaften. Die soziale Ordnung der Forschung, Frankfurt/M.: Campus.

Gläser, Jochen (2012): “Scientific communities”, in Maasen Sabine / Kaiser, Mario / Reinhart, Martin / Sutter Barbara (eds.): Handbuch Wissenschaftssoziologie, Wiesbaden: Springer, 151-162.

Glaser, Barney G. / Strauss, Anselm L. (1967): The discovery of Grounded Theory: Strategies for qualitative research, New York: Aldine de Gruyter.

Goodell, R. (1977): The visible scientists, Boston, MA: Little, Brown.

Groß, Thomas / Arnold, Natalie, (2007): Regelungsstrukturen der außeruniversitären Forschung. Organisation und Finanzierung der Forschungseinrichtungen in Deutschland, Interdisziplinäre Schriften zur Wissenschaftsforschung, Bd. 1, Baden-Baden: Nomos.

Hackett, Edward J. (1990): “Science as a vocation in the 1990s: The changing organizational culture of academic science”, in *The Journal of Higher Education*, Vol. 61, No. 3, May-June 1990, 241-279.

Hacking, Ian (1999): The social construction of what?, Cambridge MA: Harvard University Press.

Hagendijk, Rob P. (2004): “The public understanding of science and public participation in regulated worlds”, in *Minerva* 42(1), 41-59.

Hanft, Anke / Röbken, Heinke / Zimmer, Marco / Fischer, Frank (2008): Bildungs- und Wissenschaftsmanagement, Munich: Franz Vahlen Verlag.

Heidenreich, Martin (2003): “Die Debatte um die Wissensgesellschaft”, in Böschen, Stefan / Schulz-Schaeffer, Ingo (eds.) (2003): Wissenschaft in der Wissensgesellschaft. Wiesbaden: Westdeutscher Verlag, 25-51.

Hessels, Laurens K. / van Lente, Harro (2008): “Re-thinking new knowledge production: A literature review and a research agenda”, in *Research Policy*, 37, 740–760.

Hilgartner, Stephen (1990): “The dominant view of popularization: Conceptual problems, political use”, in *Social Studies of Science*, Vol. 20, No 3, August 1990, 519-539.

Hofmann, Roswitha (2009): Die Konstruktion von Differenz im Diskurs zur ‘Wissensgesellschaft’: Eine Analyse des institutionellen Diskurses der Europäischen Union am Beispiel der Kategorie ‘Ältere’, Frankfurt/M. / Bern: P. Lang.

House of Lords Science and Technology Select Committee (2000): Science and Society, Third Report, 23 February 2000.

House of Lords Science and Technology Select Committee (2016): EU membership and UK science, 2nd Report of Session 2015-16, HL Paper 127.

Irwin, Alan (1995): Citizen Science: A study of people, expertise and sustainable development, London: Routledge.

Irwin, Alan (2001): Constructing the scientific citizen: Science and democracy in the biosciences, in *Public Understanding of Science*, 10 (2001), 1-18.

Irwin, Alan (2006): "The Politics of talk. Coming to terms with the 'New Scientific Governance'", in *Social Studies of Science* 36(2), 299-320.

Irwin, Alan / Wynne, Brian (1996): Misunderstanding science? The public re-construction of science and technology, Cambridge: Cambridge University Press.

James, William (1997 [1909]): The meaning of truth: A sequel to 'pragmatism', New York: Prometheus Books.

Jasanoff, Sheila (1996): "Beyond epistemology: relativism and engagement in the politics of science", in *Social Studies of Science* 26(2), 393-418.

Jasanoff, Sheila (2003): "Technologies of humility: Citizen participation in governing science", in *Minerva*, 41, 2003, 223-244.

Jasanoff, Sheila (2004): States of knowledge: The co-production of science and social order, London: Routledge.

Jasanoff, Sheila (2005): Designs on nature: Science and democracy in Europe and the United States, Princeton, New Jersey: Princeton University Press.

Jasanoff, Sheila (2007): "Technologies of humility", in *Nature,* 450, 1 November 2007, 33.

Jasanoff, Sheila / Kim, Sang-Hyun (2009): "Containing the atom: Sociotechnical imaginaries and nuclear power in the United States and South Korea", in *Minerva*, 47, 119-146.

Keeling, Ruth (2006): "The Bologna Process and the Lisbon Research Agenda: The European Commission's expanding role in higher education discourse", in *European Journal of Education*, Vol. 41, No. 2, June 2006, 203-223.

