Proposal full title: **Electronic Maps to Assist Public Science**

Proposal acronym: **EMAPS**

Type of funding scheme:
Collaborative Project (Small or medium-scale focused research project)

Work programme topics addressed:
SiS.2011.3.0.6-1 Science-Society interaction in the digital technologies era

Name of the coordinating person: **Bruno Latour**, Dean of Research, Sciences Po
bruno.latour@sciences-po.fr

List of participants:

Participant no.	**Participant organisation name**	**Short name**	**Country**
1 (Coordinator)	Fondation Nationale des Sciences Politiques	Sciences Po	France
2	University of Amsterdam	UvA	The Netherlands
3	Institute of Spatial Planning, University of Dortmund	TUDo	Germany
4	Barcelona Media	BM	Spain
5	Politecnico di Milano, DensityDesign	POLIMI	Italy
6	The Young Foundation	YF	The United Kingdom

Table of Contents

1. Scientific and/or technical quality, relevant to the topics addressed by the call

1.1 Concept and objectives

EMAPS in a nutshell

EMAPS (Electronic Maps to Assist Public Science) is a collaborative research project aiming at answering in the most innovative way the topic SiS.2011.3.0.6-1 which calls for an assessment of "the opportunities and risks in the use of the web and the social media as a meaningful information tool and for developing a participatory communication between scientists and the different publics".

To do that, our proposal focuses first on the emerging uses of the web as a tool of collective endeavor and public debate, then on engaging actors involved in two particular technoscientific issues (aging/life expectancy and climate change adaptation) in an 'open-air' experiment using online interactive platforms that will be designed and developed within the project.

In the domain of science-society interactions, the aim of EMAPS is to get a better understanding of whether the web can provide a meaningful equipment to produce an enhanced interest of a wider public in science and technology issues, not as receivers of information about end results of science, but as potential participants in science in the making. Particularly for controversial topics like life expectancy or climate change, the present EU call underlines the potential as well as the risks of the explosion of online communication and the proliferation of producers and consumers of scientific information, whether institutions, researchers, journalists or bloggers. To cope with this situation, EMAPS proposes an innovative model to trace the heterogeneous networks constituted by science and technology issues — the continuous entanglement between the media process of producing opinions and the scientific process of producing facts.

Accordingly, the involvement of different publics, whether scientists, journalists, activists, corporations or citizens, will come from favouring the political relevance of their disagreements through access to datasets and documentation, representation of the debates and their dynamics, etc. which digitalization now enables to map and share. This is the hypothesis EMAPS would like to assess, drawing on a set of theories and practices to be assembled in the project: digital methods, science and technology studies, communication design and social innovation. Six partner institutions will participate, including specialists of the climate change adaptation issue. The scientific coordinator at Sciences Po, Prof. Bruno Latour, is among the researchers who created the field of science studies, and has an extensive experience in analysing technoscientific controversies. So far, however, the outreach of controversy mapping as a form of publicization of science and technology issues is still limited. Therefore innovations of EMAPS lie in the participation of the Young Foundation, a not-for-profit organization based in the UK; in the survey of existing experiences of online technoscientific debates; in the design of debate mapping driven by potential users' needs; and in the assessment of the impact of our web platforms to build an open community not only of users but of contributors as well.

While being innovative, the clear-cut goal and strategy of EMAPS establishes, in our view, the sound basis for an interdisciplinary research project, insures that relevant answers to the EU are provided at the end of the three-year duration, and integrates dissemination activities throughout the whole research process.

1.1.a Concepts

Those who envisage the science-society relation as a percolation of scientific truth through social channels, risk to be bitterly frustrated by digital media. In theory, the Web constitutes an ideal medium for the public understanding of science. Not only scientific knowledge can be broadcasted easily and in real time, but scientists and citizens can meet directly without the interference of journalists, politicians, activists and other intermediaries (Butler, 2005). In practice, however, things are more complicated. Type 'stars' into a search engine and you will probably learn less about astronomy than about astrology (not to mention movie stars). Or consider Wikipedia, the most celebrated online encyclopedia and the very symbol of Web 2.0: the page dedicated to Marie Curie and the one dedicated to Angelina Jolie have the exact same status (and, of course, the second one is far more visited). Even worse, as a consequence of one of Wikipedia's *founding principles*, "the ability of anyone to edit (most) articles without registration", all editors are granted the same status, no matter if they are tenured professors or anonymous users (meta.wikimedia.org/wiki/Foundation_issues).

On the Web (and even less on Web 2.0), there is no evident distinction between truth and error, *episteme* and *doxa*. All viewpoints may be equally expressed and there is no way to estimate *a priori* their value, interest and importance. That's not all. Not only does **digital communication not provide any ready-made distinction between facts and opinions**, but it actively multiplies the connections between the two. The marginal cost of hyperlink connections as well as the aggregation efforts of all sorts of portals and search engines effectively erase any residual separation between facts and opinions (Latour, 2007). Editors of scientific websites can be as rigorous and exclusive as they may, yet they will always remain a few clicks away from the worse pseudoscientific claims (Ciolek, 1996).

Still, there is ground to be optimistic about the role that the Web can play in modern technoscientific societies. In this project proposal, we will argue that **what makes the Web an awful medium for the public *understanding* of science is precisely what makes it a wonderful place for the public *discussion* of science** - upon the condition, however, that we assume a more reasonable definition of 'science' and of 'society'.

To understand how the Web contributes to the public discussion of science, we need to rethink our definitions of both 'science' and 'public'. As Science and Technology Studies (STS) have demonstrated, there is no such thing as *Science*. Scientific knowledge does not originate in isolated ivory towers – laboratories, universities, research centers – and trickle down to the general public. **Scientific knowledge is always created *within* society and would not exist without the contribution of a variety of actors**: citizens, politicians, industries, NGOs, legal institutions, activists, journalists, technical artifacts, natural elements and, of course, scientists, scientific institutions and scientific instruments (Jasanoff et al., 2001). Far from existing as abstract platonic ideas, scientific facts are rooted in social life. They are not merely discovered; rather they are constructed by the cooperation of a multitude of heterogeneous actors (Latour, 1988).

Conceiving scientific facts and technical artifacts as collective constructions has a major advantage: it draws attention to *the work needed for constructing them*. No discovery or invention, no matter how persuasive or effective, can produce an immediate consensus. Science and technology do not impose themselves under the impetus of an indisputable logic. They need to be collectively discussed and collectively accepted (Felt and Fochler, 2008). Far from being the ultimate resort for closing social debates, scientific truth and technological progress are the results of such debates (Gibbons, 1999). Whenever we use words such as 'science' or 'technology', therefore, we should always keep in mind **the collective work of a multitude of heterogeneous actors**, the networks they form, the controversies they fight, the agreements they reach (Law, 2000).

It is interesting to note that this definition of science is very close to John Dewey's definition of 'public opinion' as a heterogeneous mixture of *ad hoc* audiences, coalescing around specific issues (Dewey, 1946). Drawing on the work of Walter Lippmann (Lippmann, 1927), Dewey claims that it would be unrealistic to expect citizens to be engaged in all the issues that trouble collective life. Modern societies are so full of

debates and controversies that no citizen, no matter how diligent and motivated, can follow all of them. People only care about the issues in which they are directly involved and dedicate a fleeting attention to the rest of public debate (Michael, 1996). **Not only (as STS showed us) is there no such thing as *the Science,* but (according to Dewey) there is also no such thing as *the Public* either**.

Consider any of the technoscientific disputes that trouble our collective existence, be it industrial agriculture, energy production or medical genetics. None of these controversies can be simply ascribed to a public misunderstanding of science (Irwin and Wynne, 1996). None can be solved just by spreading scientific consensus through public opinion. First of all, because the scientific community is far from reaching an agreement and, second of all, because the participation of public actors (institutions, NGOs, activists, corporations...) is already massive, but this does not seem to bring the disputes any closer to resolution.

This is particularly evident when looking at technoscientific controversies in the context of the risk society (Beck, 1992). Risk controversies do not draw an opposition between science and misguided public perceptions of science. Rather, technoscientific disputes are disputes about who will define risk in view of existing ambiguity. Technology policy discourse is not only about who is correct about assessment of danger but whose assumptions about political, social and economic conditions win in the risk assessment debate (Slovic 1999). Danger is real, but risk is socially constructed. Scientific literacy and public education are important but not so central to risk controversies.

Things would be much easier if the problem was facilitating the encounter between *Science* and *Society*. Unfortunately, none of these mythical entities exists and all we are left with is a myriad of heterogeneous networks connecting and opposing all sorts of actors on all sorts of issues (Felt, 2000). And here is where the Web comes in handy.

By saying that sciences are heterogeneous and that public opinions are fragmented, we never meant to deny the possibility of technoscientific democracy (Latour and Weibel 2005). We just wanted to shift the focus from the percolation of science through society to the collective work of construction of socio-scientific networks (Latour, 1999). While chaotic in assuring the former, the Web may be unexpectedly helpful for the latter. Thanks to its neutrality and connectivity (and notwithstanding the limits that we will discuss in paragraph 1.2.a), the Web offers a unique space for discussing and constructing technoscientific issues. Not only can all sorts of actors easily and inexpensively express their viewpoints, but the hypertextual texture of the Web facilitates the emergence of alliances and oppositions (Rogers, 2002).

Web communication is often said to be *many-to-many* (as opposed to the *one-to-one media* as the telephone or the *one-to-many* as the television) (see, for example, Morris and Ogan, 1996). This definition is inexact: online communication is rather *several-to-several*. The Web is a great place to come together, but not *all* together. The reason why the Web is often described as a space (the *cyberspace*) is that online communication generates territories (Boullier, 2009). The fact that anything can be connected through a hyperlink does not mean that it will be (Barabasi, 2009). Despite the marginal cost required to create a hyperlink, people tend to be relatively careful in establishing connections. The result is that **the Web is not randomly organized**. Linking their discourse to other online discourses, users establish hierarchies and clusters (Gibson, Kleinberg and Raghavan, P. 1998).

Like the Internet, the Web is not a single regular network, but a network of networks, a graph where densely connected zones are separated by relatively empty spaces. Most of the time, these territories correspond to thematic communities: clusters of people gathering around a shared interest. The so-called Web 2.0, in particular, has been developed to facilitate thematic aggregation and the success of platforms such as Facebook or Flickr is largely due to their capacity of connecting people with similar interests (O'Reilly, 2005).

Once again, we can draw on the philosophy of John Dewey to show the potential of the Web as a debate space (Coleman and Gøtze, 2001). Because of their capacity to assemble people around discussion themes, **digital media are very close to Dewey's idea of a democratic communication: they allow actors to gather around the issues they share** (Sustein 2006 and 2007). By combining *ex ante* neutrality and *ex post*

organization, digital media seem capable of fulfilling the same function fulfilled by professional journalism: filtering and sorting information, allowing citizens to browse the complexity of public life and to identify the issues that concern them (Castells, 2008 and Cardon, 2009). Online debate, to be sure, is not the *panacea* of all political problems, yet, digital environments have proved to be particularly fertile in equipping public engagement (Dahlgren, 2005; Davies, and Pena Gangadharan, 2009; Wright, 2006).

This function is particularly crucial when it comes to the public debate around science and technology (Benvegnu, 2006). Considered how eco-activists use the Web to coordinate internationally, how deceived consumers mount lawsuits over the Internet, how people affected by rare diseases organize online. Where else could such issues be discussed? Where else can questions that are both local (for their thematic extension) and global (for their geographical extension) be raised, if not on a medium that is both geographically and thematically clustered?

To be sure, scientific and technological issues did not wait for the Web to organize as networks. Thanks to digital media, however, technoscientific networks are now materialized in networks of hyperlinks and web pages, facilitating their deployment and their organization.

1.1.b Objectives

What difference does it makes to be equipped with tools for mapping technoscientific issues? Can such equipment change (and potentially improve) the way we publicly discuss science and technology? These are the basic research questions of the this project, which is built around four simple objectives:

- exploring the existing experiences of online technoscientific debate;
- focusing on the analysis of two specific scientific issues;
- develop an online platform for mapping technoscientific controversies;
- using the platforms to promote and facilitate the debate among the concerned actors.

Objective I Assessing the risks and opportunities of online technoscientific debate

It is impossible to make a meaningful contribution to online technoscientific debate without a solid knowledge of existing initiatives. Citizens, activists, politicians, entrepreneurs, journalists, scientists did not wait for researchers to exploit digital media (Rogers, 2004). Although we hope to introduce a few innovations in the way science and technology are debated, it would be arrogant to ignore the work that Web users are already doing.

The first objective of this project is, therefore, to **assess the risks and opportunities of the Web as a space for technoscientific debate**. This assessment will entail examining a series of interesting practices to understand what lessons can be learnt from their success and failure. More than just listing tools and initiatives, this examination is meant to reflect upon the impact of digital technologies on public engagement with science (see WP1 description). The Web evolves so fast that it defeats all cataloguing efforts. Any list of good practices online, no matter how accurate, is obsolete as soon as it is finalized. That is why, being exhaustive is less important than being able to identify the initiatives that most resemble those we wish to explore in the next objective.

Focusing on good practices, we aim to show how the Web can contribute to improving contemporary technoscientific debate, but we will not forget to reflect on the limits of the online communication. In the section dedicated to the state-of-the-art, we will discuss the question of *digital divide* and the multiple meanings of this expression (see paragraph 1.2.a). Although correcting the limits of online communication is beyond the scope of this project, acknowledging their consequences is crucially important. Only by **recognizing the asymmetries and bias of the Web** will we have a chance to contribute to developing a truly democratic debate around science and technology (Hindman, 2009).

Objective II Investigating scientific and media debates around two case studies

As claimed in the previous paragraph, there is no such thing as *Science* or *the Public*. The scientific issues troubling our societies (as well as the *ad hoc* audiences that they engender) are too varied to be addressed by a *standard* approach (Hajer, 2005; Latour, 2005). Online and offline experiences have proven how difficult it is to 're-use' the procedures developed for a given issue. Most of the time, the success obtained in the original case is impossible to be reproduced just by reapplying the same procedures. Each sociotechnical controversy involves a specific network of agents and deserves to be treated in a specific forum (Callon, Lascoumes and Barthe, 2009). Accordingly, and following the call for proposals, we will therefore adopt a case-study approach. If examining the largest set of online practices is necessary to reveal the potential and the limits of the Web (see objective I), **progressing beyond the state-of-the-art requires to concentrate on a limited number of technoscientific debates** (see the box below).

It has been said that modern societies have difficulties in handling technoscientific issues because their institutions are not issue-specific and thus unable to treat the specific complexity of each scientific controversy (Marres, 2007). The same holds for digital media: promising that we could deliver a list of general recommendations for online technoscientific debate would be naïve and misleading. It would be naïve, because the experiences of online discussion of science are too many and too diverse to be explored in a single research project. It would be misleading, because it would conceal the fact that each scientific debate deserves and requires an *ad hoc* debate space. That is why we will concentrate on two well-defined case studies chosen for their interest and representativeness: 'aging and life expectancy' and 'adaptation to climate change'.

The advantage of concentrating on two case studies is that it will be possible to analyze them both minutely and extensively. Too often, the investigation of technoscientific issues is limited either to the discussions within the scientific community or to the media debate, as if the two discursive spheres were clearly separated (Couldry, 2008). Focusing on these two issues, we hope to be able to explore the *full* complexity of the debate they raise online and offline. If scientific facts and technical artifacts are built though a network of collective discussions, it is crucial to be able to follow each thread of such network beyond any preexisting distinction.

It is important to note that the two case studies will not be treated symmetrically or simultaneously. On the contrary, the two case studies will be addressed one after the other, so that the lessons learnt with the first can be employed when tackling the second. While the debate on climate change adaptation will be mapped extensively and with the contribution of all the Partners (see WP3 description), the debate on life expectancy will be considered as a sort of *preliminary experience*. The aim of this experience is to test the conceptual and technical tools identified as a result of objective I activities (see WP2 description).

Justification of choice of the case studies

Case study 1: aging and life expectancy

The demographic aging of societies represents one of the major challenges for the 21st century. Fertility rates have fallen, longevity increased and older people are living longer and mainly healthier lives. People aged 65 and over will soon outnumber children under age 5 for the first time in history. By 2040, more than 1 of every 4 Europeans is likely to be at least 65 years of age, and 1 in 7 is likely to be at least 75 years old.

What used to be an issue for the future is now a reality: the world's population is aging. Most countries show a steady increase in longevity over time. In particular the number of oldest old is rising; the world's population aged 80 and over is projected to increase 233 percent between 2008 and 2040, compared with 160 percent for the population aged 65 and over and 33 percent for the total population of all ages.

Scientific opinion is divided, however, over the sort of life we will be living as we age. Will the population age healthily? Will people remain fit and active for longer? Will healthier lifestyles allow us remain productive for longer or will we be struggling with chronic conditions and spend much of later years frail, ill and dependent of expensive health and care systems? Increasing prevalence of chronic conditions may well

reduce life expectancy of the current cohorts of young people.

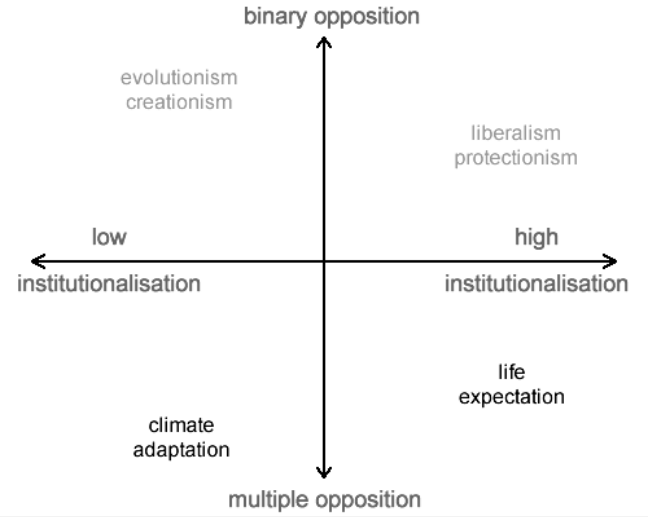
The changing demography is set to have **major implications for the way we work, for family and intergenerational relationships, social networks as well as the delivery of health, social services and welfare support**. The health and quality of life of aging populations informs economic planning for both the individual and the state, in terms of pension schemes, health care systems, and models of care.

Case study 2: The adaptation to climate change

If life expectation has been chosen because it can easily be grasped as a subject of controversy, the second case study of EMAPS has been selected for its unmatched complexity. The term 'climate change adaptation' is generally employed to refer to the ensembles of transformations that climate change will impose on our collective existence. Far from being a well-identified controversial issue, climate change adaptation is a cluster of disparate and yet interconnected questions: which seeds will we sow to comply with a changing weather? Which energy source will we privilege? How will we organized our industrial production? How will we protect our landscape, manage our freshwater supplies, shelter natural and agricultural biodiversities?

All these problems have in common the fact they can neither be resolved by local goodwill nor entrusted to a national or international authority. Too many actors are concerned as well as too many questions, their connections are too intertwined; their mutual dependences too complex; climate adaptation is just too complex to hope that solutions can be imposed by an authority or spontaneously emerge from the accumulation of individual choices. Solutions are to be found, they can only come from a tremendous work of negotiation and coordination to be organized at any level, from the tiniest personal choices to the management of international relations and throughout all the intermediate networks of governance and conciliation.

Although we know that EMAPS will not be able to solve such an epochal challenge, we hope we will be able to make a contribution by trying to make more visible the work of negotiation that hundreds of thousands of actors are doing all over the world in a variety of different ways. Quoting Dewey political philosophy once more, **a democratic governance of change is only possible if all the concerned stakeholders acknowledge each other and their mutual dependences**. Our only change to survey climate change is to be aware of the networks that tie our actions to the actions of a myriad of other beings, individual and collective, human and non-humans.



The space of technoscientific controversies as defined
by their level of complexity and institutionalization

Besides their intrinsic and specific interest, the reason that encouraged us to choose these two case studies is the fact that they occupy two symmetrical positions in the 'space' of controversies. Categorizing technoscientific issues is a very tricky exercise because the criteria that can be used to characterize

controversies are many. For the sake of EMAPS, however, we believe that the two most relevant dimensions to be considered are the complexity of the oppositions at stake and the level of institutionalization of the dispute. The first criterion is meant to distinguish controversies that are organized around a binary opposition between two contrasting viewpoints (e.g. evolutionism vs. creationism or protectionism vs. liberalism) from controversies that implies a multiplicity of different arguments. The second criterion is meant to distinguish controversies that are discussed in traditional political arenas (such administrative institutions) from controversies that reach beyond those arenas.

EMAPS will exclusively concentrate on non-binary oppositions, as they are the ones that may benefit more from a cartographic effort. Among the countless non-binary controversies, we chose two controversies with two different levels of institutionalization. By choosing two debates that share the same position on the Y-axis, we meant to assure their comparability. By choosing two controversies having two opposite position on the X-axis we hope to augment the possibilities of generalization of our results.

Objective III Developing an integrated platform for debate mapping

The last two objectives represent the specific originality of this research, which is meant not only to assess the current state of online technoscientific debate, but to contribute to its improvement as well. This is, of course, an extremely ambitious objective and one that need to be carefully specified.