Keller, Reiner (2001): "Wissenssoziologische Diskursanalyse", in Hirseland, Andreas / Keller, Reiner / Schneider, Werner / Viehöver, Willy (eds.): Handbuch Diskursanalyse, Band I, Opladen: Leske + Budrich, 113-144.

Keller, Reiner (2004): "Der Müll der Gesellschaft. Eine wissenssoziologische Diskursanalyse", in Hirseland, Andreas / Keller, Reiner / Schneider, Werner / Viehöver, Willy (eds.): Handbuch Diskursanalyse, Band II, Wiesbaden: VS Verlag, 197-232.

Keller, Reiner (2008): "Diskurse und sozialer Wandel", in Keller, Reiner (ed.): Wissenssoziologische Diskursanalyse. Grundlegung eines Forschungsprogramms, Wiesbaden: VS Verlag, 279-315.

Keller, Reiner / Hirseland, Andreas / Schneider, Werner / Viehöver, Willy (eds.) (2001): Handbuch Sozialwissenschaftliche Diskursanalyse. Band II: Forschungspraxis, Opladen: Leske & Budrich.

Kennedy, Donald (2003): "Europe, Science, and Unity", in *Science*, Vol. 301, 29 August 2003, 1157.

King, Gary / Keohane, Robert / Verba, Sidney (1994): Designing social inquiry, Princeton: Princeton University Press.

Kitson-Pantano, Raphaela (2008): AAAS Annual Meeting 18-22 February 2010 Report.

Knorr-Cetina, Karin (1981): The manufacture of knowledge: An essay on the constructivist and contextual nature of science, Oxford: Pergamon.

Knorr-Cetina, Karin (2002 [1999]): Wissenskulturen, Frankfurt/M.: Suhrkamp.

Köhler, Horst (2006): Grußwort von Bundespräsident Horst Köhler bei der Eröffnung des 2. EuroScience Open Forum und des Wissenschaftssommers 2006, 15 July 2006, Munich: Bundespräsidialamt.

Kordon, Claude (2003): "The origins of Euroscience: A brief personal recollection", in *Euroscience News* 25, autumn 2003, 2-3.

Krohn, Wolfgang (1997): "Rekursive Lernprozesse: Experimentelle Praktiken in der Gesellschaft. Das Beispiel der Abfallwirtschaft", in Rammert, Werner / Bechmann, Gotthard (eds.): Technik und Gesellschaft. Jahrbuch 9: Innovation - Prozesse, Produkte, Politik, Frankfurt/M. / New York: Campus, 65-89.

Krohn, Wolfgang (2001): "Einleitung", in Franz, Heikel Kogge, Wemer / Möller, Torger / Wilholt, Torsten (eds.): Wissensgesellschaft: Transformationen im Verhältnis von Wissenschaft und Alltag. IWT-Paper 25: Bielefeld: 10-17 http://archiv.ub.uni-bielefeld.de/wissensgesellschaft/ (accessed on 05.06.2011).

LaFollette, Marcel C. (1990): Making science our own: Public images of science, 1910-1955. Chicago: University of Chicago Press.

Lambert, Helen / Rose, Hilary (1996): "Disembodied knowledge? Making sense of medical science", in Irwin, Alan / Wynne, Brian (eds.): Misunderstanding science? The public re-construction of science and technology, Cambridge: Cambridge University Press, 65-83.

Lane, Robert E. (1966): "The decline of politics and ideology in a knowledgeable society", in *American Sociological Review,* 31, 649-662.

Larédo, Philippe (2008): Understanding the role of ERA in the Lisbon process, the diverse understandings of the ERA and the role of the Framework Programme in fostering Europeanisation, Background Paper for the Ex-Post Evaluation of FP6, Paris: Université Paris Est and MoIR Manchster University.

Latour, Bruno (1987): Science in action: How to follow scientists and engineers through society, Cambridge, MA: Harvard University Press.

Latour, Bruno (1988a): The pasteurization of French society, Cambridge, MA: Harvard University Press.

Latour, Bruno / Woolgar, Steve (1988b): Laboratory life, Beverly Hills, CA: Sage Publications.

Latour, Bruno (1996): Aramis or the love of technology, Cambridge MA: Harvard University Press.

Latour, Bruno (1998): "From the world of science to the world of research?", in *Science,* 10 April 1998, Vol. 280, Issue 5361, 208-209.

Latour, Bruno (1999): Pandora's hope. Essays on the reality of Science Studies, Cambridge: Harvard University Press.

Latour, Bruno (2005): Re-assembling the social: An introduction to Actor-Network Theory, Oxford: Oxford University Press.

Law, John / Mol, Annemarie (eds.) (2002): Complexities: Social studies of knowledge practices, Durham, N. Ca.: Duke University Press.

Leshner, Alan / Turekian, Vaughan (2009): "Harmonizing global science", in *Science*, Vol. 326, 11 December 2009, 1459.

Lévy-Leblond, Jean Marc (1992): "About misunderstandings about misunderstandings", in *Public Understanding of Science* (1), 17-21.

Lippmann, Walter (2012 [1922]): Public opinion, New York: Dover Publications.

Lippmann, Walter (2011 [1925]): The phantom public, New Brunswick/London: Transaction Publishers.

Luhmann, Niklas (1995): "Die Soziologie des Wissens. Probleme ihrer theoretischen Konstruktion", in Luhmann, Niklas: Gesellschaftsstruktur und Semantik, Bd. 4, Frankfurt/M.: Suhrkamp, 189-201.

Lundvall, Bengt-Ake / Johnson, Björn (1994): "The learning economy", in *Journal of Industry Studies* 1, 23-42.

Lynd, Robert Staughton / Lynd, Helen Merrell (1929): Middletown: A study in modern American culture, New York: Harcourt Brace Jovanovich.

Maasen Sabine / Kaiser, Mario / Reinhart, Martin / Sutter Barbara (eds.) (2012): Handbuch Wissenschaftssoziologie, Wiesbaden: Springer.

Machlup, Fritz (1962): The production and distribution of knowledge in the United States, Princeton, N.J.: Princeton University Press.

Maraveyas, Nikos (ed.) (2012): Εξοδος από την Κρίση. Η Συμβολή της Ερευνας και της Τεχνολογίας [Overcoming the crisis: The contribution of science and technology], Athens: Themelio.

Maraveyas, Nikos / Chryssomallides, Christos (2016): "Αποψη: Μια βασική προϋπόθεση για την έξοδο από την κρίση" [A key prerequisite for overcoming the crisis], in *Kathimerini*, 24.07.2016, 6.

Marres, Noortje (2005): No issue, no public: Democratic deficits after the displacement of politics, Doctoral dissertation, University of Amsterdam.

Marx, Karl / Engels, Friedrich (1969): Die deutsche Ideologie. Marx-Engels-Works Vol. 3. Berlin: Dietz.

Mason, Richard O. (1979): "The role of management in science", in *Public Administration Review*, Vol. 39, No. 2, March -April, 1979), 112-116.

Merton, Robert K. (1974a [1938]): “Science and the social order” in Merton, Robert K.: The sociology of science: Theoretical and empirical investigations, edited by N.W. Storer. Chicago/London: The University of Chicago Press, 254-266.

Merton, Robert K. (1974b [1942]): “The Normative Structure of Science”, in Merton, Robert K.: The sociology of science: Theoretical and empirical investigations, edited by N.W. Storer. Chicago/London: The University of Chicago Press, 267-278.

Merton, Robert K. (1974c [1957]): “Priorities in Scientific Discovery”, in Merton, Robert K.: The sociology of science: Theoretical and empirical investigations, edited by N.W. Storer. Chicago/London: The University of Chicago Press, 286-324.

Merton, Robert K. (1974d [1960]): “‘Recognition’ and ‘excellence’: Instructive ambiguities”, in Merton, Robert K.: The sociology of science. Theoretical and empirical investigations, edited by N.W. Storer, Chicago/London: The University of Chicago Press, 419-438.

Meyer, Morgan (2010): “The rise of the knowledge broker”, in *Science Communication* 2010 32, 118-127.

Mitroff, Ian I. (1979): “On managing science holistically or is the management of science becoming more important than the philosophy of science?”, in *Public Administration Review*, Vol. 39, No. 2 (Mar. - Apr., 1979), 129-133.

Müller, Ruth (2012): On becoming a ‘distinguished’ scientist. Careers, individuality and collectivity in postdoctoral researchers’ accounts on living and working in the life sciences, Doctoral Dissertation, University of Vienna.