First of all, let's clearly state that EMAPS does *not* intend to provide yet another web-space for discussing scientific and technological issues. The problem with online technoscientific debate is not the shortage of discussion spaces, but their proliferation (see paragraph 1.2.a). For any issue in science and technology, the simplest Web search returns thousands of discourses connected through thousands of hyperlinks and dispersed through hundreds of websites. Most of these fora allow commenting or posting new messages (and, even when this is not allowed, it is always possible to publish one's thoughts elsewhere and create dialogues through hyperlinks). Clearly, it is not by offering yet another discussion forum (as sophisticated as it may be) that we would contribute to online debate. In online environments, expressing one's opinion is relatively easy. What is difficult is making sense of the deluge of discourse and discussions entangling any technoscientific issue. It is this difficulty that this project is meant to address.

The good thing about digital technologies is that they not only allow the proliferation of the discourses around science and technology, but they also provide the techniques for handling them. First of all, an essential feature of electronic media is that everything they mediate is automatically traceable and often actually traced (with the notable exception of classified and censored information). To be sure, harvesting the Web and retracing thousands of discussions from a myriad of dispersed web-pages is far from being trivial (see WP3) Yet, once collected, these traces can be easily recorded, massively stored and inexpensively retrieved. Second of all, besides making it possible to integrate a whole scientific debate in a single data set, digital technologies also provide the techniques to analyze it. Applied to technoscientific controversies, data mining and digital exploratory data analysis may help citizens in making sense of public debate.

Once again, we are aware that envisioning a *universal* toolkit for mapping any technoscientific controversy is delusional at best. What we hope to do is to gather as many discourses as possible around our main case study and designing a platform to represent them. **The third objective of this project is developing an online platform for mapping the debate around the issue of climate change adaptation**.

At this stage, it is difficult to anticipate what such a platform will look like. Its functions and interface depend heavily on the nature of the mapped territory, which will only be revealed after the extensive work of investigation described in the previous objective. We can however draw on the experience of a few previous project in controversy mapping (see paragraph 1.2.b) to provide a **tentative list of the possible mapping-layers composing the platform** (Venturini, 2011). For a few life examples of how these layers have been implemented by Sciences Po students in the websites they realised in the controversy mapping course see http://medialab.sciences-po.fr/controversies/guidedtour.

1) **Glossary of non-controversial elements**. Every debate always involves a foundation of shared notions. Some of these non-controversial elements are so common that they do not need to be explained. Others may hinder the understanding and the participation of the public. Instead of describing in words the procedures of science, it is now possible to actually show them through simulations and multimedia, thereby partially overcoming the difficulties of specialized jargon.

2) **Documentation repository**. While we will try to preserve as much as possible the complexity of the discourses around climate adaptation, it will not be possible to provide a legible representation of the debate without incurring some simplification. This is why our maps will be accompanied by the complete documentation gathered by the study (obviously within the limits imposed by copyright and privacy) as well as direct link to the original online resources.

3) **Debate scale**. Every debate is made of several sub-discussions, horizontally and vertically connected to several other debates on different spatial scales and part of one or more larger controversies (Young 2002). Choosing the level of granularity is, in itself, a major decision to be taken by this project. As adaptation to climate change is considered as a cross-cutting issue (Swart et al. 2009), it does not make sense to concentrate on a particular spatial level or sector like spatial planning which is considered as particular vulnerable (Roggema 2009). Taking this decision, however, will not exempt us from the need to situate our subject in the scale of disputes where it belongs, showing how it affects and is affected by the other smaller or larger debates (Ciuccarelli, Ricci, Valsecchi, 2008).

4) **Tree of disagreement**. Few debates can be reduced to a binary opposition between two alternative viewpoints. Debates always involve a plurality of different questions and only a few of them can be answered with a simple yes or no. The platform should reveal how arguments are articulated one to the other logically or pragmatically, showing which arguments contradict or strengthen each other . Moreover, since the debate on climate change adaptation is considerably influenced by legal-administrative settings, cultural beliefs, social milieus etc., the same arguments are differently articulated and contradicted depending from the existing context (Massey and Bergsma 2009). Consequently several trees of disagreement will have to be developed to account for the specificities of the different European macro-regions.

5) **Diagram of actors-networks**. As debates are seldom binary oppositions, their actors rarely confront each other as two opposing armies. More often debates resemble a complex geometry of alliances and oppositions, an ever-changing space where clusters of actors emerge and dissolve unpredictably. Debates evolve through this magmatic movement which is very difficult to represent on paper, but can be rendered by digital animations that show how the balance of the dispute is constantly transformed by the creation and dissolution of the connections among the actors.

6) **Table of cosmos**. While separating the tree of arguments and the network of actors may facilitate they representation, it also makes it impossible to have a full appreciation of the debate. The table of cosmos is meant to show which actors support and are supported by which arguments, revealing how arguments may connect because they are held by allied actors and how actors may associate by sharing an argument.

7) **Debate dynamics**. The last four layers we described cannot be represented by a series of static visualizations. Debates are the most dynamic phenomena of social life and as such they can only be explored through dynamic maps. Time is a crucial variable in debate mapping and one that deserves to be present in every representation composing our platform (Ricci, 2010).

8) **Reflexive mapping: representing the debate and debating through representations**. There is one more function that we hope to be able to offer through our platform: the possibility for the users of locating themselves within the space of the debate. Consider a traditional geographic map: no matter how accurate and precise it is, it will be completely useless for a user that does not know where he is. It is only by portraying ourselves *in the map*, that we can use cartography as tool for orientation (Corner, 1999). The same is true for debate mapping. If we want our atlas to be a *navigation* device and not only a *representation* device, we should allow users to read our maps *reflexively* (November, V., Camacho-Hübner, E., & Latour, B. 2010).

There is, however, a crucial difference between geographical maps and debate maps. Debate maps describe a territory that is defined by the very positions of the actors that occupy it. Far from being constant, the space of technoscientific debate transforms every time an actor change its position. Our maps, therefore, should be able to show not only the position of an actor in the space, but also how his/her movement would affect the field of forces that constitute the controversy. This layer is the most difficult to implement because it entails opening the maps to its users. Being reflexive in a debate map means being able to participate in the cartography and affect its result. It is only by implementing this reflexive circle that we may assure that mapping become a form of action-in-the-debate (see paragraph 3.2).

Objective IV Disseminating the platform and the lessons learnt from it

To provide an answer to the research questions addressed by this project, we will employ an experimental methodology. Focusing on climate change adaptation, we will collect all the scientific and media discourses around this issue and we will develop an online platform integrating a series of tools to map and explore them. Finally, we will disseminate the platform to the actors involved in the climate adaptation debate and we will observe the use that they will make of it.

Dissemination activities are crucially important in this project, for it is impossible to understand and improve the technoscientific debate without entering in it. Developing and integrating a series of mapping tools is as much important to this research as understanding their impact on public debates. And there is no other way for studying this impact than asking the actors concerned by the discussion on climate change adaptation to use platform. A significant effort will therefore be deployed to engage as many users as possible in the platform.

When we say 'engage in the platform', we means *using* it, but also *contributing* to its development**.** The success of the so-called Web 2.0 has proved that a large part of the Internet audience is reluctant to be confined to the role of information consumers. To be sure, many people use to the Web as they use traditional media, as a place to find information. Many others, however, (and in particular those concerned by technoscientific controversies) are willing to assume a more active role: not just receiving, but also providing and elaborating information. EMAPS must be able to engage all these different types of users. Bloggers, journalists, decisions makers, activists, researchers and ordinary citizens may all be interested in debate mapping, but their interests are obviously very distant. Disseminating our platform means being open to the diverse expectations of its different publics. According to their interests and to the resources they wish to dedicate to it, users will be able to:

- Skim through the debate, enabling a rapid appreciation of the questions at stake and of the actors involved.
- Follow the dynamics of the controversy, tracing actors and arguments in time and space.
- Take part in the debate providing comments, ideas or interpretations.
- Contribute to the mapping efforts by submitting new data or analysing the existing ones.
- Contribute to the platform's enhancement by developing additional plug-ins or extensions.
- Use the platform strategically as a set of tools to act in the debate (see paragraph 3.2).

Dissemination is so crucial for this research that we cannot just leave it to the end of the project, hoping that the users will find our platform useful enough to use it. **Prototyping and testing efforts will be present throughout the whole project**, in order to minimize the risks of failing the final dissemination. Accordingly, we will start our project surveying the good and bad practices of online communication and identifying the critical factors deciding their success of failure. This is why, before addressing the climate change adaptation debate, we will organize an extensive preliminary test on the 'life expectancy' case study. This is why the specifications of the platform will be defined in strict collaboration with the users. This is why the platform will be released under an open-source licence encouraging users' appropriation.

Unlike most academic projects, the final dissemination phase of EMAPS is not meant to divulge the results of the research to a passive audience, but to share its conclusion with the actors already active on the Web or in climate adaption controversy. The dissemination phase of this project will resemble more the 'forge' of an open source project than a scientific publication or a laboratory experiment. The objective of the dissemination is not to test the value of the platform (which is to be tested throughout the whole project), but to observe its impact on public debate. To say it in other words, the debate experiment we will organize at the end of this project is not meant to test the value of the experimental settings, but to answer our main research question: **What difference does it makes to be equipped with digital tools for mapping technoscientific issues? Can such digital equipment change (and potentially improve) the way we publicly discuss science and technology?**

1.2 Progress beyond the state-of-the-art

The current proposal prolongs a fertile line of research projects financed by the European Commission to foster and reflect on the public participation to science and technology. Although most these projects are interesting and related to the objective of the current proposal, none of them specifically focus on the debate mapping as a tool to foster public participation. Indeed, they concentrate either on investigating the existing discussions around scientific and technological issues (e.g. CARGO[1], MIRRORS[2]) or on opening new spaces for debate (e.g. the FUND[3], ACCENT[4]). No previous project (with the notable exception of MACOSPOL[5], see the next paragraph) has tried to occupy the 'medium' position that EMAPS proposes to fill. Aiming at equipping citizens with the tools to make sense of the complexity of the disputes that concerns them, EMAPS intends to do more than just observing the technoscientific debate, but without directly intervening on it. In this medium position lies the originality of this project and the potential for contributing to the participatory communication of science and technology.

1.2.a The limits of the Web (aka the digital divide)

Until this point, we have been deliberately optimistic and claimed that, on the Web, any viewpoint has an equal chance of being discussed and linked. Unfortunately, this is not always the case. Though the Web is intrinsically less asymmetrical than traditional mass media, several major asymmetries are inscribed in digital communication and Web 2.0 is not making them any smaller (if anything, the opposite seems true). These asymmetries need to be considered thoughtfully, as they can have dramatic consequences on science and technology participation.

Thanks to the efforts deployed in the last forty years to build a worldwide network of computers, digital bandwidth is today relatively abundant and inexpensive. Broadcasting on the Internet is not only incredibly cheap (compared to other mass media), but also relatively simple. Just a few years ago, none would have ever thought that a one-man newspaper could exist (Boczkowski, 2004). Today, the blogosphere is full of them and some are competing with the most renowned newspapers. Just a few years ago, airing a television show would require huge investments and a large workforce. Today people can upload their videos onto YouTube or Vimeo, and publicize them on social media to their friends and followers who subsequently like and share them, creating a new kind of audience formation (Shirky, 2009).

The result is an unprecedented explosion in the number of people publishing opinions and information and in the number of people they can potentially reach. Still, this does not mean that the Web is *completely* symmetrical. First of all because **the technical infrastructure on which digital communication is grounded, the Internet is far from impartial**.

Although Internet technologies have extended to the whole planet, their coverage is not uniform. According to the latest report by the International Telecommunication Union (http://www.itu.int), while over 70% of the population of developed countries has access to online communication, **the figure falls to 21% for developing countries and only 9.6% for Africa**. These figures, moreover, hide the differences in the quality of Internet connections. Whereas bandwidth is growing broader and broader in Europe and the United States, less than 1% of Africans have access to high-speed Internet. Though most observers predict a rapid connectivity growth in developing countries in the next few years, such growth is likely to be assured by mobile devices and, in particular, mobile phones. Compared to the personal computer, such devices are

[1] Comparison of approaches to risk governance (financed under the FP6)
[2] Monitoring Ideas Regarding Research Organizations and Reasons in Science (financed under the FP7)
[3] Facilitators' Units Network for Debates (financed under the FP7)
[4] Action on Climate Change through Engagement, Networks and Tools (financed under the FP7)
[5] Mapping Controversies on Science for Politics (financed under the FP7)

cheaper and easier and do not require wiring infrastructures. Still, their capacity for transmitting, receiving and playing multimedia communication is limited. Therefore, when celebrating the capability of the Web to provide a rich and multimedia access to science and technology, we will have to bear in mind that such access is only available to a privileged minority. For the majority of world population, online communication remains limited to text and numbers.

Bandwidth inequalities, however, are only one of the several asymmetries of the Internet. Another important disparity comes from the fact that, although the access to digital networks is relatively inexpensive, the construction and maintenance of these networks are not. Consequently, everywhere in the world, Internet infrastructures are largely controlled by national monopolies and private oligopolies. In some countries, this results in a subtle system of restrictions to Web communications or in plain censorship. In many others, it does not and yet, even where the access to the Web is democratic, the ownership is not (Benkler, 1998).

Finally, the Web is built on numerous protocols which rule the way connections, information exchange are set. Those protocols bring an asymmetry between the nodes constituting the Internet (Galloway, 2004). The very first one is the client-server divide. Although the peer-to-peer model of exchanges has been developed, daily uses are mainly set on the model of a client (a laptop, a smartphone...) interacting with a server on which a service is hosted. As a consequence, one should not forget that online interaction is only possible to the extent allowed by servers' administrators. This is especially true for the so-called Web 2.0, which inherited the focus on collective cultural production of the earlier peer-to-peer movement, but not the egalitarian organization. Though emphasizing user contribution to the production of contents, **the Web 2.0 has developed around a number of online platforms rigidly controlled by their administrators**. The amazing openness of websites like Wikipedia, YouTube or Facebook, where anyone can freely share (almost) any content, should not lead us to forget that all the content is stored in server farms owned and managed by a handful of individuals, associations or corporations. And this hosting has a cost as the recent events like the denied announcement of Delicious social bookmarking service closing by Yahoo! (http://bits.blogs.nytimes.com/2010/12/16/yahoo-may-shut-down-some-services/?scp=2&sq=delicious&st=cse) or the latest wikipedia donation campaign remind us.

To be sure, in EMAPS, we will not be able to lessen any of the previous technical asymmetries. Although we will do our best to reflect on the limits that they impose on technoscientific debate, we will not be able to remove them. There is, however, a further set of asymmetries that this project will directly address. These asymmetries concern the usage of the Web (more than its technological structure). Studies on hyperlink distribution show that **the Web is organized according to an amazingly steep *power law*** (Barabasi, Albert, and Jeong, 2000). Simply put, a small minority of websites receives by far the largest share of citations. What is more troubling is that this unequal distribution can be found at any scale of observation. Take whatever domain, no matter how specific, and most links and hits will flow to a handful of websites.

Different reasons have been proposed for this 'preferential attachment' (Barabasi and Albert, 1999), but the bottom line is that attention is a scarce resource. Since the appearance of the Web, it has been evident that the reduction in communication costs would have been paid by a dramatic aggravation of the attention scarcity. Precisely because online publishing is so easy and inexpensive, the amount of online information grows exponentially encouraging users to be extremely selective in their interests.

Attention scarcity also explains the spectacular success of search engines. In the intentions of its inventors, the Web was meant to be browsed as one huge hypertext jumping from link to link (Berners-Lee, 1999). *Surfing*, however, was soon replaced by *searching* as the Web grew so fast and large that no human surfer could make sense of it. Hyperlinks remained the structuring mechanism of the Web, but they started to be followed by *search spiders or crawlers* more than by human beings. Using hyperlinks as indicators of relevance, **search engines imposed their rankings over the original flatness of the Web** and this strategy proved so efficient that few people consider anything beyond the first few results of a search query (Jansen and Spink, 2006). Even worse, these rankings are not issue-specific: they are calculated on the basis of the global distribution of hyperlinks, not the specific search query. The result is that users' attention is funneled

to a handful of well-linked websites, while the rest of online contents remains completely unnoticed (Introna and Nissenbaum, 2000).

To be sure, it would be silly to blame search engines for being effective in the task we assigned to them: sifting online complexity to provide quick answers to simple questions. But it would be just as silly to believe that this is all that we can ask of the Web. The Web is an amazing debate space, a place where the full complexity of technical democracy can be deployed, where all perspectives can be expressed and all viewpoints considered. Still, the potential of the Web as a space of discussion is threatened by its very openness. When everyone is speaking at the same time, only the loudest voices have a chance to be heard. This is the part of the digital divide we wish to mitigate through this project: finding ways to gather and organize the discussion around technoscientific issues so that the "long tail" (Anderson, 2008) of the Web is not overlooked.

Good news is that, despite the power law distribution of hyperlinks, the hierarchy of the Web seems to be surprisingly *flexible*. Numerous technical and usage innovations have been introduced in the last few years allowing Web users to collectively promote contents that would remain hidden. This is why the so-called Web 2.0 seems to offer an interesting potential for this project and, more generally, for the public participation to science and technology. Social tagging, folksonomies, collective bookmaking, microblogging are spreading through the Web precisely because they offer an organization of online discourses that is more open and supple that that of search engines. Online collaboration seems capable of assuring not only the collective production of contents, but also **its filtering, organizing and ordering.** With suitable collaborative tools Web users can both deploy the complexity of public debate and keep it under control (Benkler, 2006). This approach seems particularly promising when it comes to technoscientific debate. When developing our platform we will not pursue the impossible (an absurd) goal of giving everyone the same visibility, but we will encourage actors to collectively discuss which space should be granted to each viewpoint in the system.

1.2.b The legacy of MACOSPOL

The reflection on how the Web 2.0 can be harnessed to facilitate the participation to technoscientific debate does not start with this project. In a previous European funded project, MACOSPOL (MApping COntroversies On Science for POLitics), two of the partners of the present consortium (Sciences Po and the UvA) worked to build an **online platform for exploring and representing controversies around technoscientific issues**. MACOSPOL started from the hypothesis that, far from being a failure, disagreement is the engine of scientific and technical advancement. Instead of worrying about the fact that the public is exposed to a growing number of scientific disputes, the project asked which advantages could be drawn from this situation (Venturini, 2010). Instead of worrying about the fact that scientific reflection can be contaminated by political quarrels, the project asked under which conditions public interferences could enhance scientific discussions. Instead of lamenting the fragmentation of contemporary societies, the project asked what tools could help citizens navigating through such fragmented landscapes.

Right from the beginning, the partners of the project felt that the new tools for public debate were to be found in digital technologies. **Digital media** are particularly adapted to the heterogeneous character of scientific disputes, for they **provide a unique and coherent space where debates can be projected and traced**. On the Web, one can easily retrieve not only the whole scientific literature concerning any relevant dispute, but also the full extent of public opinions, commercial patents, institutional positions, journalistic coverage, legal decisions and so on. Using the same hardware (an ordinary personal computer) and the same interfaces (a web browser), it is possible to follow controversies across the full range of environments and networks they permeate. If there is a way to recompose the fragments of contemporary existence, it certainly involves digital technologies (Venturini, 2011).

What none expected at the beginning of MACOSPOL was the incredible richness of tools and projects to be discovered. Sifting through the Web in search of resources for controversy mapping, MACOSPOL came

across hundreds of well-developed initiatives fostering public participation to scientific debate. **Long before social scientists, Internet users recognized the role that digital technologies could play in opening scientific controversies to public exploration**. Much of MACOSPOL work consisted in reviewing, testing and documenting the myriad of resources freely available on the Web. The result is **an online platform meant as a toolkit for observing and describing contemporary scientific debate (mappingcontroversies.net)**.

Since the end of MACOSPOL, the results of the project have been extensively used within the Demoscience consortium (Demoscience.org). Demoscience is an informal consortium gathering all the universities experimenting controversy-mapping as a didactic tool (Sciences Po, Ecole de Mines Paris, Telecom ParisTech, the MIT, Manchester University, Ecole Polytechnique de Lausanne, Oxford University, Portland University). Using the tools gathered by MACOSPOL, **several groups of students have analyzed dozens of disputes and produced dozens of websites to present them** (medialab.sciences-po.fr/controversies and medialab.sciences-po.fr/controversies/guidedtour/).

The work of Demoscience students demonstrated the value of MACOSPOL's results, but also revealed two main limits of our controversy-mapping platform. **MACOSPOL has been simultaneously too ambitious and too modest**. It has been too ambitious, because it addressed socio-technical controversies *in general* instead of focusing on a few specific case studies. Too modest, because it collected hundreds of remarkable mapping tools, but did not integrate them under a single mapping methodology. **Being too generic, the MACOSPOL platform failed in integrating the tools it gathered.** It is not surprising: lack of integration is a common inconvenience of digital media. The speed at which new digital tools are released challenges any reassembling initiative. This is particularly true for a field that is expanding as fast as public participation in science and technology. No matter how promptly we update our website, how flexibly we design our classification, how thoroughly we prepare our tutorials, **the creativity of Internet users will always exceed our efforts**.