Muldur, Ugur / Corvers, Fabienne / Delanghe, Henri / Dratwa, Jim / Heimberger, Daniela / Sloan, Brian / Vanslembrouck, Sandrijn (2006): A new deal for an effective European research policy: The design and impacts of the 7th Framework Programme, Dordrecht: Springer.

National Unions of Students in Europe - ESIB (2004): Social objectives and the economic perspective of the Lisbon Strategy in relation to Higher Education, Tallinn Estonia.

Neidhardt, Friedhelm (1993): “The public as a communication system”, in *Public Understanding of Science*, (2), 339-350.

Nelkin, Dorothy (1995): Selling Science: How the press covers science and technology, New York: WH Freeman & Co.

Nordmann, Alfred (2009): “European Experiments”, in *Osiris* 24 (1) (2009), 278-302.

Nowotny, Helga (1993): “Socially distributed knowledge: five spaces for science to meet the public”, in *Public Understanding of Science* (2), 307-319.

Nowotny, Helga / Felt, Ulrike (1997): After the breakthrough: The emergence of High-Temperature Superconductivity as a research field, Cambridge, UK: Cambridge University Press.

Nowotny, Helga / Scott, Peter / Gibbons, Michael (2001): Re-thinking science: Knowledge and the public in an age of uncertainty. Cambridge: Polity Press.

Nowotny, Helga (2006): The potential of transdisciplinarity, (First published in: interdisciplines, [http://www.interdisciplines.org] May 2006) retrieved from http://helga-nowotny.eu/texts.php (accessed on 16.05.2010).

Organisation for Economic Co-Operation And Development (OECD 1996): The knowledge-based economy, OCDE/GD(96)102, Paris.

Osborne, Thomas (1998) Aspects of enlightenment: Social theory and the ethics of truth. London: UCL Press.

Praderie, Françoise (1996): "A new opportunity for science in Europe", in *Nature* Vol. 384, 14 November 1996, 108.

Praderie, Françoise (2007): 'Euroscience: witness to origins and first steps (1997–2001)", in Euroscience: Next objective 100 years, Euroscience 2007, 8-17.

Rietschel, Ernst Theodor et al. (2009): Evaluation of the Sixth Framework Programme for Research and Technological Development 2002-2006: Report of the Expert Group.

Rip, Ari (2002): "Science for the 21st century", in Tindemans, Peter / Verrijn-Stuart, Alexander, Visser, Rob (eds.): The future of science and the humanities, Amsterdam University Press: Amsterdam, 99-148.

Royal Society (1985): The Public Understanding of Science, London: Royal Society.

Royal Society (2008): Royal Society's response to "A vision for Science and Society: a consultation on developing a new strategy for the UK, Department for Business, Innovation and Skills", London: Royal Society.

Royal Society / Royal Academy of Engineering (2004): Nanoscience and nanotechnologies: Opportunities and uncertainties, RS Policy Document 19/04, London: Royal Society.

Schumpeter, Josef (1935 [1912]): Theorie der wirtschaftlichen Entwicklung. Eine Untersuchung über Unternehmergewinn, Kapital, Kredit, Zins und den Konjunkturzyklus (4. Auflage), München/ Leipzig: Duncker & Humblot.

Sentker, Andreas (2006): "Euroscience übt noch", in *DIE ZEIT* 30/2006, also published online on 19.07.2006 at http://www.zeit.de/2006/30/Glosse-Esof (accessed on 30.01.2015).

Shapin, Steven (1998): "Placing the view from nowhere: Historical and sociological problems in the location of science", in *Transactions of the Institute of British Geographers*, 23, 5-12.

Shapin, Steven (2008): The scientific life: A moral history of a late modern vocation, Chicago: University of Chicago Press.

Shapin, Steven / Schaffer, Simon (1985): Leviathan and the air-pump: Hobbes, Boyle, and the experimental life, Princeton, NJ: Princeton University Press.

Simon, Dagmar / Knie, Andreas / Hornbostel, Stefan (eds.) (2010): Handbuch Wissenschaftspolitik, Wiesbaden: VS Verlag.

Smaglik, Paul (2002): "Fresh paths in Europe", in *Naturejobs*, 418, 1 August 2002, 3.

Special Eurobarometer (2005): “Europeans, science and technology”, Brussels: European Commission.

Stampfer, Michael (2008): European Added Value of Community research activities, expert analysis in support of the ex post evaluation of FP6, WWTF – Vienna Science and Technology Fund.

Star, Susan Leigh / Griesemer, James R. (1989): “Institutional ecology, translations and boundary objects: Amateurs and professionals in Berkeley’s Museum of Vertebrate Zoology”, in *Social Studies of Science*, Vol. 19, No. 3. , August 1989, 387-420.

Stehr, Nico (1994): Knowledge societies, London: Sage.

Stehr, Nico (1994): Arbeit, Eigentum und Wissen. Zur Theorie von Wissensgesellschaften, Frankfurt a. M.: Suhrkamp.

Stehr, Nico (2001): “Moderne Wissensgesellschaften”, in *Aus Politik und Zeitgeschichte,* B 36, 7-14.

Stehr, Nico / Moldaschl, Manfred (eds.) (2010): Wissensokonomie und Innovation: Beitrage zur Okonomie der Wissensgesellschaft. Metropolis Verlag: Marburg.

Stokstad, Erik (2015a): “Greek researchers worry as crucial referendum looms”, in *Science,* 10.1126/science.aac880.

Stokstad, Erik (2015b): “Greek ‘no’ vote leaves researchers in uncertainty”, in *Science,* 10.1126/science.aac8808.

Strauss, Anselm / Corbin, Juliet (2000): Basics of qualitative research: Techniques and procedures, Thousand Oaks: Sage.

Sundberg, Carl Johan (2000): Proposal of a biennial meeting for science and technology in Europe, PowerPoint Presentation, September 2000.

Sundberg, Carl Johan (2007): “The birth and growth of the Euroscience Open Forum: an arena for dialogue and influence”, in Euroscience: Next objective 100 years, Euroscience 2007, 40-49.

Suppes, Patrick (1978): “The plurality of science”, in *Proceedings of the Biennial Meeting of the Philosophy of Science Association*, Vol. 1978, Volume Two: Symposia and Invited Papers (1978), 3-16.

Sverrisson, Árni (2001): “Translation networks, knowledge brokers and novelty construction: Pragmatic environmentalism in Sweden”, in *Acta Sociologica*, 44 (4), January 2001, 313-327.

Swan, Jacky / Bresnen, Mike / Robertson, Maxine / Newell, Sue / Dopson, Sue (2010): When policy meets practice: Colliding logics and the challenges of ‘Mode 2’: Initiatives in the translation of academic knowledge in organization studies 2010 31: 1311, downloaded from oss.sagepub.com at Vienna University Library on 27.03.2011.

Uebel, Thomas E. (ed.), (1991): Re-discovering the forgotten Vienna Circle. Austrian studies on Otto Neurath and the Vienna Circle, (Boston Studies in the Philosophy of Science), Dordrecht: Kluwer.

Uebel, Thomas (2010): “Vienna Circle”, in *The Stanford Encyclopaedia of Philosophy* (winter 2010 Edition), Edward N. Zalta (ed.) http://plato.stanford.edu/archives/win2010/entries/vienna-circle/ (accessed on 25.07.2011).

van Dijk, Teun A. (1993): “Principles of critical discourse analysis”, in *Discourse & Society,* 1993, Vol. 4(2), 249-283.

Waldschmidt, Anne et al. (2006): “Ist ‘Bioethik’ ein ‘Diskurs’”? Methodologische Reflexionen am Beispiel des Internetforums 1000 Fragen zur Bioethik” in Kerchner, Brigitte / Schneider, Silke (eds.): Foucault: Diskursanalyse der Politik. Eine Einführung, Wiesbaden: VS Verlag, 191-209.

Weber, Max (1922): “Wissenschaft als Beruf”, in Gesammelte Aufsätze zur Wissenschaftslehre, Tübingen: Mohr Siebeck, 524-555.

Weber, Max (1958): “Science as a vocation”, in *Daedalus*, Vol. 87 No. 1, winter 1958, 111-134.

Weber, Max (1972): Wirtschaft und Gesellschaft, Tübingen: Mohr.

Weingart, Peter / Pansegrau, Petra (2008): Vergleichende Analyse Wissenschaftskommunikation - WissKomm: Abschlussbericht des Projektes (Laufzeit: 10/2006 - 02/2007).

Whyte, William Foote (1993 [1943]): Street corner society: The social structure of an Italian slum, Chicago: University of Chicago Press.