MACOSPOL achieved its objectives: it proved the interest of opening scientific disputes to public participation and revealed that countless resources for are already available on the web. The very success of this project, however, demands to take its enterprise a step further. This new project will address a research question that is very close to the one of MACOSPOL, but will reverse its approach. This time, we will be both more humble and more ambitious. **Instead of aiming at the impossible goal of creating a universal tool for controversy mapping, we will develop a fully integrated platform to map a single carefully chosen debate**. The experience with MACOSPOL taught us that it is not the platform or the tools that should be generalized, but the lessons that we learn by using them.

1.2.c Potentials and limits of online technoscientific debate

In the section dedicated to the concepts of this project, we explained why the 'Public Understanding of Science' model does not fit online communication. When it comes to the Web, “the problem is not how to increase an already large stock of information but how to increase people's ability to find useful information, to judge what is reliable and relevant for them at that moment, to make sense of the sometimes conflicting information with which they are faced, and then to engage in communication and discussion when appropriate” (MASIS Expert Group, 2009). In line with this approach, EMAPS will not make any effort *to contribute* to the proliferation of online information. This project ambition, therefore, is neither to provide new information on technoscientific debate nor to offer a space of expression for scientists and citizens. EMAPS is meant to devise a methodology for mapping online debate on science and technology and to test the validity of such methodology by applying it to 'life expectancy' and 'adaptation to climate change' debate.

There is an important difference between organizing an online debate and mapping it, though the components that are employed for its organization are normally those also used to map it effectively. For example when a topic is introduced in a forum, the following threads can be analyzed as a series of positions, each with a specific composition of actors, a volume of contributions as well as an activity rate, including a

freshness component (making it hot or not). In the blogosphere posts are uploaded, and subsequently linked to as well as commented upon. Links between blogs (both between blog rolls as well as those between specific posts) are analyzed in terms of the type of debate space they organize. Is it a monologue (like broadcast media), a dialogue or something else entirely? If a dialogue, does it organize like-minded voice, or bridge political, ideological, expert-lay and other sorts of divides (and how can one tell)?

For analysts, comment space is more of an editorial affair. While sentiment analysis may be considered as attractive to gain an indication of the tone of the debate, normally a small sample of the debate is read, and categorized substantively (contents) as well as discursively (interpretation or deconstruction of contents). The comment space in online newspaper articles (which cross-over into the blogosphere) is also analyzed most often as a grouping exercise so as to show either the richness or (more often) the poverty of the level of contributions. It is important to note that **debate is constituted differently per online space**, and is a product of its analysis more than anything existing in the wild (Rogers, 2009).

For example, Twitter is fast becoming a debate space of choice, where hashtags are put forward by users to organize a backchannel, discussion or some other form of attention organization. Analysts pull out most important tweets per hashtag as well as other, competing hashtags. When mapped, most important tweets across the competing hashtags would constitute 'debate'. That is to say key words or full tweets visualized in the form of side-by-side tag clouds are one form of representing contemporary debate, or mapping.

It is important to point out that a current state of the art in online debate mapping has left behind traditional representations of debate (pro-con columns, conversation trees, stakeholder agreement/disagreement charts, position statement mind maps, roundtable utterances bubbles, etc.), and has introduced labeled cluster graphs instead. The 'map' of the online debate (broadly conceived) has become denser and less readable, whilst at the same time covering more of it. Debate mapping thereby invites dynamic visualizations, especially zoomable and pan-able ones where map-reading is a special skill. Thus a great challenge for debate mapping is grappling with the complexities and other consequences participating in debate, given the maps.

Drawing on all these forms of self-organization of online discussions, this project will try to develop ways of exploring and representing the technoscientific debate that are consistent with the 'cartographic' practices developed by Internet users. Compared to other online debate projects, EMAPS will therefore be characterized by **an innovative focus on mapping rather than debate organizing discussion.**

1.2.d Integration of data sets and data mining

To assess the credibility of climate research a recent study by Anderegg et al (2010) performs a simple analysis segmenting climate researchers into two groups of either convinced by or unconvinced by the evidence for anthropogenic climate change (CC). The assignment is based on a much reduced set (<20) of signed statements in favour or against anthropogenic CC. However, such a simple split ignores the (likely) existence of grey zones and does not assess at all the diversity of opinions around CC and the possibly overlapping subcommunities around specific topics in the scientific debate.

To overcome these limitations a much wider approach is needed, which takes advantage of the great amount of useful information that can be found in unstructured form in various textual sources, be they scientific articles, blog posts, or discussions, and that has be extracted using what is commonly referred to as opinion mining and/or sentiment analysis. A recent and comprehensive review of the state-of-the-art on these technologies is provided by Pang & Lee (2008). The most common sub-tasks involved in opinion and sentiment analysis are: (i) the detection of the subjective nature of text (Wiebe & Riloff, 2005); (ii) the determination of the opinion polarity, which is generally based on vector method or lexical indicators, (Turney, 2002), (Esuli & Sebastiani, 2006); and (iii) the identification of the topic or attribute being referred to by the opinion.

One of the technologies of Natural Language Processing that has reached a higher level of maturity these last years is Named Entity Recognition (NER). The task of detecting and marking entities, objects and events

(generally relative to predefined categories such as persons, locations, institutions, etc. that are referenced within a text segment) is an important aspect of Information Extraction. Entity identification has been developed for a large variety of thematic domains, from news items (e.g. for market intelligence) to scientific literature, e. g. in order to feed computational models of gene and protein interactions, using thousands of biomedical articles each contributing some data about the complex interactions of metabolic regulation (Rodríguez, 2007).

Dependency parsing (Attardi, 2007) can provide information about the syntactical relations of different parts of a sentence, and thus provide the basis to relate entities with the opinions that refer to them.

At a more global level, e.g. in order to group and classify documents or opinions, techniques such as *Latent Semantic Analysis (LSA*, also known as *Latent Semantic Indexing* o *LSI*,), which is a method of corpus semantics (i.e. extraction of semantic information from the statistical analysis of large text corpora), can be used. It has been used in a variety of context, including word sense disambiguation, synonym detection, topic detection, etc. and permits to automatically deduce higher level concepts or topics, and relate terms or documents with those topics.

EMAPS presents a particular challenge in the variety of aspects, and the complexity of multi-facetted opinions. The focus of opinions, which are not always named entities in the usual sense, need specifically adapted robust detection models, and the mixture of opinions and stated (but possibly controversial) "facts" need a representation beyond simple opinion "polarity". **The combination of linguistically driven information extraction with statistical techniques for semantic classification** can then provide a valuable tool for the exploration, aggrupation, and summarization of very large amounts of textual data that would be beyond the possibilities of human annotation and analysis. The resulting data landscape will be the base for a detailed analysis of the temporal and structural dynamics of scientific and media discourse.

It is important to notice that, as powerful as they may be, data mining techniques can deliver meaningful results only if they are directed by insights of one or more human experts having a long familiarity with the object of the analysis. EMAPS will not be afraid to use the cutting edge techniques of data elaboration, but it will not employ them just for the sake of technological hype. In EMAPS automatic data mining will never be separated from human interpretation (see the strict connection between task C and task D in WP3). **The most important added value of EMAPS, as far as web-mining is concerned, is the effort of developing methods of data elaboration 'STS-driven',** that is to say based on the conceptual notions developed in the last two decades of science and technology studies.

1.2.e Beyond the Scientific Purposes of Data and Information Visualization: the role of Communication Design

Visualizations and images offer important cognitive advantages for reasoning and communication. They can be considered as cognitive prostheses in two senses: they make available some perceptually unavailable space, as well as normally invisible relations between perceptually available points. They explicitly display information, and further information can inferentially be recovered from them. These advantages are due to the fact that visualizations are in a sort of isomorphic connection with what they represent and they make some inferences easier to understand and perform.

To further exploit these aspects, Data and Information Visualization emerged as research fields aimed at supporting human cognition by developing effective visual metaphors for mapping abstract data (Card, Mackinlay, and Shneiderman 1999). The developments of such visualization devices are generally supported by visual cognition and perception research (Ware 2000) as well as taxonomical studies, which can be used by scientists to match data types to the most effective mapping technique (Cleveland and McGill 1984; Lau and Van de Moere 2007; Lengler and Eppler 2007).

Thanks to the ability to represent abstract data, visualization has always played an important role in scientific activities (Latour, 1988 and 1990). Recently, however, it is science itself which has become an object of

visualization. Drawing upon data such as research papers, patents, and funding awards sciences have been visualized as a highly interconnected spaces (Börner, Maru, and Goldstone 2004; Kutz 2004; Börner, Chen, and Boyack 2005). Indeed, several research projects have been carried out to demonstrate the benefits of information visualization techniques to support science and technology management. Diagrams, maps and graphs have been employed to identify research areas, experts, institutions, journals. Furthermore, visual techniques have been used to highlight the growth of scientific fields, as well as the impact of applied researches and funding programs. *Knowledge cartography* has emerged as a new area of studies, aiming at depicting spatially knowledge domains (Shiffrin and Börner 2004), providing both *descriptive* and *explanatory models*.

The rise of this field of research has been made possible by the growing availability of three resources: larger and data sets on sciences and technologies; algorithms capable to handle large and continuous streams of data; computers capability of processing large data amounts. These three phenomena have deeply redefined the purposes of data visualization and widen its potential audience. While 'dataviz' used to be limited to expert applications, more and more non-scientific applications have been developed in the last few years (Pousman, Stasko, and Mateas 2005) to address common users (Masud, Valsecchi, Ciuccarelli, Ricci and Caviglia 2010). Data showed the potential to become *stories* (Segel and Heer 2010) when handled by creative people. For example, journalists create information visualizations to support their reports, politicians or activists use visualization to mobilize the public opinion.

Besides *pragmatic visualizations* (meant to support research and scientific reasoning) and *artistic visualization* (meant to be interpretive and expressive) (Kosara 2007), we are increasingly confronted with *speculative visualization* (Tanyoung and DiSalvo 2010). **Speculative visualization** presents socially and politically meaningful data to provoke viewers' interpretation, to elicit discussions, to envisage possible futures: **its ultimate goal is promoting public engagement in social and political issues**. Visualization has therefore become a relevant topic in social researches (Scagnetti, Ricci, Baule and Ciuccarelli 2007; Ricci 2010) and humanities studies (Drucker 2010; Schich, Meirelles, Barabási 2010).

The EMAPS project is meant to contribute to this line of research on visual methods, by reflecting on how data and information visualization can be effectively put at the service of public debate. While the digital tools of visual representation become more and more powerful, their interest to political arena is still to be proved. The aim of this project is to provide such evidence by applying the cutting-edge visualization resource to the debates on life expectancy and climate change adaptation.

1.3 S/T methodology and associated work plan

i) Overall strategy of the work plan

The work plan of EMAPS is composed by 5 main work packages (plus an extra WP dedicated to the management and scientific direction of the project) partially overlapping with the 4 objectives described in paragraph 1.1.b.

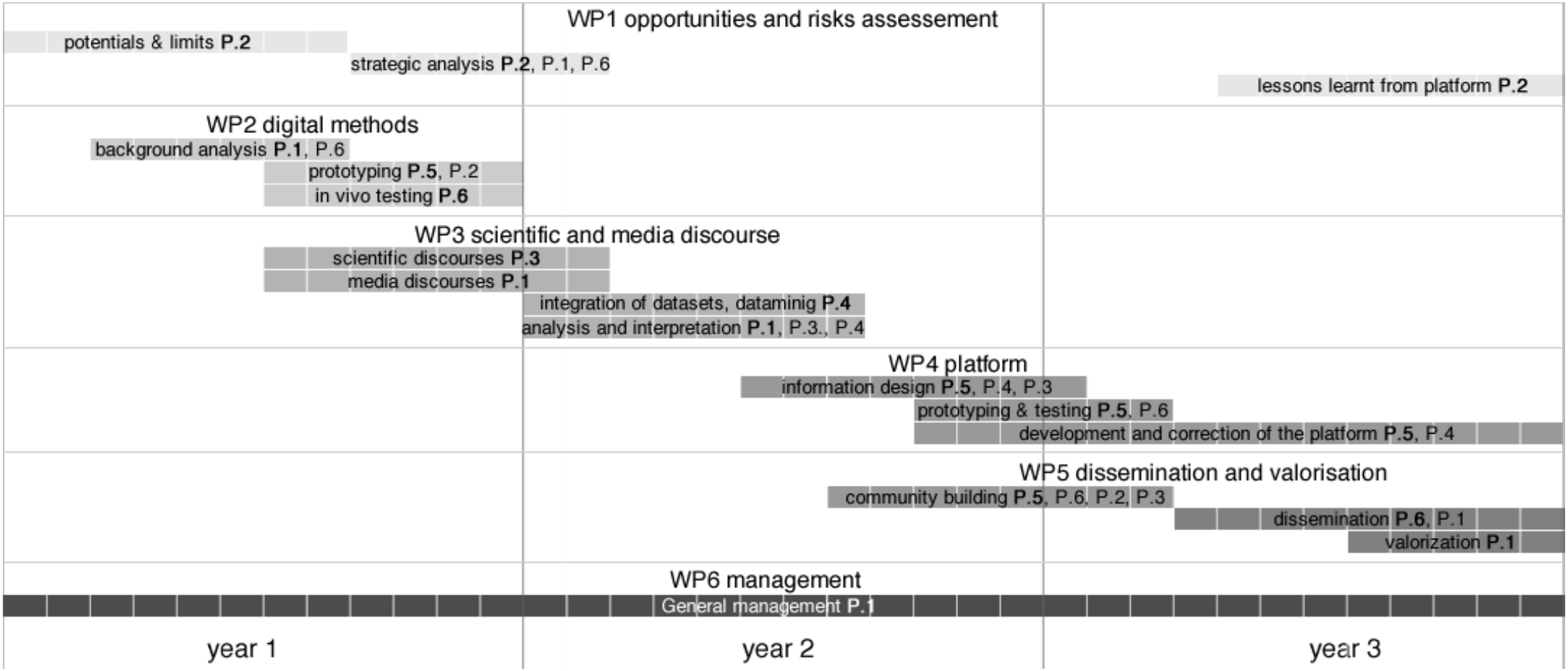
- WP1 Assessments of opportunities and risks in online technoscientific debate.
- WP2 In vivo test of digital methods for debate mapping
- WP3 Collection and analysis of scientific and media discourses
- WP4 Design and development of a debate mapping platform
- WP5 Dissemination
- WP6 Management

EMAPS will start by reviewing the existing online initiatives in technoscientific debate. The aim of this review is to identify the critical features deciding the success or failure of online participatory communication. Special attention will be given to the limits connected to 'digital divide' (see paragraph 1.2.a.). At the same time, we will start reflecting on our first case study (aging and life expectancy), identifying the conceptual and technical tools that could be use to map this controversy. Drawing on this reflection, we will develop a first set of interactive maps. This tentative atlas will be tested *in vivo*, forcing our project to reach beyond the limits of academic reflection and establishing a fruitful dialogue with social and scientific actors. Combined with the insights extracted from the review of existing initiatives, this dialogue will help us to identify the blocking points and the leverages of online communication. The goal of the preparatory phase is to acquire (as early as the beginning of year II) a clear understanding of the challenges we will face in the continuation of the project.

While working on the preparatory phase, we will also start digging into the second case study. This works constitutes the core of the project and is mean to devise a fully integrated and user-friendly platform to map the controversy on climate change adaptation. The first step of this development is building a (quasi-) exhaustive collection of the discourses composing this debate. The word 'discourses' is purposely vague as it is meant to cover at least three types of enunciations: the scientific data employed in the debate, the academic and grey literature on the subject, the opinions and insights published on the traditional and social media. Significant effort will be necessary to integrate all these discourses in a single data set, but once this work is done, we hope to be able to model and interpret the dynamics of climate adaptation debate. Such models and interpretations will be the basis for devising a mapping platform capable of deploying the complexity of technoscientific debate in a readable representation.

The final phase of the project will be the dissemination of the platform to as many participants as possible. A range of different possibilities for participation will be offered to the different actors varying from the simple use of the platform to the contribution to its development. This last phase has a crucial importance for at least two reasons. First of all, it will allow this project to provide an actual contribution to the debate on climate adaptation. Second of all, it will make sure that the results of this project are spread and discussed beyond the limit of academic community, becoming a resource for policy-makers, activists, scientists and all the actors working with technoscientific debates.

ii) Timing of the different WPs and their components (Gantt chart)



iii) Detailed work description

Table 1.3 a: Work package list

WP N°	Work package title	Type of activity	Lead participant N°	Lead participant short name	Person-months	Start month	End month
1	Assessment of opportunities and risks in the use of the Web in technoscientific debate	RTD	2	UvA	19,3	1	36
2	Digital methods (case study one)	RTD	6	YF	25,1	3	12
3	Collection and analysis of scientific and media discourses (case study two)	RTD	1	Sciences Po	45	7	20
4	Design and development of the 'debate-mapping' platform (case study two)	RTD	5	POLIMI	40,4	18	36
5	Dissemination	OTHER	6	YF	51,3	20	36
6	Management and scientific direction	MGT	1	Sciences Po	19	1	36
		TOTAL			**200,1**		

Table 1.3 b: Deliverables List

Del. N°	Deliverable name	WP n°	Nature	Dissemination level	Delivery date
D1.1	Evaluation framework for online participatory communication	1	R	CO	Month 8
D1.2	Recommendations and guidelines for the project	1	R	CO	Month 14
D1.3	Evaluation of the platform and finalization of guidelines and recommendation	1	R	PU	Month 36
D1.4	Scientific publication about the risks and opportunities in online technoscientific debate	1	R (publication)	PU	Month 36
D2.1	Report of the test	2	R	PP	Month 12
D3.1	Report on the dataset on scientific discourses	3	R	CO	Month 14
D3.2	Dataset on media discourses	3	R	CO	Month 14
D3.3	Scientific publication about the controversy on climate change adaptation	3	R (publication)	PU	Month 20
D4.1	Functional specifications of platform 2	4	R	CO	Month 26
D5.1	Guidelines on Community Building	5	R	PP	Month 27
D5.2	Report about the dissemination results	5	R	PP	Month 36

D5.3	Scientific publication about public participation to science through digital communication	5	R (publication)	PU	Month 36
D6.1	Kick-off meeting	6	O	RE (consortium and advisor group)	Month 1
D6.2	Report on kick-off meeting	6	R	CO	Month 1
D6.3	Meetings of the Steering Committee	6	O	RE (id. Above)	Months 14, 20 and 34
D6.4	Intermediate report	6	R	CO	Month 20
D6.5	Final report	6	R	PP (but CO for financial information)	Month 36

Table 1.3 c: List of milestones

Milestone number	Milestone name	Work package(s) involved	Expected date	Means of verification
1	Debate corpus	WP3	Month 20	Relational databases
2	Platform	WP1, WP2, WP3, WP4	Month 31	Public release of the mapping platform

Description

M.1 Debate corpus (Month 20)

The debate corpus will be constituted by one or more relational databases gathering and integrating all the collected data in form that will support their use and visualization in the platform.

M. 2 Platform (Month 31)

The release of the mapping platform (and of its code source) is meant to be first key achievement of the project (see paragraph 3.2). The platform will provide an integrated and user-friendly interface allowing users to explore the complexity of the climate adaptation debate through a series of legible representations.

Table 1.3 d: Work package description

In the following tables, tasks are often assigned to more than one partner of the Consortium, as their execution require the collaboration of different research centers. When this is the case, the partner responsible for the leading and accomplishing the task is mentioned in bold.

Work package number	**1**	Start date or starting event	Month 1

Work package title	**Assessment of risks and opportunities in online technoscientific debate**
Activity Type	RTD

Participant number	1	**2**	6				
Participant short name	Sciences Po	**UvA**	YF				
Person-months per participant:	4,8	**13**	0,9				

Objectives

The main objective of this work package is to assure, throughout the whole project, an encompassing reflection on the potentials and limits of the Web as a medium for participatory communication on science in society.

Description of work and role of participants.

WP1 include the following tasks:

*T1.a Identification of potential and 'digital divide' limits of existing online initiatives (**P.2**)*

This is the first substantial task of the project and it is meant to survey the numerous online initiatives of participatory communication on science and technology. The task is assigned to Partner 2 because of its expertise in digital studies, but its results will be the basis for the work of all other partners in other Work Packages. The goal of this task is to make sure that the partners of the Consortium are informed on all relevant projects and initiatives and aware of their success of failure.

*T1.b Strategic analysis of the state of the art and of the first test (**P.2**, P.1, P.6)*

This task concludes the preliminary phase of the project providing a strategic reflection on the review of existing initiatives (T1.a) and the results of case study-1 test (T.2.c). The objective of the analysis is to anticipate the obstacles that the project is likely to encounter as well as the resources that can help to overcome them. The task will be organized by the Partner 2, leader of the first WP, but will be realized in close collaboration with Partners 1 and 6.

*T1.c Assessment analysis and lessons learnt from platform (**P.2**)*

Far from being limited to the preparatory phase, the reflection on the potentials and limits of online communication will characterize every phase of the project. In particular, analyzing the impact of the mapping platform will be crucially important to answer our main research question: how is public participation to science affected by equipping the citizens with digital tools for mapping the full complexity and richness of its debates?

Deliverables

D1.1 Evaluation framework for online participatory communication (month 8)

The review will include a detailed assessment of the good and bad practices. For each analysed experience, strong and weak points will be identified to devise a sort of checklist or framework for evaluating online debate initiatives.

D1.2 Recommendations and guidelines for the project (month 14)

Drawing on D1.a framework and on the results of the WP2 test, this document will contain a series of theoretical recommendations and practical guidelines meant to guide the project through all the following phases.

D1.3 Evaluation of the platform and finalization of guidelines and recommendation (month 36)

The document will derive from the reflexive application of D1.b guidelines to the work done throughout the project. This document will summarize all the lessons learned in the project and will be addressed to institutions willing to replicate this type of initiative.

D1.4 Scientific Publication about the risks and opportunities in online technoscientific debate (month 36)

Work package number	**2**	Start date or starting event	month 3

Work package title	**Digital methods (case study one)**
Activity Type	RTD

Participant number	1	2	5	**6**			
Participant short name	Sciences Po	UvA	POLIMI	**YF**			
Person-months per participant:	3	4,8	11	**6,3**			

Objectives

The objective of this WP is to secure the methodological foundations of the project, by submitting them to a sample of actors in a technoscientific debate. Developing a debate-mapping platform will require a tremendous investment of resources and efforts. Such investment will be pointless if the platform turns out to be irrelevant for its target public. That is why we need an *in vivo* test of the platform long before the dissemination phase. This WP is meant to provide such test.

Description of work and role of participants.

WP2 include the following tasks:

*T2.a Background analysis of the debate (**P.6**, P.1)*

We already discussed the asymmetry of treatment that this project will dedicate to its two case studies (see paragraph 1.1.b). While, the development of the final mapping platform will be preceded by an extensive investigation of climate adaptation debate, we will not be able to perform such work for the 'life expectancy' case study. The reason is that we want to start the *in vivo* test as early as possible. This does not mean, of course, that we will launch the test with no preparation or knowledge of the debate they are supposed to map. This task is meant to provide this preparation.

*T2.b Prototyping of the digital tools for debate mapping (**P.5**, P.2)*

and

*T2.c In vivo test of the debate-mapping tools (**P.6**, P.1)*

Though different (and realized by different partners), the task T2.b and T2.c are so strictly related that they are better described together. The basic idea is to adopt a *user-centered* approach to the selection and development of tools for controversy mapping. While in the project MACOSPOL previously coordinated by Sciences Po (see paragraph 1.2.b) we assumed a rather tool-centric approach (identifying interesting tools and then testing them on sample of users), in this project we would like to reverse our strategy by involving test users right from the beginning of the research.

This is why the work of identification and prototyping of mapping tools will be accompanied, right from the beginning, by a work of *in vivo* testing. The aim of this first effort of prototype/testing is not to deliver a fully integrated platform, but to select or design the technical and conceptual tools that will be integrated in the second part of the project. Although the level of integration that we will able to reach in this preliminary atlas will be undoubtedly lower than the one required for the final platform, we will do our best to develop a user-friendly interface capable of supporting the test of the selected tools.

Deliverables.

D2.1 Report of the test (month 12)

This report will describe the results of the preliminary test of the selected digital tools and will highlight the strong and weak points of each of them, as well as the needs for improvement and integration identified by the users.

Work package number	**3**	Start date or starting event	Month 7

Work package title	**Collection and analysis of scientific and media discourses (case study two)**
Activity Type	RTD

Participant number	**1**	3	4				
Participant short name	**Sciences Po**	TUDo	BM				
Person-months per participant:	**8**	21	16				

Objectives

If we want to map the complex territory of climate adaptation, we need first of all to explore it and identify its landmarks. WP3 as a twofold aim. First, it aims at collecting a large share of the discourses that animate the debate in the scientific community and in traditional and social media. Second, it aims at submitting these discourses to a mathematical and sociological analysis to reveal the dynamics of the debate.

Description of work and role of participants

WP3 include the following tasks:

*T3.a Collecting discourses in scientific and grey literature (**P.3**)*

The first task of this WP is collecting the full extent of the disagreement among the scientists working on climate change adaptation, gathering all the relevant literature published in academic journals as well as in grey literature (working documents, pre-prints, research papers, statistical documents...). Moreover, as scientists argue not only through the documents they write, but also through the data that they produce, those data are both object of discussion and instruments of persuasion. As such they need to be included in the exploration of climate change debate.

*T3.b Collecting discourses in traditional and social media (**P.1**)*

Although climate change adaptation is certainly a scientific controversy, its networks extend far beyond the limits of the scientific community. As climate change is likely to have dramatic impacts on every aspect of our collective existence, the debate on adaptation is emerging in the most disparate economic and political forums and on different spatial scales. The occasions and settings where this debate is discussed are so numerous that it would be impossible to trace them all, if it wasn't for the traceability of digital media (see paragraph 1.1.a). Thanks to the digital convergence of communication media, however, it is now possible to retrieve on the Web a large share of the public debate around climate change adaptation. The médialab Sciences Po will drive the task to identify, harvest and structure the digital traces from digital datascapes. One of the main data source will be the web corpus. This corpus will be acquired from the French web specialist company Linkfluence which creates web corpus in various countries. The corpuses are based on the analysis of the topology of hyperlinks network (how the blogs are connected one to another) in order to assure the best coverage of the wide variety of spontaneous expression on the Web by a large representative sample of websites : traditional media, political spheres, individual blogs and forums about health, mode, sports, technology, creative leisure... The contents are then harvested, cleaned and indexed through time making it possible to study what has been written in the last year on the web of different countries. The médialab will subcontract the provision of those corpuses to Linkfluence, which is one their research

partners, to focus time and energy to the analysis and content filtering and not to the highly technical and difficult operations of harvesting.

*T3.c Integration of datasets and data mining (**P.4**)*

Once collected, the datasets on scientific and media discourses will have to be merged in a single heterogeneous landscape of data. This is an extremely difficult operation, but one that is necessary to establish an integrated investigation of the debate on climate change adaptation. Such an investigation will be based on a series of EDA (exploratory data analysis) techniques in order to reveal the key arguments, their exponents and their interrelationships through both opposing and concurring opinions which drive the debate.

First, opinion mining techniques, based on natural language processing techniques and statistical models (see 1.2.d) will be used to extract relevant aspects of textual discourse, such as the targets of opinions or facts, the stated opinion, the relationships between different aspects of the discourse and the opinion holders. This will provide the basis for connecting and grouping the different arguments that can be found in different sources, and build a semantic space reflecting the spectrum of diverging or concurring opinions. Furthermore, the debate actors can be grouped and the relationships between different networks can be revealed to add a further dimension to the analyses of the debate. Finally, temporal aspects will be considered to detect movements of individuals between networks or shifts in the argumentation as a whole. The objectives of this task are to find a common description format of the two datasets and to provide the consortium with data mining tools to explore those datasets and thus equip the analysis described in T3.d.

*T3.d STS analysis and interpretation (**P.1**, P.3, P.4)*

The mathematical elaboration of the debate dataset will not be realized in the void. On the contrary, the mathematical analysis will be accompanied by a parallel analysis based on the methods and concepts of STS (Science and Technology Studies). A strict collaboration between the two types of analysis is crucial for the project and will assure that all the relevant phenomena are identified and interpreted. The médialab Sciences Po will lead this task as it is their very precise expertise to make a bridge between computer sciences and social sciences in order to bring social sciences methodological constraints in the process of building digital tools to ensure their validity in the research context.

Deliverables.

D3.1 Report on the dataset on scientific discourses (month 14)

The document will describe the structure and the content of the database containing the discourses around climate adaptation collected in scientific and grey literature.

D3.2 Dataset on media discourses (month 14)

The document will describe the structure and the content of the database containing the discourses around climate adaptation collected in traditional and social media.

D3.3 Scientific publication (month 20) about the controversy on climate change adaptation

This document will integrate the mathematical models and the sociological analysis performed on the collected data in a publishable paper.

Work package number	**4**	Start date or starting event	Month 18

Work package title	**Design and development of the 'debate-mapping' platform (case study two)**
Activity Type	RTD

Participant number	2	3	4	**5**	6		
Participant short name	UvA	TUDo	BM	**POLIMI**	YF		
Person-months per participant:	4,8	2	7	**21,5**	5,1		

Objectives

The objective of WP4 is to deliver an online platform offering a series of interactive maps of the debate on climate change adaptation.

Description of work and role of participants.

WP4 include the following tasks:

*T4.a Information and interaction design for the platform (**P.5**, P.4, P.3, P.2)*

At the end of the WP3 we will have a fairly detailed understanding of the debate on climate change adaptation: we will know who the actors are, what the arguments of this controversy are, and how they are related. The goal of T4.a is to find ways to present this information simultaneously complying with three mapping needs: 1) preserving as much as possible the original complexity and richness of the debate; 2) providing a set of representations simple enough to be easily readable by the users of the platform; 3) remaining open to the contributions of the users while assuring the stability of the platform. The third need is certainly the most complicated as it implies to define the procedures and the limits of the interaction between the users and the platform. The objective of remaining as open as possible to users' contributions should therefore be conciliated with the necessity to avoid chaotic and disruptive interventions on the platform. Drawing on the work done in the preliminary phase (T1.b) and in the WP5 community building task T5.a, this task is meant to anticipate the interaction between the platform and its users.

*T4.b Prototyping and testing of platform (**P.5**, P.6)*

An integrated mapping platform for such a vast debate as climate adaptation is a complicated piece of software: a web-based application to explore the controversy and find one's own position in this complex space. Although we will do our best to keep the platform open for further modifications, there will be choices difficult to revert. The goal of this task is to validate the core features of the system in a *beta prototype* before finalizing the development of the platform. For the testing to be successful, it is crucially important to choose an ensemble of 'beta-testers'. As the platform is meant to be a place where the actors of the climate change controversy could agree on their disagreement, the beta-tester should ideally be as varied and representative as possible, representing all the viewpoints of the debate. But this would mean starting the dissemination at an early stage to a sub panel of stakeholders. We will not choose this direction to avoid the risks of biasing the real dissemination, or of spreading buzz about the platform based on the prototype and before the final platform is publicly accessible. Thus the beta-testers will be selected as experts of scientific controversies but not specialized on climate change debates. Three different communities will be addressed: STS scholars, debate specialists from political sciences and journalists. Those beta-testers will

help us design the platform by criticizing the prototype regarding the information interaction design, as well as the scenarios of use which imagine how the users could participate into the very mapping process.

*T4.c Development and ongoing correction of the platform (**P.5**, P.4)*

The objective of this task is to develop the final mapping platform to explore and represent the debate on climate adaptation. Obviously, this is a decisive task for our project, the moment in which the preparatory work and the investigation on the case study materialize in an integrated toolkit for debate mapping. As repeatedly claimed in the previous WPs and tasks, we will do every effort to anticipate and overcome the obstacles that may hinder the success of our platform. Still, we are aware that there are problems that will emerge only *after* it has been launched. This is why the development of the platform will continue until the end of the project, constantly correcting and improving the platform while it is in use.

Given the strategic role of the platform, its design and development will be complemented by a series of micro-tests and micro-interactions with the identified beta-testers through the methodologies of Communication Design to develop the platform incrementally, progressively checking out, in real-time, its successes as well as its criticalities. These interactions within the micro-tests and the progressive verification of the identified model are aimed at obtaining a high feedback responsiveness and at providing a continuously updated grid of development strategies in terms of accessibility, interface, interactivity and functionality.

Deliverables.

D4.1 Functional specifications of platform 2 (month 26)

The document will contain the detailed functional specifications of the platform, describing as meticulously as possible all the functionalities that shall be implemented.

Work package number	**5**	Start date or starting event	Month 20

Work package title	**Dissemination**
Activity Type	OTHER

Participant number	1	2	3	4	5	**6**	
Participant short name	Sciences Po	UvA	TUDo	BM	POLIMI	**YF**	
Person-months per participant:	4	2,5	2	2	28	**12,8**	

Objectives

We will dedicate the last scientific WP of our project to dissemination, as they constitute an integral part of our research. The dissemination activities in this project will include much more than simply diffusing the results of our project. This WP is in fact meant to set up a full-scale experiment in technoscientific debate. Experiments are uncommon in the methodology of the social sciences and yet this precisely what we want to do: an experiment how technoscientific debate is affected by the availability of digital maps. Our platform is therefore to be considered as an experimental setting and its dissemination represent the very launch of the experiment. Neglecting this last phase will be like building an accelerator, but failing to use it on actual particles.

Description of work and role of participants.

WP5 include the following tasks:

*T5.a Community Building for the platform (**P.6**, P.5, P.2, P.1)*

To be successful in the goal of mapping the debate around climate adaptation, the platform should fit the usage that the actors of the debate will make of it. Maps are useful when they provide a distilled view of the territory they represent that is consistent with the expectations and needs of its users. This task is meant to feed the work of information and interaction design task (T4.a) with the interests and need of an online community of users and stakeholders including politicians, academics, policymakers, non-governmental organisations and lobby groups, journalists, think tanks, bloggers, and other opinion formers, as well as interested members of the public. This community will be invited to use, disseminate and contribute to the mapping platform. There will therefore be a widespread publicity campaign, targeting and relevant policy makers and opinion formers, to ensure that there are high levels of interest and engagement.

This publicity will take the form of: network marketing through the online community as well as other relevant networks such as the Social Innovation eXchange, Euclid; online marketing through the websites of the partners, the Atomium Culture Platform and social networking sites such as Twitter; direct emails to lists of potential users and interested stakeholders, including journalists, bloggers, wiki-editors.

*T5.b Dissemination of the platform (**P.6**, P.1)*

We mean by dissemination the organization of the use of the platform by the stakeholders of the controversy on Climate change. This task is meant to animate and moderate the engagement of users on the platform, creating a user design cycle that goes from experiments to new developments or corrections. Indeed Internet users have proved to be far more creative than social researchers in discovering new repository of data,

releasing new resources, inventing new tool of analysis and visualization. A key factor of success of our project will be its capability to engage a fruitful dialogue with all the bloggers, wiki-editors, online journalists and simple internet users already involved in the climate adaptation debate (see paragraph 3.2).

There will be a high-profile launch event with Atomium Culture to show case the platform and its application. The Atomium Culture Platform engages 25 universities, over one hundred thousand researchers, over one million students, seventeen newspapers, around ten million European readers per day, and some of the most important businesses in Europe with a total turnover of around 720 Billion Euros. This event will convene 50-70 high level practitioners and active policy makers, as well as VIPs from the European institutions, to validate the platform and to discuss it application to other fields of scientific controversy which affect public policy and society. The event will be live streamed through the internet allowing interested stakeholders across Europe to view and participate in the event by sending their comments.

The general success of EMAPS will be measured by the success of the dissemination. If we are able to attract the actors of the climate adaptation debate on our platform, persuade them to use it and thus verify its usability and relevance, all the previous phases will be validated. We will know that we have correctly identified the potentials and the limits of online communication on science and technology (WP1), that we selected the most effective mapping tools (WP2), that our interpretations and models were correct (WP3), and that we developed a useful mapping platform (WP4).

*T5.c Dissemination of the scientific results (**P.1**)*

If we manage to involve a large set of debate actors on our platform, the experiment we set up should provide an answer to the basic research questions of this project: What difference does it makes to be equipped with tools for mapping technoscientific issues? Can such equipment change (and potentially improve) the way we publicly discuss science and technology? There is no doubt that answering this question would constitute an important contribution to the research on the public debate on science and technology. The last task of the project is therefore dedicated to the dissemination of such contribution, making sure that it circulates not only within the scientific community, but also to policy-makers and issue-professionals.

Deliverables

D5.1 Guidelines on Community Building (month 27)

This toolkit will review the best practices and innovative approaches for engaging people, so that scientists working in other fields have tools to better influence public debate.

D5.2 Report about the dissemination results (month 36)

This report will discuss the results of dissemination activities, describe how the platform was received by its different audiences, highlight its elements of success and failure.

D5.3 Scientific publication (month 36) about public participation to science through digital communication

This last deliverable will provide a concluding reflection on the project in the form of a publishable paper. This paper will provide a detailed answer to the main research question of this project: how is public participation to science enhanced by digital mapping tools?

Work package number	**6**	Start date or starting event	Month 1

Work package title	**Management and scientific direction**
Activity Type	MGT

Participant number	**1**						
Participant short name	**Sciences Po**						
Person-months per participant:							

Objectives

The management structure of EMAPS is designed to be as efficient and flexible as possible. The objectives are the following:

- ensure an efficient liaison with the European Commission;
- define, divide and develop the tasks according to the time schedule;
- check the progress of the work;
- advise and direct the partners on the development necessary for the project;
- coordinate the teams and permit formal exchange of information between the team leaders;
- coordinate the preparation of the reports (financial, technical) and of the deliverables.

Description of work and role of participants.

WP6 includes the following tasks:

*T6.a General management of the research project (**P.1**)*

The management structure will be composed of a Co-ordinator, a Steering Committee, a General Assembly, a Scientific Advisor Group, and three collaborative groups.

The Co-ordinator will be the Fondation Nationale des Sciences Politiques (Sciences Po). It will be responsible for the administrative, legal and financial management. The scientific Co-ordinator will be Bruno Latour. A Project Manager will be recruited to ensure the daily follow-up of the project, in particular the administrative, legal and financial issues.

The team leaders will be responsible for the co-ordination of the technical progress in the different Work Package (WP). They will specify the planning of the different tasks within the project, and will ensure the follow-up of the technical progress (the production of the deliverables in accordance with the project's schedule for example).

When meeting together, the team leaders and the scientific coordinator form the **Steering Committee**. Its role is to launch, implement and supervise together each stage of the Project.

Two General Assemblies will gather one representative of each beneficiary, who will validate all aspects concerning institutional issues.

An **Advisor Group** will be added in order to have a constant external feedback on the development of the Project and give specific expertise in the three **collaborative groups**, which will center around issues of

particular importance: debate, science and tools.

Deliverables

D6.1 Kick-off meeting (month 1)

D6.2 Report on kick-off meeting (month 1)

D6.3 Meetings of the Steering Committee (months 14, 20 and34)

Month 20 and 34 meetings will also be meetings of the General Assembly.

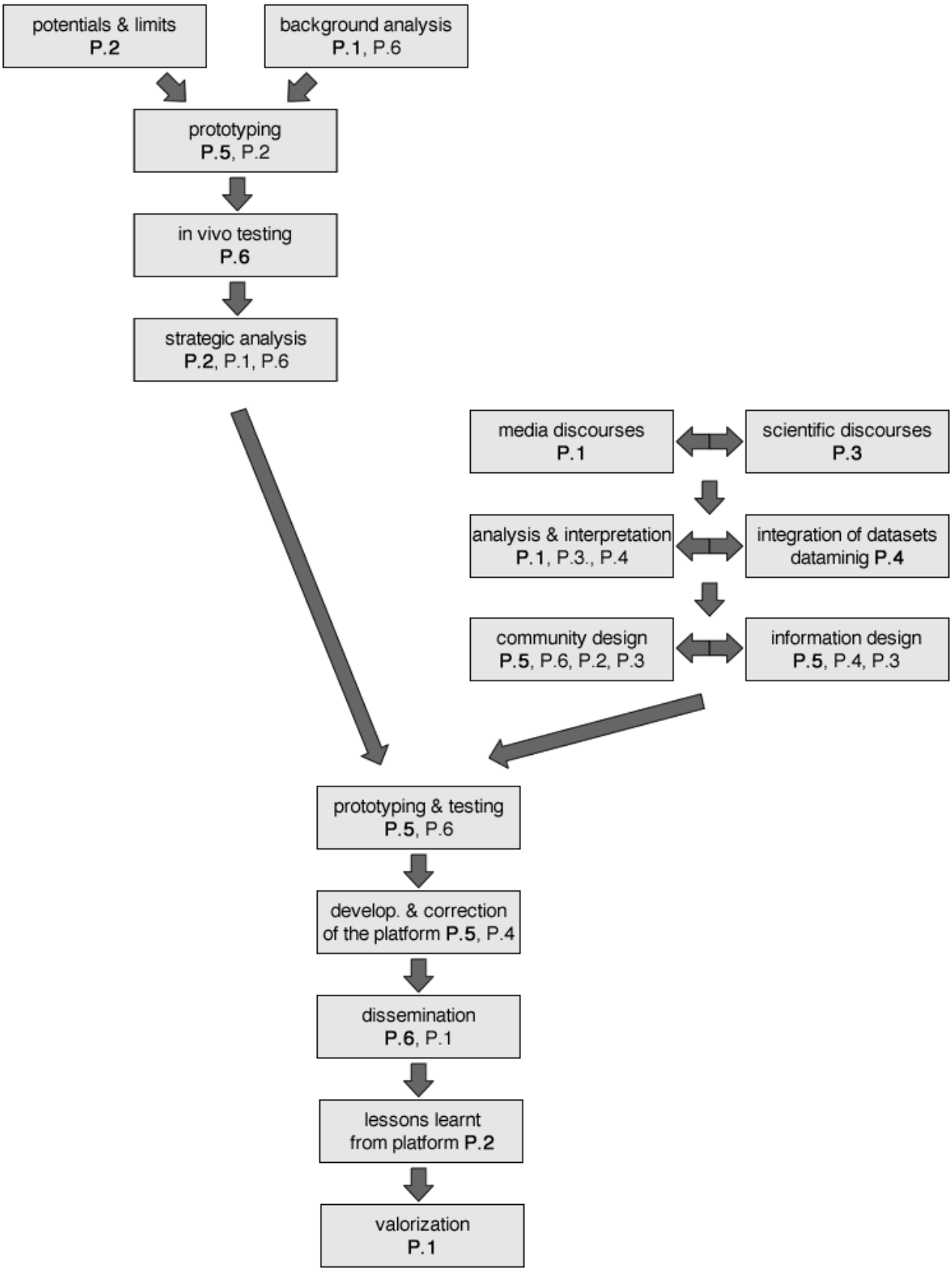
D6.4 Intermediate report (month 20)

D6.5 Final report (month 36)

Table 1.3 e: Summary of staff effort

Participant n°/short name	**WP1**	**WP2**	**WP3**	**WP4**	**WP5**	**WP6**	**Total person months**
Sciences Po	4,8	3	**8**	0	4	**19**	**38,8**
UvA	**13,6**	4,8	0	4,8	2,5	0	**25,7**
TUDo	0	0	21	2	2	0	**25**
BM	0	0	16	7	2	0	**25**
POLIMI	0	11	0	**21,5**	28	0	**60,5**
YF	0,9	**6,3**	0	5,12	**12,8**	0	**25,1**
Total	**19,3**	**25,1**	**45**	**40,4**	**51,3**	**19**	**200,1**

iv) PERT diagram



v) Risks and associated contingency plans

The risks that challenge EMAPS may be listed according to the WP that they concern.