Wilsdon, James / Willis, Rebecca (2004): See-through science: Why public engagement needs to move upstream, London: Demos.

Wilsdon, James / Wynne, Brian / Stilgoe, Jack (2005): The public value of science: or how to ensure that science really matters, London: Demos.

Weingart, Peter (1998): “Science and the media”, in *Research Policy*, 27, 9, 869-879.

Weingart, Peter (2001): Die Stunde der Wahrheit? Zum Verhältnis der Wissenschaft zu Politik, Wirtschaft und Medien in der Wissensgesellschaft, Weilerswist: Velbrück Wissenschaft.

Weingart, Peter (2002): “Kassandrarufe und Klimawandel’ in *Gegenworte*, 10. Heft, Herbst 2002, 21-25 Aufsatz.

Wenger, E. (1998): Communities of practice: Learning, meaning, and identity, Cambridge, UK: Cambridge University Press.

Wünning Tschol, Ingrid (2012): “Euroscience Open Forum – ein Ort der persönlichen Begegnungen für die europäische Forschergemeinde”, in Dernbach, Beatrice / Kleinert, Christian / Münder, Herbert: Handbuch Wissenschaftskommunikation, Wiesbaden: Springer, 89-92.

Wynne, Brian (1992): “Misunderstood misunderstanding: Social identities and public uptake of science”, in *Public Understanding of Science* 1(3), 281-304.

Wynne, Brian (1995): “Public Understanding of Science”, in Jasanoff, Sheila et al. (eds.): Handbook of Science and Technology Studies, Thousand Oaks/London/New Delhi: Sage, 361-388.

Yin, Robert K. (1993): Applications of case study research, Newbury Park, Ca: Sage.

Yin, Robert K. (1994): Case study research: Design and methods, Newbury Park, Ca: Sage.

Ziman, John (2000): Real science: What it is and what it means, Cambridge, UK: Cambridge University Press.

7.2 Material from the Euroscience Open Forum and Euroscience

Euroscience Open Forum 2004:

PowerPoint Presentation (2002): “Euroscience 2004 in Stockholm”

Programme Book (2004)

Norlin, Gabriela (2005): Report from the first Euroscience Open Forum: Inspiration, participation and entertainment.

Euroscience Open Forum 2006:

Programme Book (2006)

ESOF2006 Final Report (2006)

Euroscience Open Forum 2008:

Programme Book (2008)

ESOF2008 Final Report (2008)

Euroscience Open Forum 2010:

Programme Book (2010)

ESOF2010 Final Report (2010)

Euroscience Statutes (1998)

7.3 Interviews with ESOF stakeholders

Rainer Gerold (2011)

Robert Klapisch (2009)

Claude Kordon (2008)

Patrice Laget (2011)

Rémy Lestienne (2009)

Françoise Praderie (2007b)

Raymond Seltz (2010)

Carl-Johan Sundberg (2011)

Al Teich (2011)

Ekkehard Winter (2011)

Ingrid Wünning Tschol (2008)

ZUSAMMENFASSUNG

Die vielfältigen Wechselwirkungen zwischen Wissenschaft und Europa als Gemeinschaft stellen einen prominenten europäischen Diskurs dar, der eine Vielzahl von sozialwissenschaftlicher Literatur, darunter im Feld der Wissenschafts- und Technikforschung, hervorgebracht hat. Befasst man sich mit der Entstehungsgeschichte der Europäischen Union, stellt man fest, dass Wissenschaft und Technologie eine einflussreiche Rolle zukommt, als auch Europa die wissenschaftliche Domäne, ihre Struktur, Methoden und Mitglieder politisch wie kulturell stark beeinflusst hat.

Somit stellt sich die spannende Frage nach dem Grad der gegenseitigen Einflussnahme und des Formens zwischen Wissenschaft einerseits und Europa als Gemeinschaft andererseits. Zieht man weiterhin viel beachtete politische Prozesse und Entscheidungen in Betracht, stellt sich zudem die Frage, ob hierdurch Wissenschaft in Europa, Europäische Wissenschaft oder sogar ein wissenschaftliches Europa gefördert werden soll. Die Beantwortung dieser Fragen ist vermutlich nicht ohne Berücksichtigung weitreichender Veränderungen im Wissenschaftssystem, das zunehmend offener und durchlässiger für gesellschaftliche Elemente und Akteure wird, möglich. Eine derartige Veränderung des Forschungssystems führt allerdings auch zu einer entsprechenden Diversifizierung von Europa, ein Prozess, der ebenfalls Aufmerksamkeit verdient.