Neglecting the lessons of other projects (WP1)

We mentioned several times that debate actors did not wait for social scientists to start reflecting on technoscientific controversies. Dozens of debates have been organized or represented online. Some succeeded, others failed dramatically. Nothing would be sillier that repeating the same errors and ignoring the existing best practices. Online communication is so full of innovations and experiments, that being creative is less important than being able to learn from previous experiences.

An entire WP of this project is dedicated to the investigation of good and bad practices of online technoscientific debate. Yet the Web is so large and changes so rapidly that no research project can be sure to know it all. This is why this project will make any effort to stimulate the active participation of the largest number of Internet users. By remaining open to users' contributions throughout the whole project, we hope to encourage them to suggest ideas and pinpoint experiences to be followed.

Wrong selection of the digital methods to be tested (WP2)

The second work-package of EMAPS is meant to test the conceptual and technical tools will be integrated in the mapping platform. To be sure, the potentially interesting digital resources are so numerous, that only a limited selection of them can be experienced in the testing session planned for WP2. If we fail the preliminary selection of the tools, it is possible (though unlikely) that too few of the tested tools stand the test. Should this happens, extra testing sessions will be organized until enough tools will have been selected to proceed to the integration in the final platform.

Incompleteness or poor integration of scientific and media discourses (WP3)

Acknowledging all the viewpoints concerned by the climate adaptation debate is essential to prove that our platform is credible and impartial. Unfortunately, if there is something that the experience with the cartography of controversies taught us, this is that, no matter how restricted a debate is, it will always raise an endless series of arguments and counter-arguments. We are therefore aware that our efforts in WP3 will not be enough to investigate the climate adaptation debate in all its richness. Exhaustiveness in debate mapping is both necessary and impossible to obtain.

Luckily, one of the advantages of digital media is that they can be flexible enough to accommodate an unlimited number of revisions and adjustments. Though based on data collected in WP3, our mapping platform will therefore draw on this flexibility to remain open to users' contribution. Far from being fully exhaustive at the moment of its release, our platform is meant to become the more extensive the more it is used.

Another major risk of incompleteness comes from the plurality of different languages employed in the controversy on climate adaptation. Much of the online discussion and of the existing grey literature (i.e. adaptation strategies), but also contributions to economic and political forums is not available in English. If we would just consider material in English we would not be able to map the existing heterogeneity of the debate on adaptation in Europe. To tackle the problem we will draw on the linguistic competences of the members of the Consortium (covering no less than 6 different national languages), but we will also considering the possibility to engage native speaking national experts to contribute to the project.

Failing in eliciting the participation of debate actors (WP4 and WP5)

The greatest risk challenging EMAPS is that of being ignored by its audience. If the actors of our target debate find our platform unreliable or, even worse, irrelevant, EMAPS will have failed its mission. Our research objective (investigating how socio-technical democracy is enhanced by debate mapping tools) may be achieved only indirectly, if debate actors' objectives are achieved as well. This explains why so much importance is given to working with users throughout the whole project. Involving the users in all the stages

of conception and development, we want to make sure that the final platform corresponds to their needs and interests and not to ours.

Still, despite all our efforts, the platform as we will release it at the beginning of year 3 may fall short of users' expectations. Should this happen, we are ready to spend the rest of the project to correct the platform. This is why dedicated several months to the dissemination activities and why the development of the platform is intended to last until the end of the project. If everything goes well, the involvement on developing activities will of course diminish after the release of the platform, but, should problems arise, we want to make sure that we have the resources to overcome them.

Lack of cooperation between the partners of the consortium (WP6)

EMAPS will be realized by a relatively small consortium of research centers. While this will facilitate the management and coordination of the project, it also attributes a crucial importance to the contribution of each partner. Because of the integrated structure of the research, difficulties experienced by any of the partners may seriously jeopardize the whole project. Besides, several key tasks of the project require the tight cooperation of two or more partners. Lack of coordination may thereby hinder the success of the research.

In order to cope with this risk, the consortium has been formed by research centers having previous or ongoing collaborations on other projects (see paragraph 2.3). This should facilitate the teamwork and minimize the coordination difficulties. However, should cooperation problems emerge, the project's leader (Science Po) and the project's advisors have the competences to assist (and if necessary replace) any of the partners on specific task, in order to remove potential blocking obstacles.

1.4 Bibliographic references

Anderegg W. R. L., Prall J. W. , Harold J., and Schneider S. (2010). "Expert credibility in climate change", Proceedings of the National Academy of Sciences, 107(27), 12107–12109.

Anderson, C. (2008). *Long Tail, The, Revised and Updated Edition: Why the Future of Business is Selling Less of More* (p. 288). Hyperion.

G. Attardi G. et al. (2007). "Multilingual dependency parsing and domain adaptation using desr," in *Proceedings of the CoNLL Shared Task Session of EMNLP-CoNLL*, 1112–1118.

Barabasi, A. L., & Albert, R. (1999). Emergence of scaling in random networks. *Science*, *286*(5439), 509.

Barabasi, A. L. (2009). "Scale-Free Networks: A Decade and Beyond". In *Science* 325, 412-413.

Barabasi, A, Albert, R., & Jeong, H. (2000). "Scale-free characteristics of random networks: the topology of the world-wide web", *Physica A: Statistical Mechanics and its Applications*, *281*(1-4), 69-77.

Beck, U. (1992). *Risk society: towards a new modernity* (p. 260). Sage Publications.

Benkler, Y. (1998). "Communications infrastructure regulation and the distribution of control over content", *Telecommunications Policy*, *22*(3), 183–196.

Benkler, Y. (2006). The wealth of networks. Yale University Press.

Benvegnu, N. (2006). "Le débat public en ligne", *Politix* 3/(75), 103-124.

Berners-lee, T. (1999). *Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by its Inventor*. HarperOne

Boczkowski, P. (2004). *Digitizing the News: Innovation in Online Newspapers*. MIT Press.

Börner, Katy, Chaomei Chen, and Kevin W. Boyack. 2005. "Visualizing knowledge domains", *Annual Review of Information Science and Technology*, 37, 179-255.

Börner, Katy, Jeegar T Maru, and Robert L Goldstone. 2004. "The simultaneous evolution of author and paper networks", *Proceedings of the National Academy of Sciences of the United States of America*, 101 Suppl. (April), 5266-73.

Boullier, D. (2009). "Au-delà des territoires numèriques en dix thèses". In F. Rowe (Ed.), *Sociétés de la connaissance et prospective. Hommes, organisations et territoires*. Lemna.

Buchanan, Richard (2006). "Design and the New Rhetoric: Productive Arts in the Philosophy of Culture". *Philosophy and Rhetoric* 34(3): 183-206.

Butler, D. (2005). "Science in the web age: Joint efforts". *Nature*, 438(7068), 548-549.

Callon, M., Lascoumes, P., & Barthe, Y. (2009). *Acting in an uncertain world : an essay on technical democracy*. MIT Press.

Card, S., Mackinlay, J. and Shneiderman, B. (1999). *Readings in Information Visualization: Using Vision to Think*, in Card, S. Mackinlay, J. and Shneiderman, B. (ed.) *Information Display*. Morgan Kaufmann.

Cardon, D. (2009). *La démocratie Internet : Promesses et limites*. Seuil.

Castells, M. (2008). "The new public sphere: Global civil society, communication networks, and global governance", *Annals Of The American Academy Of Political And Social Science*, 616, 78-93.

Ciolek, T. M. (1996). "Today's WWW-tomorrow's MMM? The specter of multi-media mediocrity". *Computer*, *29*(1), 106-108.

Cleveland, W. S., and McGill, R. (1984). "Graphical Perception: Theory, Experimentation, and Application to the Development of Graphical Methods". *Journal of the American Statistical Association* 79(387), 531-554.

Coleman, S. & Gøtze, J. (2001). *Bowling Together: Online Public Engagement in Policy Deliberation*. Hansard Society.

Corner, J. (1999). "The agency of Mapping. Speculation, Critique and Invention". In Cosgrove, D. (ed.) *Mappings*. London: Reaktion.

Couldry, N. (2008). "Actor Network Theory and Media: Do They Connect and On What Terms?". In Hepp, A. (ed.) *Connectivity, Networks and Flows: Conceptualizing Contemporary Communications*. The Hampton Press, pp. 93-110.

Ciuccarelli, P., Ricci, D. and Valsecchi, F. (2009). "Handling changes through diagrams: Scale and grain in the visual representation of Complex Systems". In Cipolla C. and Peruccio P. (ed.) *Changing the change Proceedings*. Allemandi.

Dahlgren, P. (2005). "The Internet, public spheres, and political communication: Dispersion and deliberation", *Political Communication*, 22(2), 147-162.

Davies, T., Pena Gangadharan, S. (2009). *Online Deliberation : Design, Research, and Practice*. Center for the Study of Language and Information.

Dewey, J. (1946). *The public and its problems: an essay in political inquiry*. Gateway Books.

Directorate General for Regional Policy (2009). *Regions 2020 – The Climate Change Challenge for European Regions*. Brussels.

DiSalvo, C. (2009). "Design and the Construction of Publics". *Design Issues* 25(1), 48-63.

Drucker, J. (2010). "Graphical Expressions of Humanistic Interpretation in Digital Environments". In *Humanities + Digital. Visual Interpretation Conference*. MIT Press.

ESPON Climate (2010): *Interim Report*. Dortmund.

Esuli, A. and Sebastiani, F. (2006), "Determining term subjectivity and term orientation for opinion mining," in *Proceedings of EACL*, 6, 193–200.

Felt, U. (2000). "Why should the public understand science? Some aspects of Public Understanding of Science from a historical perspective". In Dierkes, M. and Grote, C. (ed.) *Between understanding and trust*. Harwood Academic Publishers.

Felt, U. and Fochler M. (2008) "The bottom up meanings of the concept of public participation in science and technology", in *Science and Public Policy*, 35(7).

Fogg, B. J. (2002). "Persuasive technology: using computers to change what we think and do". *Ubiquity* December.

Galloway, A. (2004). *Protocol: How control exists after decentralization*. MIT Press.

Gibbons, M. (1999). "Science's new social contract with society". *Nature*, 402

Gibson, D., Kleinberg, J., & Raghavan, P. (1998). "Inferring Web communities from link topology". *Proceedings of the 9th ACM conference on Hypertext and hypermedia*. ACM Press, pp. 225-234

Greiving, S. and Fleischhauer, M. (2010). *National strategies of European countries for climate change adaptation: A review from a spatial planning and territorial development perspective*. BMVBS-Online-Publikation.

Hajer, M. (2005). "Setting the stage: A dramaturge of policy deliberation". *Administration & Society*. 36(6), 624-637.

Hindman, M. (2009). *The Myth of Digital Democracy*. Princeton University Press.

Hulme, M. (2009). *Why we disagree about climate change: understanding controversy, inaction and opportunity*. Cambridge University Press.

Introna, L. and Nissenbaum, H. (2000). Shaping the Web: Why the Politics of Search Engines Matters. *The Information Society*. 16(3), 1-17.

Irwin, A., & Wynne, B. (1996). *Misunderstanding science?: the public reconstruction of science and technology*. Cambridge University Press.

Jasanoff, S., et al. (2001). *Handbook of Science and Technology Studies*. Sage.

Kaufer, D. S., and Butler, B. S. (1996). *Rhetoric and the arts of design*. Routledge.

Kosara, R. (2007). "Visualization Criticism - The Missing Link Between Information Visualization and Art". *11th International Conference Information Visualization (IV '07)*. IEEE, July.

Kutz, D. O. (2004). Examining the evolution and distribution of patent classifications. In *Proceedings. Eighth International Conference on Information Visualisation, 2004. IV 2004.*, 983-988. IEEE.

Landauer, T. K, Foltz, P. W. and Laham, D. (1998). "An introduction to latent semantic analysis," *Discourse processes* 25(2), 259–284.

Latour, B. (1988a). *Science in Action: How to Follow Scientists and Engineers through Society*. Harvard University Press.

Latour, B. (1988b). "Visualisation and Cognition: Thinking with Eyes and Hands". In *Knowledge and society studies in the sociology of culture past and present*, Kuklick, H. and Long E. (ed.). Jai Press.

Latour, B. (1990). "Visualisation and Cognition: Drawing things together". In *Representation in Scientific Practice*, Lynch, M. and Woolgar, S. (ed.). MIT Press, pp. 1-32.

Latour, B. (1999). *Pandora's hope: essays on the reality of science studies*. Harvard University Press.

Latour, B. (2005). "From Realpolitik to Dingpolitik". In Latour, B., & Weibel, P. (ed.) *Making Things Public: Atmospheres of Democracy*. MIT Press.

Latour, B. (2007). "Beware your Imagination Leave Digital Traces". *Times Higher Literary Supplement*.

Latour, B., & Weibel, P. ed. (2005). *Making things public: atmospheres of democracy*. MIT Press.

Lau, A., and Van de Moere, A. (2007). "Towards a Model of Information Aesthetics in Information Visualization". *2007 11th International Conference Information Visualization (IV '07)* (July): 87-92.

Law, J. (2000). *Notes on the theory of the actor-network: ordering, strategy and heterogeneity*. Routledge.

Lengler, R., and Eppler, E. (2007). "Towards a Periodic Table of Visualization Methods for Management". In *Proc. of the Conference on Graphics and Visualization in Engineering*, 1-6.

Lippmann, W. (1927). *The Phantom Public*. The Macmillan Company.

Marres, N. (2007). "The Issues Deserve More Credit: Pragmatist Contributions to the Study of Public Involvement in Controversy". *Social Studies of Science*, *37*(5), 759-780.

Massey, E.; Bergsma, E. (2008). *Assessing adaptation in 29 European countries. Report W-08/20*. Institute for Environmental Studies. Vrije Universitei.

MASIS Expert Group. (2009). *Challenging Futures of Science in Society*. Brussels.

Masud, L., Valsecchi, F., Ciuccarelli, P, Ricci, D. and Caviglia, G. (2010). "From Data to Knowledge - Visualizations as Transformation Processes within the Data-Information-Knowledge Continuum". In *2010 14th International Conference Information Visualisation*. IEEE, pp. 445-449.

Michael, M. (1996). Ignoring science: Discourses of ignorance in the public understanding of science. In Irwin, A., & Wynne, B. (ed.) *Misunderstanding science?: the public reconstruction of science and technology*. Cambridge University Press, pp. 107-125.

Morris, M., & Ogan, C. (1996). The Internet as Mass Medium. *Journal of Communication*, *46*(1), 39-50.

November, V., Camacho-Hübner, E. and Latour, B. (2010). "Entering a risky territory: space in the age of digital navigation". *Environment and Planning D: Society and Space*, *28*(4), 581-599.

O'Reilly, T. (2005). *What Is Web 2.0*. Retrieved from http://oreilly.com/web2/archive/what-is-web-20.html.

Pang B. and Lee L., (2008). "Opinion Mining and Sentiment Analysis". In *Subjectivity Detection and Opinion Identification*. Now Publishers Inc.

Rodríguez-Penagos et al. (2007). "Automatic reconstruction of a bacterial regulatory network using Natural Language Processing". *BMC bioinformatics* 8(1), 293.

Pousman, Z. and Stasko, J. (2006). "A taxonomy of ambient information systems". *Proceedings of the working conference on Advanced visual interfaces.* ACM Press.

Pousman, Z., Stasko, J. and Mateas, M. (2005). “Casual information visualization: depictions of data in everyday life”. *IEEE transactions on visualization and computer graphics* 13(6), 1145-52.

Ricci, D. (2010). “Seeing what they are saying: Diagrams for socio-technical controversies”. In eDavid Durling et al. (ed.) *DRS2010 - Design & Complexity proceedings*. Montreal.

Rogers, R. (2002). Operating Issue Networks on the Web. *Science as Culture*, 11(2), 191-214.

Rogers, R. (2004). *Information Politics on the Web*. Cambridge, Mass: MIT Press.

Rogers, R. (2009). *The End of the Virtual: Digital Methods*. Amsterdam University Press.

Roggema, R. (2009). *Adaptation to Climate Change: A Spatial Challenge*. Springer.

Segel, E., and Heer, J. (2010). “Narrative visualization: telling stories with data”. *IEEE transactions on visualization and computer graphics* 16(6), 1139-1148.

Scagnetti, G., Ricci, D., Baule, G. and Ciuccarelli, P. (2007). “Reshaping communication design tools. Complex systems structural features for design tools”. In Poggenpohl, S. (ed.), *IASDR07 Proceedings*.

Schich, M., Meirelles, I. and Barabási, A.L. (2010). “Arts | Humanities | Complex Networks”. *Leonardo* 43(3), 212-213. The MIT Press.

Shiffrin, R.M., and Börner, K. (2004). “Mapping knowledge domains”. *Proceedings of the National Academy of Sciences of the United States of America* 101(Suppl. 1), 5183-5185.

Shirky, C. (2009). *Here comes everybody: The power of organizing without organizations*. Penguin.

Shum, S. B., and Okada, A. (2008). “Knowledge Cartography for Controversies: The Iraq Debate”. In Okada, A., Buckingham S., Simon J. and Sherborne, T. (eds.). *Knowledge Cartography: software tools and mapping techniques. Advanced Information and Knolwedge Processing*. Springer, pp. 249–265.

U. Shweda and . Bearman, S. (2010), “The Temporal Structure of Scientific Consensus Formation”. *American Sociological Review* 75(6), 817-840.

Slovic, P. (1999). “Trust, Emotion, Sex, Politics, and Science: Surveying the Risk-Assessment Battlefield”. *Risk Analysis*, 19(4).

Spink, A. and Jansen, B. (2006). “How are we searching the World Wide Web? A comparison of nine search engine transaction logs”. *Information Processing and Management.* 42, 248-263.

Sunstein, C. R. (2006). *Infotopia: how many minds produce knowledge*, NY, Oxford University Press.

Sunstein, C. R. (2007). *Republic 2.0*, Princeton, Princeton University Press.

Swart, R., Biesbroek, R., Binnerup, S. et al. (2009). *Europe Adapts to Climate Change. Comparing National Adaptation Strategies. PEER Report No. 1*. Helsinki.

Tanyoung, K., and DiSalvo, C. (2010). “Speculative Visualization : A New Rhetoric for Communicating Public Concerns”. In *DRS2010 - Design & Complexity proceedings.* Montreal.

Tufte, E.R. (2006). *Beautiful Evidence*. Graphics Press.

Turney, P.D. (2002), “Thumbs up or thumbs down? Semantic orientation applied to unsupervised classification of reviews,” in *Proceedings of the 40th annual meeting of the Association for Computational Linguistics*, pp. 417–424.

Tyler, A. C. (1992). “Shaping Belief: The Role of Audience in Visual Communication”. *Design Issues* 9(1), 21-29.

Venturini, T. (2010). Diving in magma: how to explore controversies with actor-network theory. *Public understanding of science, 19*(3), 258.

Venturini, T. (2011). Building on faults: how to represent controversies with digital methods. *Public Understanding of Science*, (forthcoming).

Viégas, F. B., and Wattenberg, M. (2007). “Artistic data visualization: beyond visual analytics”. In *Online communities and social computing: II international conference proceedings*. pp. 182-191.

Ware, C. (2000). *Information Visualization: Perception for Design*. Morgan Kaufmann.

Wiebe J. and Riloff E. (2005), “Creating Subjective and Objective Sentence Classifiers from Unannotated Texts,” in *Computational Linguistics and Intelligent Text Processing*, 486-497.

Wright, S. (2006) "Government-run Online Discussion Fora: Moderation, Censorship and the Shadow of Control", *The British journal of politics and international relations*, 8(4), 550-568.

Wurman, R.S. (2000). *Information Anxiety 2*. Que Publishing.

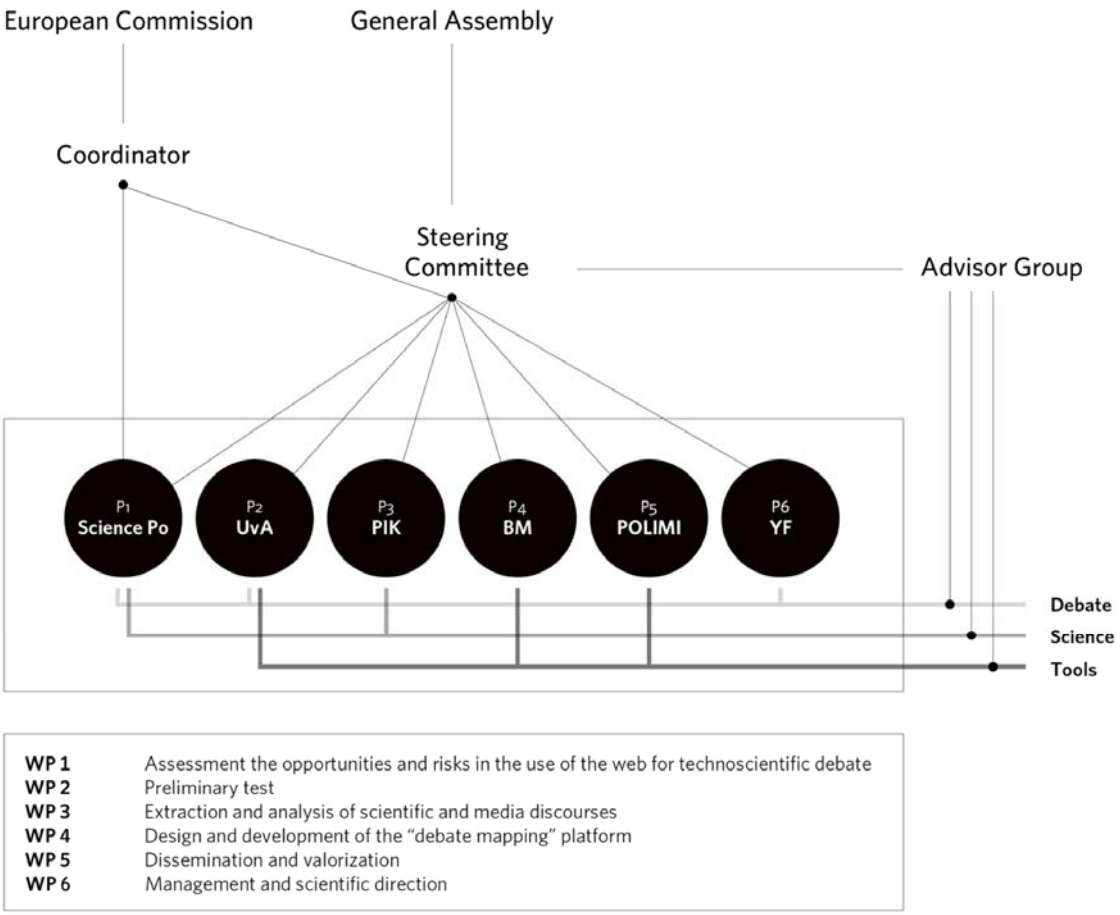
2. Implementation

2.1 Management structure and procedures

The consortium composing the EMAPS project is quite small (6 participants), however the research work envisaged requires a close collaboration between these participants.

The list of involved partners show a set of theories and practices assembled in the project: digital methods (University of Amsterdam), science and technology studies (Sciences Po), communication design (Density Design Lab at Politecnico di Milano, and Barcelona Media) and social innovation (Young Foundation), including specialists of the climate change adaptation issue (Institute of Spatial Planning at Dortmund Technical University).

Furthermore, the fact the project has one foot in the academic world, and one foot in the world of social innovation will require to create an organizational interface capable of nurturing the originality of the project, the timely delivery of the intermediary and final outcomes, any unexpected deviations in the course of the project, a strategic direction agreed upon by all, a full understanding by each partner of their position in the project etc.



This is why we suggest 5 different items in the management and organization structure of the project, whose roles will be developed in this chapter:

- The coordinator;
- Team leaders in each partner institution;
- The Steering Committee composed of the teams leaders and scientific coordinator
- A set of 3 collaborative groups, including external advisors when their expertise is useful;
- The Advisor Group.

The Beneficiaries will use any relevant communication means, including but not limited to phone, fax, e-mail and mail services to ensure a smooth implementation of EMAPS as well as an effective and efficient cooperation. Electronic means of communication, because they are fast, environment-friendly and allow for frequent contacts regardless of the geographical distance that may separate the partners, will be given priority in this project.

The Consortium Agreement will state arrangements agreed between the Beneficiaries as well as their rights and obligations within each other.

2.1.a The Co-ordinator

The Co-ordinator will be the Fondation Nationale des Sciences Politiques (Sciences Po). It will be responsible for the administrative, legal and financial management.

The Scientific Co-ordinator will be Bruno Latour, who has participated in many research and co-ordination projects. He is Dean for Research at Sciences Po, a major university for research in social sciences and humanities in France. He has previously coordinated the two-year FP7 project MACOSPOL (2008-2010). Bruno Latour will assure the scientific direction of the project, and chair the Steering Committee.

He will be assisted by Tommaso Venturini, coordinator of research projects at the Medialab, as scientist-in-charge of the project for all its scientific aspects and team leader at Sciences Po. A Project Manager, to be hired, will join the Management Team. He will ensure the daily follow-up of the project, in particular the administrative, legal and financial issues.

The Management Team above-described shall ensure the overall management of EMAPS:

- Overall responsibility for the liaison between the beneficiaries and the Commission,
- Preparation of meetings,
- Project supervision and reinforcement of progress according to the time schedule,
- Follow up of the Project progress and the budget consumption,
- Timely delivery of all deliverable items, according to the Grant Agreement or requested by the Commission for reviews and audits,
- Timely collection and transmission of any documents, including the activity and financial reports required by the Grant agreement,
- Communication within the consortium and to other publics.

The collaborative tool the Management Team is planning to implement is an aggregator of simple and easy-to-use tools:

- E-mails, Doodle, etc.
- File sharing system (like Dropbox),
- Bibliographic reference sharing tool (such as Mendeley),
- Mailing list and archive of emails sent through the mailing list,
- Collaborative task management online platform via an enhanced version of Wordpress.

2.1.b Team leaders

The six team leaders, one for each team within the partner institutions, will be responsible for the the planning, technical progress, and achievement of each task they are in charge of within the different Work Packages (WP). They will ensure the production of the deliverables related to their tasks within the proposed schedule.

They will also be in charge of producing the scientific and administrative reports on time, as per communicated by the Co-ordinator during the meetings of via emails.

Each team leader will deliver a short six monthly report to the Co-ordinator with at least:

- the summary of technical progress;
- the description of the problems encountered;
- the review progress of the Project tasks and budget consumption according to the scheduled person/months and budget, Deliverables and Milestones.

At the end of the Project, each team leader will deliver a final report for the WP with:

- a full description of technical progress, tasks and deliverables under their supervision within the Project;
- a well-argued explanation for any Deliverable that is not reached, indicating which efforts/deliverables have been added to the Project results in their stead.

2.1.c The Steering Committee

When meeting together, the team leaders and the Scientific Co-ordinator form the Steering Committee that shall convene as often as necessary and shall be chaired by the Co-ordinator, or the scientist-in-charge who will act on his behalf. It will operate as the main management and decision-making body of the Consortium.

Its role is to launch, implement and supervise each stage of the Project. It will oversee the achievement of the different objectives, and more specifically it will:

- follow up progress of the Project and tasks according to the scheduled person/months, Deliverables;
- ensure the completion of the three milestones during the project, which are of the responsibility of the whole Steering Committee under the Co-ordinator’s supervision
- decide of all the meetings to be held throughout EMAPS, among others the meetings of the collaborative groups;
- support the Co-ordinator in fulfilling its obligations towards the European Commission.

The General Assembly of the project composed of one representative per beneficiary, who might or might be the team leaders depending on each partner institution’s decision, will meet once a year. During these general assemblies, legal and commitment issues within the consortium will be dealt with. Representatives of all beneficiaries will:

- agree to modification of the work plan and budget, requesting the approval of the Commission if necessary;
- implement exclusion of participants or acceptance of new participants;
- validate amendments or any other changes to the Consortium Agreements and all aspects concerning institutional issues;
- ensure the exchange of information between the beneficiaries regarding the results achieved within the Project.

2.1.d Collaborative groups

Teams in partner institutions involved in a particular field of issues the project deals with, will work together in collaborative groups. The collaborative groups will be more issue-centered than the work packages, which are organizational tools to ensure the monitoring of the progress, the breakdown of the overall work in sets of items of tasks, the timely delivery of the outcomes.

The collaborative groups will focus in issues such as “Debate”, “Science” and “Tools”. Among other means, the collaboration will include topical meetings, whose participants will be decided by the team leaders of each partner institution within the Steering Committee. They might also require some members of the advisor group to be present, depending on the issue at hand.

Debate : this collaborative group is composed of P1 (Sciences Po), P2 (UvA) and P6 (YF).

This group will discuss the way the project, focused on digital interaction, is inserted within societal debates offline and will assist the coordinator to connect the project’s work with the wider public thanks to the expertise of P2 in social networks for debates within WP1 and the expertise of P6 in social innovation. The group is concerned with both case studies. It will take into account the work of WP5 right from the beginning of the project.

Science : this collaborative group is composed of P1 (Sciences Po) and P3 (TUDo).

This group will focus on the analysis and interpretation of the data collected in case study two, in the footsteps of other STS studies.

Tools : this collaborative group is composed of P4 (BM), P5 (POLIMI) and P2 (UvA).

This group will discuss the technical challenges posed by the building of the ‘debate-mapping’ platform, and will serve to bridge the gap between the data modeling and the development of the platform (between WP3 and WP4).

The collaborative groups will also be in charge of:

- suggesting changes within the Project, including re-allocation of budgets and workloads, to be agreed, if need be by the Steering Committee and / or the Commission;

- monitoring progress and identify problems, technical limitations, exploitation opportunities.

2.1.e Advisor Group

A set of experts has will gathered in an Advisor Group to ensure constant external feedback on the development of the platform and to add some crucial knowledge.

The foreseen scientific advisors are:

Manuel Castells	Professor of Sociology, and director of the Internet Interdisciplinary Institute at the Open University of Catalonia (UOC), Barcelona
Michel Callon	Emeritus Professor at the Centre de Sociologie de l’Innovation at Mines ParisTech, Paris
Yochai Benkler	Berkman Professor of Entrepreneurial Legal Studies at Harvard, and faculty co-director of the Berkman Center for Internet and Society
John Law	Professor of Sociology in the Faculty of Social Sciences at the Open University, UK

David Chavalarias	CNRS Researcher at the Center For Research in Applied Epistemology (CREA, Ecole Polytechnique), and co-director of the Complex Systems Institute of Paris IdF
Pablo Jensen	CNRS Rsearcher at Ecole Normale Supérieure, Lyon, and director of IXXI, Complex Systems Institute, Rhône-Alpes

They will receive the Project intermediate report and will be able to give advice and recommendations for second work plan. They may be invited to participate in the Collaborative Groups or in the Steering Committee, according to the agenda proposed, to advise on the strategic scientific direction of EMAPS.

2.2 Individual participants

PARTNER 1 : FONDATION NATIONALE DES SCIENCES POLITIQUES

The Fondation Nationale des Sciences Politiques (Sciences Po) is a fully-fledged, self-governing research university specialised in the social-economic sciences and the humanities which enrols some 9,600 students per year. Sciences Po is the leading research university in the social sciences in France with 50 full-time professors, 190 researchers, 80 foreign professors invited each year, nine research centres, five of which are closely linked to the Centre National de la Recherche Scientifique (CNRS). Sciences Po facilitates laboratories' participation in the European Research Area. Today, 15 of the research teams of Sciences Po have been involved in more than 35 European projects and 18 ANR projects.

Established in 2009 thanks to the support of the île-de-France region, the médialab of Sciences Po is a laboratory of digital resources centered on all the new technologies of information and communication. The médialab has been created to explore how data and resources provided by information and communications technologies can be harnessed for the benefit of social sciences. The médialab is a site dedicated to digital research. It is a team of specialists bringing together social scientists, engineers and designers. It is a high-tech facility, a hub for vanguard research, a scientific toolkit at the disposal of the Sciences Po academic community and a platform for launching national and international collaborations.

Bruno Latour is one of the main founders of the field of STS. He has been teaching controversy mapping for the last 15 years in les Mines, Harvard and Sciences Po. Not only does he have extensive experience in the ethnography of scientific and technical practices but he also has developed public awareness of the issues by two major international exhibitions. After field studies in Africa and California, he specialized in the analysis of scientists and engineers at work. In addition to work in philosophy, history, sociology and anthropology of science, he has collaborated into many studies in science policy and research management. He has written *Laboratory Life*, *Science in Action*, and *The Pasteurization of France*. He also published a field study on an automatic subway system *Aramis or the love of technology* and an essay on symmetric anthropology *We have never been modern*. He has also gathered a series of essays, *Pandora's Hope: Essays in the Reality of Science Studies* to explore the consequences of the "science wars". After having directed several theses on various environmental crises, he published a book on the political philosophy of the environment *Politics of Nature* (all of those books have been translated in many languages). A new presentation of the social theory which he has developed with his colleagues in Paris is available at Oxford University Press, under the title: *Reassembling the Social, an Introduction to Actor Network Theory*.

Tommaso Venturini was trained in sociology, communication sciences and semiotics at the University of Bologna (department of Umberto Eco) where he graduated with full marks. He has been visiting student at the UCLA. He attended the international Ph.D. program on the Quality of Life in the Society of Information (www.quasi.unimib.it) at the University of Milano Bicocca, investigating the biopiracy controversies aroused by the modernization of traditional agricultural communities. As a post-doc researcher, he worked at the University of Bologna analyzing the Italian food distribution systems. Since 2008, he coordinates the courses of controversies mapping at Sciences Po Paris and, since September 2009, he has joined the médialab as coordinator of the research activities. As a professional, Tommaso Venturini funded and leaded an innovative web-agency (www.ideaedi.it) taking part in several vanguard web projects and being responsible for numerous virtual communities.

Dominique Boullier is a sociologist, Professor at Sciences Po (Ph D in sociology, master degree in linguistics, HDR thesis in information and communication sciences, visiting scholar at UC Berkeley). He has been CEO of the consulting company Euristic Media (technical communication and interfaces usability) and Professor at the University of Technology of Compiegne, at the University Rennes and at Sciences Po Paris. He has leaded several research laboratories, including Costech (Knowledge, Organisation and technical Systems); LAS (Laboratoire d'Anthropologie et de Sociologie); LUTIN User Lab (Laboratoire des Usages en Technologies d'Information Numériques). Dominique Boullier is also Editor in chief of the journal « Cosmopolitiques » (éditions de l'Aube et Apogée).

PARTNER 2: UNIVERSITY OF AMSTERDAM

The Digital Methods Initiative (DMI) is the research program of the Chair in New Media & Digital Culture, Media Studies, University of Amsterdam (UvA), headed by Prof. Dr. Richard Rogers. The forerunner of the program pioneered issue mapping with its most well-known piece of software, the Issue Crawler, funded by the Information Program of the Soros Foundation. Through three Ford Fellowships as well as support from the MacArthur Foundation, the Mondriaan Foundation, Hivos, the Dutch Ministries of Foreign Affairs and Education, Culture and Science and the European Commission, Rogers and his team have built some 30 info-political tools that map and cloud debates and social issues on the Web. More substantively, the Digital Methods Initiative reworks method for the Web, concentrating on the opportunities afforded by the rich data online. Treating the Web as a data set as opposed to a cyberspace or virtual world, DMI seeks to learn from the methods employed by search engines, social media and online platforms generally, and repurpose them for social and cultural research. DMI is online at http://www.digitalmethods.net.

Prof. Dr. Richard Rogers holds the Chair in New Media & Digital Culture at the University of Amsterdam. He is director of the Govcom.org Foundation, creator of info-tools including the Issue Crawler and the Issue Ticker, and director of the Digital Methods Initiative. Among other works, Rogers is author of Information Politics on the Web (MIT Press, 2004/2005), awarded the 2005 best book of the year by the American Society for Information Science & Technology (ASIST).

Erik Borra is researcher and lead programmer for the Digital Methods Initiative, the New Media and Digital Culture PhD program at the University of Amsterdam, where he also teaches in the M.A. New Media program. Erik was involved in the Open Net Initiative as well as in Bruno Latour's European project on Mapping Controversies in Science and Politics as a programmer and analyst. Erik’s previous work includes screen scraping and mapping issue networks on the Web. His current research focuses on search engine query logs (in collaboration with Yahoo! research), Wikipedia edit histories, and social network profiles.

Marieke van Dijk works as Senior Art Director and teamlead at Mirabeau Interactive, the largest digital marketing and technology agency of its kind in the Netherlands. Mirabeau provides a full range of digital capabilities, including digital strategy, branded content, service design, media and technology development. Responsible for the voice and direction of the concept & design team, Marieke is a principal affiliate of the Govcom.org Foundation, based in Amsterdam, dedicated to creating and hosting political Web tools. She is the lead designer, as well as researcher at University of Amsterdam for the Digital Methods Initiative (DMI) through which she was involved in the 'Mapping Controversies in Science and Politics' European research project (MACOSPOL), led by Bruno Latour. She holds M.A. in Design Research and a B.A. in Industrial Design from the Design Academy in Eindhoven, the Netherlands.

PARTNER 3 : DORTMUND TECHNICAL UNIVERSITY

Technische Universität Dortmund (TUDo) was founded in 1968; It is composed of 16 faculties, mainly in science and technologies incl. economics, spatial planning and architecture, and enrols about 24.000 students. In FP6, TUDo participated in about 25 projects, three of which were coordinated by TUDo. The total budget of these coordinated projects amounted to 25,8 million Euros. For FP7 there are several successful proposals. By today four projects with a total budget of 14 million Euros will be coordinated by TUDo. All projects are supported by an experienced and competent management team from TUDo's administration. The Faculty of Spatial Planning is composed of about 1000 students, 18 professorships in 15 different disciplines like European Spatial Planning, Gender Studies and Housing, Sociology, Law, Regional Planning, Urban Design and Town Planning, Ecology and Landscape Planning, Economics, Economic Development Planning, Transport Planning, Energy, Waste and Water, Land Policy and Land Management etc.

The Institute of Spatial Planning (IRPUD) was established in 1974 as the research institute of the Faculty of Spatial Planning. TUDo bringing together researchers from several disciplines has enabled IRPUD to gain an international reputation for co-coordinating and conducting interdisciplinary research projects in the fields of spatial development and planning. Various national and EU funded research projects were carried out under the FP6 and FP7. IRPUD led the FP6 PRESOM, and currently leads the projects FP7 ERA NET CRUE IMRA and ESPON Climate.

Professor Dr. Stefan Greiving holds a diploma degree (1995) and Dr.-Ing. (1998) in Spatial Planning, and a habilitation in Planning and Administration (2001). Currently, he is Professor and Executive Director of IRPUD. He has been lead in nine research projects and involved in about 35 during the last seven years. He is currently coordinator of the two European projects ESPON CLIMATE (Territorial effects of climate change on European regions and local economies) and ERA NET CRUE IMRA on flood risk governance. Prof. Greiving is full member of the German Academy for Spatial Planning and Research, Member of the UN Expert Working Group on Measuring Vulnerability and of the EU Working Group on Implementing the White Paper on Adapting to Climate Change. Prof. Greiving will be the team leader at TUDo and his main contribution to the project will be dealing with climate change adaptation.

Dr. Alexandra Hill holds a diploma degree (2002) and a Dr.-Ing. (2010) in Spatial Planning. Currently, she works as research coordination at IRPUD. She has participated in five research projects about spatial development, sustainability, governance in Europe and about urban modelling of spatial dynamics in developing countries. She will be responsible for tasks concerning discourse analysis on climate change adaptation and change-proof urban planning.

Dr. Christian Lindner holds a diploma degree (2002) and a Dr.-Ing. (2010) in Spatial Planning. Currently, he works as senior research fellow at IRPUD. He has participated in 10 research projects about European spatial development, spatial risk management and climate impact research, urban modelling of spatial dynamics in developing countries, GIS-based spatial analysis and decision support systems. He will be responsible for tasks concerning advanced geospatial analysis, climate change adaptation strategies and web-based GIS applications.