Es bestehen zahlreiche laufende Ansätze zur Erforschung der komplexen und vielschichtigen Prozesse von Koproduktion von Europäischer Wissenschaft und Europäischer Gesellschaft. Diese Dissertation möchte einen Beitrag zu diesen Arbeiten leisten, indem sie die Analyse dieser Prozesse von Koproduktion in das Euroscience Open Forum (ESOF), eine 2004 eingeführte europäische Wissenschaftskonferenz, verortet. Es wird argumentiert, dass ESOF, das hier die empirische Fallstudie darstellt, einen Raum schafft, in dem die Beziehungen zwischen Wissenschaft und Gesellschaft in Europa in neuen Weisen geformt und ausgebaut werden können. In diesem Raum werden die verschiedenen Akteure, die in der wissenschaftlichen und gesellschaftlichen Sphäre sowie an den jeweiligen Schnittstellen und Grenzen aktiv sind, zu so genannten ‚innerwissenschaftlichen Öffentlichkeiten' performiert. Somit leistet ESOF einen Beitrag zur Konstruktion und Performanz von Europäischen Wissensgesellschaften.

Meine Analyse konzentriert sich auf die Konstellationen von Akteuren, die im Rahmen von ESOF entstehen und aktiv werden, sowie auf die ebenfalls entstehenden Räume für Interaktion und Austausch zu gesellschaftlichen, technologischen und forschungspolitischen Themen. Ich greife dabei fünf Gruppen von Akteuren heraus und analysiere ihre Eigenschaften sowie die Rollen, die sie im Rahmen der ersten drei ESOF-Treffen erfüllen. Diese sind etablierte Forschende, junge Forschende, JournalistInnen und KommunikatorInnen, PolitikerInnen und AdministratorInnen, sowie ‚knowledge brokers'. Die Analyse fußt auf umfassendem empirischen Material aus ESOF2004, ESOF2006 und ESOF2008. Ergänzt wird dieses Material durch Interviews mit Entscheidungsträgern, die besonderen Einblick in die Struktur und Zielsetzung von ESOF gewähren.

ABSTRACT

The role of science in the making of Europe as a community and, in turn, Europe's stance towards science and technology is an issue that has featured prominently in the European discourse for several decades and inspired a large body of literature among others in STS and its related fields. A study of the emergence of what is today the European Union (EU) points to a key role of science and technological innovation throughout this process of development. Equally, Europe has considerably influenced scientific research, its underlying system and its practitioners, both politically and culturally.

The question regarding the state of the relationship of science and Europe as a community today as well as the extent to which they affect and shape each other is therefore quite intriguing and worthy of exploration. What is more, when observing prevalent science policies one cannot help but ask whether they aim to promote science in Europe, to produce a distinctly European science or to build a scientific Europe. This question however cannot be addressed if we do not consider wider changes in the research system, which is becoming more open and permeable for societal elements and actors. Such a shift in the membership and output of the research system however also implies a respective diversification of Europe.

There are indeed numerous on-going efforts by scholars to understand the complex and multi-sited processes of co-producing European science and European society. This thesis aims to contribute to these efforts by choosing to observe the state of the relationship between science and Europe in the context of the Euroscience Open Forum (ESOF), a European science meeting introduced in 2004. ESOF, which thus features as the empirical case, attempts to create spaces in which the relations between science and society in Europe can be shaped and negotiated in innovative ways. This thesis argues that, within these arenas, ESOF performs different groups of actors and stakeholders into what is defined as 'inner-scientific publics'. By doing so, it paves the way for constructing and performing European knowledge societies.

In my analysis, I particularly focus on the actor constellations that emerge and become active in the Euroscience Open Forum and the arenas it provides for interaction and exchange on socio-scientific, technological and science policy issues. Concretely, I

identify five sets of actors and analyse their characteristics as well as the roles they fulfil throughout the course of the first three ESOF meetings: senior scientists, young scientists, journalists and communicators, policy-makers and administrators, and knowledge brokers. A large and diverse set of empirical material from ESOF2004, ESOF2006 and ESO2008 is employed in this effort. This is complemented by interviews with key contributors to the Euroscience Open Forum who provide particular insight into the workings of the meetings.