PARTNER 4 : FUNDACIO BARCELONA MEDIA UNIVERSITAT POMPEU FABRA

Fundació Barcelona Media Universitat Pompeu Fabra (BM; www.barcelonamedia.org), is a non-profit organization with 151 employees. BM is a research centre created to foster the competitiveness of the Catalan media and communication industry through innovative research activities and projects, actively promoting technology generation and development; transfer of research results to industry; promotion of the research results to society at large; and social awareness of the communication industry. BM had its origin at the Communication Station, a project led by Universitat Pompeu Fabra, which has been a local point of reference since 2001. Currently, BM is a member of both the Catalan and Spanish network of Technology Centres with a board of trustees from the Media Industry, Catalan Government, Barcelona City and four Universities. BM has a strong record in participation in European collaborative R&D projects. BM is currently involved in 10 EU funded research projects. BM is Coordinator of 2 FP7 projects: APIDIS (Autonomous Production of Images based on Distributed Sensing) and 2020 3D Media: Spatial Sound and Vision (IP), as well as Coordinator of an EU Life Long Learning project: ICE3 (Integrating CALL in Early Education Environments).

The BM's research group of Information Technology and Society (ITS) gathers experienced and young European researchers with cross-disciplinary profiles, including physics, mathematics, computer science, political science and sociology. Its objective is generating qualitative and quantitative knowledge about the interplay of social behavior and social media, as well as devising methods, tools and technologies that facilitate the acquisition and application of this knowledge in a variety of organizations and social environments. The ITS group focuses on empirical research into data mining, characterizing and modeling social networks for applications in policy and applied research, and methods and practices for managing the sociological and technical implications of social media. Current work includes the analysis, modeling and prediction of temporal, structural and social interaction patterns in social media sites. Another parallel line of research focuses on the role of conversations and social networks in social innovation in general.

BM's participation in the project will be mainly focused in the tasks of data integration and modeling of debates, one of the core fields of expertise of BM's ITS group. The members of the ITS group have authored several publications dealing with the analysis and modeling of online debates in social-media websites. Currently the group is working in a large project (CENIT) funded by the Spanish government, where it explores this topic together with partners from the media industry such as Yahoo! Iberia and Activa Multimedia (the media company of the Catalan public broadcaster Televisió de Catalunya).

Dr. Ricard Ruiz de Querol has a degree in Physics from the UAB (1976), a Ph. D. in Physics from MIT (1982), a degree from the IESE (1991) and a Ph.D. on Information Society and Knowledge for the UOC (2006). His doctoral thesis, directed by Professor Manuel Castells, dealt with "The formation of public policy of information society in Catalonia: 1993-2003". Over the past twenty years he has had various responsibilities in activities linked to the ICT industry. He has held senior posts at Olivetti-AT & T, l'Institut Cerdà and Centrisa (now Azeri). In 1996 he joined Telefónica, where he was Director of Information Society and Secretary of the Board of Telefónica in Catalonia. Today he forms part of the Fundació Barcelona Media as head of the ITS Group.

Dr. Andreas Kaltenbrunner is senior researcher at the ITS Group and performs empirical research on the characterization and modeling of social networks and social media. He also develops and designs experimental pilots and projects related to the interconnection between social media and the development of information society in general. Dr. Kaltenbrunner obtained his Ph.D. from the University Pompeu Fabra in Computer Science and Digital Communication in 2008 on a research topic on Social Media, and obtained a Masters degree in Mathematics and Informatics from the Vienna University of Technology in 2000.

PARTNER 5 : POLITECNICO DI MILANO

The DensityDesign Lab is a research lab and an experimental teaching program in the design department (INDACO) of the Politecnico di Milano (POLIMI). Established in 2004, it focuses on the visual representation of complex social, organizational and urban phenomena, combining a continuous research for data visualization with information aesthetics and knowledge presentation. By rearranging numeric data, reinterpreting qualitative information, locating information geographically, and building visual taxonomies, it develops diagrammatic visualizations to describe and unveil the hidden connections of complex systems.

DensityDesign carries on research projects in the domain of visual presentation, stemming from a design perspective. The research interests include theoretical and epistemological reflections on visualizations and analyses of their cognitive underpinnings, in addition to the development of large frameworks for data visualization and ad-hoc solutions for speculative narration. The Lab adopts an open approach to visualization, working from visual storytelling to visual analytics. Design is, thus, treated more like a proper language than a tool.

Accepting and extending the concept that complex phenomena could emerge and become meaningful only trough their own representation, in the last two decades visualization techniques have emerged as some of the most important activities for understanding the enormous amount of data produced by our present knowledge society and seem to be particularly appropriate to explore the complex dynamics of socio-technical controversies. In this framework the contribution of the Densitydesign Lab to the EMAPS project is conceiving visualization tools able to depict the form of complex social phenomena assuming that understanding a phenomenon means understanding its form and understanding the form means, also, to see and to visualize its data and information patterns. The main effort is to reveal and dynamically describe connections between people, politics, information and scientific issues. The aim is not to represent fixed positions in space and time, but rather to render in a visual language the actors' mutable tensions and the strengths fields produced during a controversy, to provide visual languages, carefully designed for navigating controversies, to enable the depiction of the diversity and the heterogeneity of social complexity, through the creative use of digital technologies.

Moreover this project will entail rethinking visualization as an integrated method in social research. By fostering dialogue and by triggering critical engagement, between design practices, social studies and public debates, this project will explore new ways to visualize data for understanding and grasping the dynamics and the processes which characterize controversies, scientific debates, and social complexity.

Prof. Paolo Ciuccarelli is an Associate Professor at POLIMI. He teaches at the Faculty of Design in the Communication Design Masters degree. He has been visiting lecturer at Universidad de Malaga and The Royal Institute of Art (KKH - Stockholm). He is member of the board at the Design PhD - Politecnico di Milano. Since 2000 he's the Faculty of Design representative in the educational program "Master in European Design" (MEDes").

Head of the Communication Design Research Group within the Design Department at Politecnico di Milano, his research and publishing activities focus on the development of data, information and knowledge visualization tools and methods to support decision making processes in complex systems and to foster information and knowledge sharing dynamics in creative processes. In 2002 he founded POLIteca, the Design Knowledge Centre of Politecnico di Milano, where he holds the position of scientific coordinator.

In 2004 he started the DensityDesign teaching program: the premise for the foundation of the DensityDesign Research Lab (www.densitydesign.org), where he's now scientific director.

PARTNER 6 : THE YOUNG FOUNDATION

The Young Foundation is a centre for research, social innovation and entrepreneurship. We have a 50-year history of successfully meeting social needs, mainly through creating new enterprises and promoting new ideas. We start from the big questions of our times–how to cope with aging; how to engage teenagers bored by school; how to reduce conflict within communities; how to meet the needs of people living with chronic diseases? We then work with others to design and support practical solutions which can then be implemented, often starting on a small scale. We shape projects to maximize their potential for high impact and growth. Some turn into new organizations; some feed into public policy and debate; and some get taken up by existing organizations. We work across the UK and internationally–carrying out research, influencing policy, creating new organizations and supporting others to do the same, often with imaginative uses of new technology. We have over 60 staff, working on over 40 ventures at any one time, with staff in New York and Paris as well as London and Birmingham in the UK.

The Young Foundation hosts a regular and extensive program of international events through its Social Innovation eXchange (SIX). SIX is the world's primary network bringing together individuals and organizations involved in the field of social innovation and has a global community of over 1000 individuals and organizations committed to promoting social innovation. We organize an annual summer school (the 2008 Summer School was held in San Sebastian, Spain; the 2009 Summer School was held in Lisbon, with the patronage of the Portuguese President and participation from 27 countries, including many of the leading governments involved in public sector innovation. The 2010 Summer School was held in Singapore). SIX hosts regular TelePresence meetings (facilitated by Cisco) with its network and the wider community of social innovators–encouraging and facilitating regular themed discussions with up to eight countries at a time.

Professor Geoff Mulgan is the chief executive of the Young Foundation. Between 1997 and 2004 Geoff had various roles in the UK government including director of the Government's Strategy Unit and head of policy in the Prime Minister's office. Before that he was the founder and director of the think-tank Demos (described by *The Economist* as the most influential in the UK when he left). He has also been Chief Adviser to Gordon Brown MP; a lecturer in telecommunications; an investment executive; and a reporter on BBC TV and radio. He is a visiting professor at LSE, UCL, Melbourne University and a regular lecturer at the China Executive Leadership Academy. He has been a board member of the Work Foundation, the Health Innovation Council, Political Quarterly and the Design Council, and chair of Involve. He is a fellow of the Sunningdale Institute at the UK National School of Government and of the Australia New Zealand School of Government, and has served on many task forces and commissions, including most recently the European Union 2025 programme, the UK Government Commission on reducing health inequality and the Atomium Culture programme linking 25 of Europe's top universities and media organizations. He recently chaired a Carnegie Inquiry into the Future of Civil Society in the UK and Ireland. Geoff has advised many governments around the world, including several Prime Ministers. His most recent book is *The Art of Public Strategy: mobilising power and knowledge for the common good* (Oxford University Press, 2009). Other books include *Good and Bad Power: the ideals and betrayals of government* (Penguin, 2006), *Connexity* (Vintage and Harvard Business Press, 1998) *and Politics in an antipolitical age* (Polity, 1994).

2.3 Consortium as a whole

As soon as we started working on this research proposal, we realized that achieving our objectives would have been extremely demanding. Although the coordinating partner (Sciences Po) has a sound experience both in project management (having led more than 35 European projects – the FP7 project MACOSPOL included) and in debate mapping (see paragraph 1.2.b), it has soon been clear that an ambitious project such as the one described in these pages would be hopeless without a cutting-edge multidisciplinary consortium.

First of all, we were fully aware that countless experiments have been tempted in online debate and that most of them have dramatically failed. Despite all the potential of digital technologies, we knew all too well that a naïve technological hype would have seriously undermined our project. The role of the Digital Methods Initiative (University of Amsterdam) is crucial in assuring **a critical reflection throughout the whole project**. With its extensive experience in digital methods, the team headed by Richard Rogers appeared as the ideal partner to prevent us from falling in the pitfall of Web enthusiasm.

Secondly, we realized that in order to map a debate as complex as the one on climate adaptation, we needed to acquire a deep understanding of all its facets. Climatology, agriculture, economics, laws, demography, land planning, all these disciplines and many others are mobilized by this debate and we knew that we need a partner capable to handling them all. This is why the Institute of Spatial Planning (University of Dortmund) joined the Consortium, to assure that all the facets of the debate are taken into consideration and that the necessary **connections between social and natural sciences** are established.

Thirdly, given the complexity and richness of the climate adaptation debate, it has always been clear that our project should be ready to cope with a significant quantity of information. Not only all the scientific literature and media discourses that compose the debate but also the scientific data on which those discourses are based are relevant and, in fact, crucial for this project. Since social sciences are not used to deal with such a huge amount of information, we decided that our consortium needed a partner who could provide the expertise necessary to constitute and mine **a large-scale debate dataset.** Barcelona Media suits perfectly this role, not only because of its sound competences and information sciences, but also for its experience in treating human and social phenomena with mathematical tools.

Fourthly, even if we could gather and analyze all the discourses around climate adaptation, we would have no guarantee that our analysis would be relevant for the actors involved in the debate. Being able to elaborate large amounts of information is not enough for this project; we also need to design such information as to produce a series of easily readable digital maps of the debate space. At the vanguard in the visual representation of complex phenomena, the team headed by Paolo Ciuccarelli at the Politecnico of Milan assures to this project the skills and insights necessary **to make debate complexity legible**.

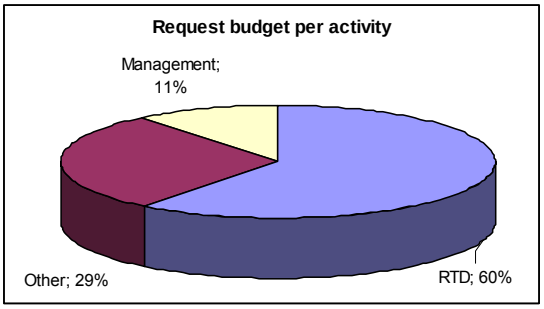
Fifthly, as we repeated countless times in this project, all our efforts would be useless if we failed in eliciting the participation of the debate actors. The Young Foundation with its 50 years experience in debate management joined the consortium to make sure that our project could reach **beyond the limits of academic communities** and affect the actual discussion on technoscientific issues in online and offline contexts.

Finally, the leading partner of the Consortium, the médialab of Sciences Po summarizes in itself much of the competences and skills owned by the other partners. Imagined by Bruno Latour (the very inventor of the cartography of controversies), the médialab has been founded with the precise mission of contaminating social sciences with digital methods and digital data. **At the crossroad between network analysis, design and STS the médialab is ideally placed** to coordinate a project on online technoscientific debate.

Coordination moreover will be facilitated but the fact that most of the partners of the consortium have already worked together. The médialab and the Digital Methods Initiative were two of the key partners of the MACOSPOL consortium and Density Design has several ongoing projects with Sciences Po and Barcelona Media.

2.4 Resources to be committed

In the following paragraphs we will provide a synthetic view of the resources to be committed to the project and we will discuss the way they are allocated to the different types of activity, WPs and partners. The total requested budget of the project amounts to €1 491 827 – indirect costs included. Please see the part A of this proposal for a detailed description of the resources mobilized by this project.

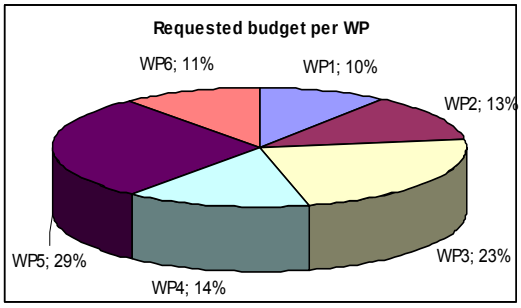


The chart oppposite represents how resources are distributed among the different types of activities. RTD activities will receive the greatest share of resources (60% i.e. €901 344). Although some resources will be necessary to set up the technical infrastructure hosting the online platform of the project, the personnel costs will constitute a significant part of this budget (83%) which is not uncommon in social sciences and the humanities where the need for technical infrastructure is relatively low and the need for human workforce relatively high. It is certainly the case with EMAPS.

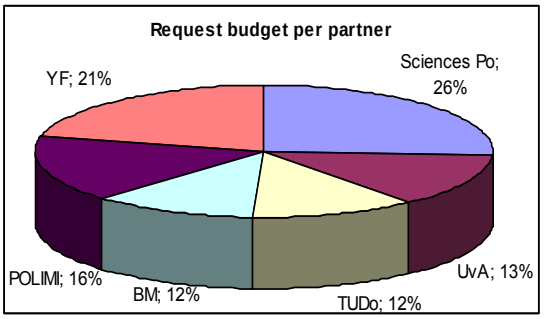
A specificity of EMAPS is that almost a third of its resources will be allocated to 'other activities' (€429 390). Most of these resources will be used for dissemination actions, which, as described in the previous pages, play a crucial role in this project. The necessity to set up large-scale events and to organize the participation of a wide audience on the project platform explains why a significant share of human and financial resources has been dedicated to dissemination.

Ten percent of the project's resources will be dedicated to management activities (€161 093). We have tried to contain these costs as much as possible while assuring an efficient management of the project. The resources allocated for traveling and for the organization of meetings have been purposely maintained as low as possible, i.e. three project meetings and three research meetings throughout the three-year duration of the project.

A project dedicated to online communication should be able to draw on digital tools for collaborative work to minimize the (economical and ecological) cost of traveling.



Looking at the resources allocated to each WP, one can notice once again the importance of dissemination activities: WP5 receives almost a third of the financial resources and a fourth of the human resources. Apart from the WP5 and WP3 dedicated to the collection of media and scientific discourses, there are no other WPs that stand as far as resources are concerned. The preparatory phase (WP1 and WP2) and the development of the platform (WP4) will receive comparable amounts of financial and human resources, which proves the balanced structure of the project. Although WP1 seems to be the WP receiving the smallest share of the project resources, it is, in fact, the one that where all the efforts of EMAPS flow to. Meant to collect and summarize all the research activities carried on in the other WPs, the WP1 will provide the critical re-elaboration of all EMAPS results.



Looking at the distribution of resources among the partners of the consortium, one can see it is relatively balanced. The differences in the attribution of resources are justified by the tasks assigned to the different partners. The three partners receiving the largest share of resources (Sciences Po, POLIMI and the YF) are, in fact, responsible for most intense or difficult tasks (respectively the scientific direction, the development of the mapping platform, the dissemination of the platform and the animation of its use). It must be noted that the leaders of WPs are not always the ones allocated with the highest number of person/months in the WP they manage: this is because the instrumental tasks can take a longer time than the strategical ones.

Subcontract "Social media harvesting"

The harvesting of web data is a difficult activity that requires a high level of knowledge and expertise into web mining. The médialab Sciences Po signed a research partnership with the French startup Linkfluence, which listens to, analyzes and maps social media. Linkfluence gained a valuable expertise on creating corpuses of social web media and on methodologies to analyze the contents of those corpora through time. Both topological and contents can be analyzed with a time depth which allows studying the dynamics of information spreading.

Subcontracting the provision of the web corpus to Linkfluence would save us time and energy to focus on the analysis. This provision will include the sourcing activity to frame the corpus and the transmission of the data.

More than a data provider Linkfluence would also advice the consortium on the analysis methodology of the social media depending on our research issues. This advice will take the form of the participation as a social media expert in the Task T3.b “Collecting discourses in traditional and social media”.

The existing research partnership between médialab Sciences Po and Linkfluence will assure an efficient collaboration between the fields of social media mining and STS, a key to success for mapping controversial issues.

Linkscape, the social media exploratory tool from Linkfluence

3. Impact

3.1 Expected impacts

Context: The rise of Social Media

The Internet has evolved during the last 15 years into a key infrastructure of modern societies. Its open architecture has allowed the number of Internet users throughout the world to grow exponentially: the Internet reaches today more than 1.800 million people. The increasing availability of Internet access through mobile terminals (of which more than 4.000 million are currently in use) is expected to sustain, if not increase, the expansion of Internet as a communication platform for all kinds of users and usages.

It is however worth noting that the views about which is the dominant feature or attribute of the Internet have evolved substantially over time: The development of packet switching protocols and technologies during the 70s and 80s, the widespread usage of email and the emergence of the WWW and hyperlinking during the early to mid 90s, the expectations about electronic commerce up to the explosion of the dot-com bubble, the increasing power of the search engines, and so on.

The Internet is nowadays seen to experiment yet another transformation with the so-call 'Social Media' playing a leading role. 'Social Media' is an umbrella term which covers a wide range of online applications and platforms that support on-line interaction, collaboration and the sharing of content among users of all kinds. It includes in its diversity social networks, blogs and microblogs, wikis, sites for sharing photos, videos or slide presentations. The uptake of Social Media by the public at large during the last four or five years has been nothing short of spectacular. At the end of 2010, the statistics point out to Facebook replacing Google as the most visited site on the Internet, and also as the main influence of directing traffic to the content sites. The power of social seems to be replacing the power of search, at least in the Internet.

The social significance of this uprising of Social Media, aside from being the one of the main current focus of Internet investors, will be manifold. It is undoubtedly provoking a significant reconstruction of the mechanisms of social communication. Therefore, as the communication processes "decisively mediate the way in which power relationships are constructed and challenged in every domain of social practice" (Castells, 2009:4) Social Media are leading to the reconstruction of power relations, including those where the soft power of influence prevails. This includes, of course, the domain of scientific collaboration and the debates over the mutual relationships between science and society.

It can be expected that evolution of Social Media in the medium term can result **in a useful tool to improve the level of information, engagement, debate and societal participation around controversial relevant issues**. Currently available Social Media tools and services might be a good starting point towards this objective. However, extensive research is still needed in tools that foster wider participation, offer better support for deliberations and sophisticated interactions and embody the appropriate qualities and attributes to allow the expression of citizen (as opposed to consumer) behavior.

Most currently available Social Media platforms, mostly addressing consumer markets, encourage consumer input and interaction, with opinion ratings, feedback and voting opportunities. Blogs, with the recent addition of Twitter, start to rival with traditional mass media in terms of reach, cultural, social and political impact.

Nevertheless, almost none of those platforms provide their users with tools to capture the nature and structure of the discussions taking place, even less their evolution in time. With this being true in a Social Media space which at the same extends and expands in a fractal-like structure, it is now almost impossible to distinguish the 'wisdom of the masses', the result of expert opinion or the influence of covert advertising, deliberate misinformation or bias.

Expected impact of EMAPS

EMAPS realistically aims to improve over this general state of affairs by concentrating its efforts just on the issue of scientific controversies, which is relevant both in itself and as a referent for handling controversies in other domains.

Success in meeting the EMAPS objectives will have a positive impact at different levels:

- For *scientists,* it would provide a significant improvement over the currently available tools in order to visualize the extent and content of relevant controversies as they extend not only among peers but also among other constituencies, including decision makers, journalists and the public at large. This might in turn stimulate the framing and phrasing of scientific issues in terms which help clarifying points of conflict, including those arising from incomplete or inadequate understanding from other agents.
- For *teachers*. The platform developed by EMAPS could also be employed as a set of tools for teaching and learning science beyond the simplistic approach of Public Understanding of Science. By showing the full complexity of a real scientific controversy as well as its entanglement of relations and networks, the EMAPS platform can provide an innovative viewpoint on the 'science in action'.
- For *decision makers*, both public and private, it would allow on one hand to more readily understand the essence and the extent of open controversies among scientists, and therefore the assessment of their potential consequences. In parallel they will be able to obtain, using the same tools, an integrated view of the perception of the same issues by other affected constituencies, including media representatives, professional bodies, specialists in connected disciplines, and eventually the citizenship at large.
- For *communicators,* be it on professional media or in open platforms such as blogs, having access to the background of the controversies, including their geographical and temporal evolution, will allow for a better informed description of facts and issues to the public.
- For *citizens* wishing to be better informed, and for society in general, access to an integrated platform which maps the nature and the extent of controversies, will help on one hand alleviate the danger of the communication silos, polarization and information cascades which are observed to form around disputed issues (Sunstein, 2007).
- At the same time, access to the background of the controversies will facilitate the online implementation of consultation and deliberation mechanisms with a degree of variance and sophistication at least as varied as the ones that have been developed over time for off-line discussion and concertation.
- Finally, as the results of MACOSPOL have proved that Internet developers/users are far more creative than social researchers in inventing new tools of communication, analysis and visualization, it is hoped that the development of EMAPS will stimulate a fruitful dialogue with all the bloggers, designers, developers and researchers working to foster public participation in techno-scientific debates. The technologies and platform resulting from this dialog would undoubtedly be useful in many other social domains where substantial controversies are apparent and relevant.

The actions including in the Dissemination Work-package will guarantee that appropriate relationships with all those different social groups are adequately explored and sustained during the course of the project.

The outcome of EMAPS is therefore expected to have a multiple positive impact by:

- Contributing to the advance of the European debates over life expectancy and climate change adaptation.
- Assessing the present and desirable qualities of the social technologies that facilitate an efficient debate on non trivial matters (of which scientific topics are just one of the many possible categories).

- Promoting the design and widespread availability of digital methods, technologies and platforms that facilitate and stimulate social participation of scientific disputes, taking into account the different 'personalities' of the public that can be involved (e.g. research bodies, media, government, scientists or the public at large).

Castells M. (2009), *Communication Power*, Oxford. University Press

Sunstein C. R. (2007), *Republic.com 2.0*, Princeton University Press

3.2 Dissemination and/or exploitation of project results, and management of intellectual property

Dissemination strategy

At the beginning of the project, an action plan outlining the guidelines for dissemination would be drafted and circulated among all project partners. The **Dissemination Action Plan** would remain an open document, subject to constant updating agreed upon by the Steering Committee, upon suggestions by project partners, Advisor Group members as well as the European Commission.

The first strategic goal would be to indicate ways to create external awareness of the project and to disseminate its results to the widest audience possible. Accordingly, it would make mandatory for each activity of the project to include a dissemination dimension. In the case of confidential activities, it would specify how to report the activity without exceeding the confidentiality threshold.

The second strategic goal would be that of identifying specific audiences of EMAPS among the broad categories mentioned above and possibly beyond these. Key in this respect would be the compilation of the contact database (see below).

Also crucial would be to indicate the means of dissemination that each partner institution would be invited to make use of according to its capacity.

Finally, it would set **parameters to evaluate progress of the dissemination effort**. Such parameters would be both of a qualitative and quantitative nature. The former would include the publication of papers/articles produced in the framework of EMAPS in peer-reviewed academic and major current publications. As for the quantitative parameters, these may include the various logs of activity of the platform regarding the number of users and more precisely the level of involvement. As the open content services like Wikipedia, the platform would assure a transparency of contents production through an open log of any access and contributions. Those digital traces in spite of anonymity will be a perfect set of data to quantify the success of the platform. The consortium will produce a report of the platform activity based on those data.

EMAPS as an open source/data forge

We already stated that this research is not meant to provide yet another online forum for public debate. As the call correctly assumes, online communication in itself (and in particular the so called Web 2.0) is already promoting the proliferation of scientific communication to an extent that no research project could ever match. Social actors did not wait for academic research to recognize and exploit the potential of digital technologies. In the last ten years scientific debate has flourished on almost every available online communication platform (bbs, mailing lists, newsgroups, forum, blogs, social networks…). The point, therefore, is not to encourage an even greater proliferation of online communication, but to provide the

actors with **tools for making sense of this proliferation**. This is why this project is meant to map the existing debates rather than organizing new ones.

We are not so naïve, however, to believe that mapping activities can be carried out in a purely descriptive fashion. Ever since cartography exists, maps have always constructed the territories as much as they described them. This is even truer for the cartography of scientific controversies. Far from being a neutral act of depiction, representing an issue is always a performative act. No matter how many precautions we take and how strongly we strive to maintain our platform partial, **mapping will always be a way of acting in the controversy**.

This long theoretical warning explains why it is so important for this project to extend beyond the limits of the academic community. A research dedicated to technoscientific debate cannot be restricted to academic speculations but is compelled to make any efforts to establish a fruitful dialogue with social actors. From scientists to activists, from decision-makers to journalists, from administrators to involved citizens, this project cannot afford to neglect the contribution of any of the debate actors. Contrary to what many social scientists believe, they are not the only ones interested in collective discussions: actors themselves are constantly striving to account for the controversies they participate in. Overlooking these "native" representations is the surest way to draw useless maps.

The success of this project is therefore intrinsically connected to its openness: the capability to remain as transparent as possible and put actor's contribution at the center of its development. The effort to remain open will invest all the project activities and will have direct consequences on the management of its intellectual property question. All the results of activities carried out within this project (being them piece of software, data, visualizations…) will be released under **open licenses**. The precise licenses employed for each part of the project will be object of a meticulous reflection within the consortium in order to assure that they fit the specific challenges meet by the project. Generally speaking, we will prefer licenses containing *Attribution* and *Share-Alike* clauses such as:

- Reciprocal Public License (RPL) for software (http://www.opensource.org/licenses/rpl1.5)
- Attribution-ShareAlike 3.0 (CC BY-SA 3.0) for models and visualization (http://creativecommons.org/licenses/by-sa/3.0)
- Open Database License (ODbL) for data (http://www.opendatacommons.org/licenses/odbl/summary).

Our preference for open licenses will admit two exceptions:

- The need for protecting the privacy of the personal data that may be collected by the project (see also paragraph 4);

- The respect for the previous work realized by the partners of the consortium or acquired from private companies through subcontracting, which could be 'imported' in the project without having to comply with the selected licenses.

Reaching beyond the digital divide

Despite our relative optimism towards the potential of Web technologies, we are fully aware that the access to these technologies is far from being universally equal. In the paragraph dedicated to digital divide (1.2.a), we identified several substantial asymmetries hindering the online participation to science. If this project directly addresses one of these asymmetries (namely, the power-law distribution of online attention), we will not be able to do much to alleviate the others. The unequal access to the Web, the centralized control of Internet infrastructures, the server-client asymmetry: fighting against these facets of digital divide requires resources far beyond the reach of this project. However, acknowledging that these asymmetries exist will encourage us to do our best to overcome them indirectly.

Since Lazarsfeld and Katz's work on the two-step flow of communication, we know that much of the public opinion is always indirectly affected by communication messages. Communication flows through a long series of intermediaries, passing through different channels and being re-transmitted by different people. The success of the dissemination activities of this project cannot, therefore, be measured by the mere number of users/contributors to the platform. Much more important is to **be sure that the platform is known and used by actors that have the power to amplify its effects**, transporting its results beyond the reach of this project and beyond the limits of digital divide.

Particular attention will be reserved to engage actors (such as journalists, decision-makers, opinion-leaders, association organizers…) whose role in scientific debate is precisely to encourage and organize the mobilization of public opinion. These actors are the first targets of our initiative and we will make any effort to assure their participation in it.

Katz, E., & Lazarsfeld, P. (1955). *Personal Influence: The Part Played by People in the Flow of Mass Communications*. Transaction Publishers.

4. Ethics Issues

The present research project does not raise any of the mentioned ethical issues. It does not entail research on human, human embryos or animals. It does not concern any ICP countries and it has no military or terroristic use. The research will make use of data collected on the Web and in scientific literature, but those data will not concern genetic or personal information. The present research will only make use of information publicly divulged by its authors. Furthermore, the research will strictly comply with the deontology chart described below.

The following chart is meant to assure that this project complies with the current European legislation on privacy and protection of personal data, included

- the Articles 7 and 8 of the Charter of Fundamental Rights of the European Union;
- the European Parliament and Council Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data;
- the European Parliament and Council Directive 2002/58/EC on privacy and electronic communications)
- the OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data.

EMAPS Deontology Chart

The ethical concerns raised by the research use of digital data can be divided in:

A. The 'nature' of the collected data

B. The harvesting procedures

C. The use and accessibility of collected data

A. The 'nature' of the collected data

The binary distinction between private and public information is far too simple to fit the heterogeneity of digital communication. Online data resemble more to a continuum of digital traces spanning from the most sensible and personal information (age, address, sexual lifestyle, ethnicity, political or religious believes…) to the discourses intentionally broadcasted by collective actors (such as public institutions or private companies). Between these two extremes lies a large variety of semi-private/semi-public data traces, which should be, characterize according to several dimensions and deserve and treated accordingly.

· **Sensitive vs. non-sensitive traces.** Digital traces are 'sensitive' if their publication can to cause harm to the concerned individuals. Sensitive traces will not be collected or used by this research. In case of accidental harvesting, they will be immediately deleted and (if possible) owners will be prevented of the leakage of their sensitive data.

· **Personal vs. anonymous/aggregated traces**. Digital traces are 'personal' if they can be attributed to a specific identifiable individual or if they allow the identification of the concerned individual. Personal non-sensitive traces can be collected by this research but they will be anonymized before being stored. Should anonymization be impossible (or unreliable), personal traced will be elaborated immediately and conserved only in aggregated form.

· **Private vs. public traces**. Digital traces are 'private' if they are left by individuals inadvertently (ex. browsing histories), within secured transaction (ex. online purchases) or in the context of a confidential exchange (ex. personal e-mail). Private traces will not be collected by this research, they will be acquired by third parties but only in aggregated form (ex. the server logs of a website or the statistics of a platform use).

· **Narrow-casted vs. broadcasted traces.** Digital traces are 'narrow-casted' if the users intend them to remain within the original context of their publication, with expectations of ephemerality, context-based interpretation, availability to selective groups or communities (ex. conversations in social networks, mailing-list, chat-rooms, weblogs comments etc.). Narrow-casted traces can be collected or acquired by this research, but they will be published only in aggregated or anonymized form. Should scientific reasons suggest the non-aggregated and non-anonymized use of these traces, the informed consent will be asked to the information owners.

· **Occasioned vs. harvested traces.** 'Occasioned' traces are all the data collected as a result of the use of the platform developed by the project (server-logs, comments left on the platform…). This information will be carefully stored and extensively analyzed, as it is crucially important for answering our research questions. Users will be warned that their activities on the platform will be recorded and will be made available to anyone in a non-aggregated form to assure the transparency of the platform and foster the secondary analysis of the content production. As for the data directly occasioned by the platform, the project will comply with all the obligations required by the 1*995 E.U. Data Privacy Protection Act* (Directive 95/46/EC). In particular, users of the platform will be:

- asked to give unambiguous consent for personal information to be gathered online;
- given notice as to why data is being collected about them;
- able to correct erroneous data;
- able to opt-out of data collection at any moment.

B. The harvesting procedures

The data employed by EMAPS will derive from three main sources:

1. Data specifically harvested for this research.
2. Data collected by the partners of the consortium during previous or parallel researches.
3. Data acquired by other research laboratories or private companies.

As for case 1 (data specifically collected for this research), data will be collected manually (by researchers browsing through the web) or by the use of *semi-automatic* systems of collection. 'Semi-automatic' means that this research will *not* perform large spectrum harvesting of the Web. The harvesting actions launched by this project will always be addressed to limited sets of websites and to specific information available on those websites. We will not launch massive crawling campaigns following all available hyperlinks and collecting entire web-platforms. When automatic crawlers will be employed, their action will be supervised by human researchers who will:

- predetermine their scope;
- monitor their activities;
- inspect their results.

Information will be collected preferably on the original sources that made it available. However, if the research design demands it, we may decide to collect data already harvested and elaborated by third parties (such as search engines, portals, social media…). In this case, however, we will carefully inspect the privacy policies of the target platform before considering its use.

In any case the research will scrupulously respect the privacy policies of all the websites we will address.

As for the cases 2 and 3 (data collected by partner or by other research laboratories or private companies), this project limits to data that comply with the policies listed above concerning the nature of the data and the

harvesting procedures. When considering data collected for different purposes, we will only acquire information if it is strictly related to the objectives and the scope of the EMAPS project.

C. The use and accessibility of collected data

All information harvested or acquired by EMAPS will be used according to the objectives of the project. Data will be made available to the members of the Consortium that will analyze them through a variety of research methodologies. The result of such analyses will be an online platform providing a digital atlas of the controversy on climate change adaptation.

In the platform, the information collected by the project will therefore be available in an elaborated form. However, in order to assure the maximum transparency of the project, raw data will be made available to anyone who will submit a motivated request to the Consortium. Likewise, all the analytic techniques employed through the project will be publicly disseminated together with their results. Finally, the mapping platform developed by the project will be released under an open source license thereby encouraging its public examination as well as its reuse for other research projects.

All the data and the tools shared by the EMAPS project, however, will be available exclusively for scientific purposes and under the same privacy policies. Any subsequent use of the information and the software released by the project will have to comply with all the directives of this deontological chart. In order to prevent the transfer of raw data to projects employing a less rigorous privacy policy, the Consortium will carefully evaluate the requests for data reuse and verify that they assure an appropriate level of data protection and they do not entail any commercial or surveillance use.

The Consortium will take all the necessary precautions to make sure that the data harvested or produced by the EMAPS project are stored safely and protected against the risks of unauthorized access, modification or disclosure.

ETHICS ISSUES TABLE

	Research on Human Embryo/ Foetus	YES	Page
*	Does the proposed research involve human Embryos?		
*	Does the proposed research involve human Foetal Tissues/ Cells?		
*	Does the proposed research involve human Embryonic Stem Cells (hESCs)?		
*	Does the proposed research on human Embryonic Stem Cells involve cells in culture?		
*	Does the proposed research on Human Embryonic Stem Cells involve the derivation of cells from Embryos?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	X	

	Research on Humans	YES	Page
*	Does the proposed research involve children?		
*	Does the proposed research involve patients?		
*	Does the proposed research involve persons not able to give consent?		
*	Does the proposed research involve adult healthy volunteers?		
	Does the proposed research involve Human genetic material?		
	Does the proposed research involve Human biological samples?		
	Does the proposed research involve Human data collection?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	X	

	Privacy	YES	Page
	Does the proposed research involve processing of genetic information or personal data (e.g. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?		
	Does the proposed research involve tracking the location or observation of people?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	X	

	Research on Animals	YES	Page
	Does the proposed research involve research on animals?		

	Are those animals transgenic small laboratory animals?		
	Are those animals transgenic farm animals?		
*	Are those animals non-human primates?		
	Are those animals cloned farm animals?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	X	

	Research Involving ICP Countries	**YES**	**Page**
	Is the proposed research (or parts of it) going to take place in one or more of the ICP Countries?		
	Is any material used in the research (e.g. personal data, animal and/or human tissue samples, genetic material, live animals, etc): a) Collected in any of the ICP countries?		
	b) Exported to any other country (including ICPC and EU Member States)?		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	X	

	Dual Use	**YES**	**Page**
	Research having direct military use		
	Research having the potential for terrorist abuse		
	I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	X	

5. Consideration of gender aspects

In the paragraph dedicated to the limits of Web communication (1.2.a), we did not discuss an important type of digital divide that we will have to address in this project: the so-called "gender digital divide". An increasing number of researches (see Cooper, 2006 for a review) have proved that **men and women have significantly different approaches to computer technologies and to the Web**, and that women have less chances to benefit from the advantages of the digital revolution. Moreover, important gender asymmetries have also been shown to exist as far as understanding and participation to science are concerned (Hayes and Tariq, 2000 and Sturgis and Allum, 2001). Women are underrepresented in scientific research and have fewer opportunities to achieve high academic positions (EU, 2000 and 2006 and Felt, 2009 pp. 238-242). Women are less visible in technoscientific debates and find it more difficult to have their opinions recognized. Finally, it is well known that, in most world countries, serious barriers still exist to the political expression and participation of women. These three gender asymmetries constitute obviously a major obstacle for a project aiming to renew the public participation to science through digital technologies.

Although there is little we can do to alleviate political and scientific gaps between women and men, we hope to be able to give some contribution at least to the problem of **gender digital divide**. Until a few decades ago, and even today as far as developing countries are concerned, gender digital divide was to be ascribed above all to differences in access to computer and Internet infrastructures. As the access to online communication had high financial and intellectual costs, women (as well as other underprivileged social groups) were actively excluded from using electronic media. The obstacles hindering women's access to Internet included cost, geographical location of facilities, social and cultural norms, linguistic skills, and time (Goyal, 2003). Fortunately, at least in industrial countries addressed by this project, most of these obstacles have been or are being overcome (but this is far from being the case in developing countries). In Europe, for example, the differences in Internet access have been almost completely eradicated and studies proved that women seem today to have surpassed men in the time and frequency of the access to the Web (Ono and Zavodny, 2002).

The fact the most of the obstacles to women access to online communication have removed does not mean that the parity between genders has been reached (Kennedy, Wellman and Klement, 2003). Researches on actual use of the Web have in fact suggested that women may still be in a disadvantaged position in online communication. Women tend to use digital media for relationships and friendship, much less for professional reasons or for information seeking. This may be connected to traditional gender roles, but it also have to do with the very way digital media have developed (Frenkel, 1990). As said, in the first years of Internet the male-female digital inequalities were far more important than today. As a consequence, the first experiences of Web communications have been largely dominated by male engineers. Men "got there first" (Spender, 1997) and as such they were able to control the way digital networks have been developed. The lower performances that women achieve on the Web are therefore a sort of self-fulfilling prophecy: since online communication have been developed by men and for men, it is not surprising that men can profit the most from it (Cooper 2006). Writing this proposal from a STS and ANT point of view, we are well aware of how social (and particularly gender) differences can be inscribed in technical systems and how this can, in return, hinder social change.

If this project wants to foster inclusion and promote gender equality, it will have to start from a significant rethinking of the very technologies that we will employ. Since **digital media are not gender neutral**. The effects of the the 'male-oriented' origins of the Web will be specifically address by this project in WP1, where they were considered as important as other forms of digital divide. Moreover, in order to fight the effects of male/female asymmetries, we will strive to design the interaction on our platform (WP4) so that it is women-friendly and not just user-friendly (which is too often synonym of men-friendly). Finally, and this is probably the most important action that we will take to contrast digital gender divide, more dissemination efforts will be address to women than to men. We think that this positive inequality is necessary to counterbalance the negative inequalities inherently inscribed in digital technologies.

Cooper, J. (2006) “The digital divide: the special case of gender”. *Journal of Computer Assisted Learning* 22 (5), 320334.

EU (2000) *ETAN Report on Women and Science*. Luxembourg: Office for Official Publications of the European Communities.

EU (2006) *She Figures. Women and Science Statistics Indicators*. Brussels: European Commission Directorate General for Research.

Felt, U. (ed.) (2009) *Knowing and living in research: Convergences and heterogeneity in European research cultures*. Prague: Press of the Academy of Sciences.

Frenkel, K. (1990) “Woman and Computing”. Communications of the ACM 33(11): 34-47.

Goyal, A. (2003) “ICT and Gender: Why women lag and why they may lead?” Available: http://www.i4donline.net/issue/sept-oct2003/women.htm.

Hayes, B., Tariq V. (2000) “Gender differences in scientific knowledge and attitudes toward science: a comparative study of four Anglo-American nations” in *Public Understanding of Science* vol. 9 no. 4 433-447.

Herring, S. (2000). “Gender Differences in CMC: Findings and Implications” CPSR Newsletter. 18(1): http://cpsr.org/issues/womenintech/herring/

Kennedy T., Wellman B., Klement, K. (2003) “Gendering the digital divide” in *IT&Society*, vol. 1(5), pp. 72-96.

Ono, H. and Zavodny, M. (2002) “Gender and the Internet” in *Working Paper Series in Economics and Finance* 495, Stockholm School of Economics.

Spender, D. (1997) “The Positions of Women in Information Technology - or Who Got There First and with What Consequences”. *Current Sociology* 45 (2), pp. 135-147.

Sturgis, J. and Allum, N. (2001) “Gender differences in scientific knowledge and attitudes toward science: Reply to Hayes and Tariq”. In *Public Understanding of Science*, vol. 10, 4: pp. 427-430.

Wyer, M. at al. (eds) (2001) Women, Science and Technology: A Reader in Feminist Science Studies (p. 376). Routledge.