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MAPPING THE POLICIES AND THE IMPACT OF SCIENCE AND

TECHNOLOGY ACTIVITIES AT LOCAL AND REGIONAL LEVEL

ΔΙΠΛΩΜΑΤΙΚΗ ΕΡΓΑΣΙΑ

ΤΗΣ

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ΚΟΡΙΝΘΟΣ

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❖ **Methodology**

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Abstract

Background: Eugenides foundation is a science center in Athens, Greece which hosts an interactive science and technology exhibition as well as a planetarium.

The **aim** of this study was to investigate the role of science centers in contemporary Greek society and economy. For this reason the author has chosen the case of Eugenides Foundation. Through the national context of science and technology in Greece the aim was primarily to assess the impact on the public as well as investigate the role that actors who collaborate with the center play

Procedure: For the purpose of this research the author has produced a number of interviews from visitors and actors related with the Eugenides Foundation. All participants were approached and interviewed in the premises of the foundation.

Results: There is a consensus of views for the role of Eugenides foundation in contemporary society and on the development of the city of Athens. Participants, however they highlighted certain problematic issues acknowledged the importance of the foundation for the city. There is plenty of space for improvements such as on the communication of the foundation with the wider public.

Considerations: Since there is a time of crisis, there is a necessity to find new financial resources and also to improve their communication policy. Recommendations are reported and discussed.

1. Introduction

Museum, science, civilization, arts, and culture are elements which often are interrelated and they affect each other. Furthermore, those elements do not interact only each other but they also interact with the society overall. An example can be given from a research commission from University of Leicester. In three large-scale evaluations stemming from two government funding initiatives of the impact of museum education programmes during 2004-2006, the Research Centre for Museums and Galleries (RCMG) at the University of Leicester discovered that surprisingly high levels of museum visits were made by schools located in areas of deprivation and child poverty. In the first RCMG evaluation, 46% of school visits to participating museums were made by schools located in wards in the 20% most deprived areas in England (Hooper-Greenhill et al, 2004).

In the second RCMG evaluation, 30% of school visits came from these highly deprived areas, whilst in the third evaluation this figure was 32%.The index of child poverty (IDACI) reinforced this picture, with 42% of the visits in the first evaluation being made by schools located in wards classified as among the 20% most deprived, with almost a third (30%) of schools in the second evaluation falling into this range. The RCMG research team, the Museums Libraries and Archives Council (MLA) and the Department for Culture Media and Sport (DCMS), who commissioned the evaluations, all appeared to be somewhat surprised by this research finding, which runs counter to the popular opinion of museums as rather elitist and exclusionary places. The finding was particularly welcomed as an outcome of the research, as it suggested that museums had a potential role within social policy (Hooper-Greenhill et al, 2004). This is just an example of how the museum, and any other cultural

organization, can leverage not only arts and science but also the social capital of an area or even of a country.

Indeed, places which have a cultural or scientist interest, in today's world have been shaped into places of development which provide value to the places where they belong and from where they are governed. Gray (2000) has mentioned the fact that Britain has focused after the 1990's into the culture and science in order to gain a competitive advantage as a destination. Indeed, projects such as TATE gallery and many other cultural centres have been built in London and other towns of Britain. IN the post-industrial Britain the old factories have been transformed into galleries, museums and cultural centers. The same has happened with technological centers. Till few years technological centers operated away from the public. However, things have changed; 4h generation museums are able to combine technology, the concept of a museum and learning (Lizardi, 2013).Museums today are not just a place where the visitor has the chance to see a collection and its exhibits; it is about learning. Janousek (2000) claims that museums have managed to integrate with culture and sciences. More and more museums that have opened in the 21st century combine the best use of technology, such as virtual tours, with visitor experience and learning so to provide a unique mix of knowledge and experiences to their customers (Friedman, 2010). The outcome is having a new generation of places which combine elements of museums, science centers and learning point combined with 4th generation of museums.

A key issue so to develop these new types of cultural centers, there is a need to have a cohesive policy on Science and Technology. De Clercq (2003) refers that only countries with high development rates have been able to design policies which focus

on leveraging Science and Technology. It must be mentioned that this is a tricky issue since it involves development policies, public administration, management of cultural organizations and of NGOs along with having a sound understanding of issues related with arts and culture. Despite having been extensive researches in Italy (Lizardi, 2013), in France (Janousek, 2000) and in the US (De Clercq, 2003) , the author believes that there is a lack of a similar research in Greece, while the current economic environment - especially the austerity measures – seems to create a situation which has not been widely examined and surely there is a need to examine the policies are they are now in Greece.

1.1 Aims and objectives

The objective of this study is to research the impact of science and technology centers on the society and economy of a nation. The case study was the Eugenides Foundation, one of the most popular Greek science centers. Eugenides Foundation hosts a planetarium, an interactive exhibition, science events, scholarships, publications. It is very important in Greece as an informal learning environment which popularizes science.

The aim of this study was primarily to assess the impact on the public as well as investigate the role that actors who collaborate with the Eugenides foundation play.

The study was based on a document that has been created for the purpose of serving as an instrument for the measure of the impact of initiatives and policies within the area of science communication and scientific culture in general (SCIP: Science

Communication Initiatives and Policies). This toolkit is part of the European project PLACES (Platform of Local Authorities and Communicators Engaged in Science) whose main goal is to offer to a wide and diverse community of actors a common platform to structure their science communication activities, at a city/regional level (PLACES, 2012)

The PLACES project aims to contribute to the creation of instruments that allow for the study of the impact of initiatives and policies related to science communication (SCIP). All of this contributes to the definition of the concept of "Cities Scientific Culture". (PLACES, 2012)

1.2 Value of the thesis

In today's "knowledge economy" it is vital to develop the necessary competencies and capabilities which will allow a country to obtain a competitive advantage through its intellectual capitals. We assume that there is a necessity to examine how the institutions which promote science and technology can contribute on the social and economical leverage of a country.

In our case, Greece is a country which has suffered from austerity measures and has reduced its competitiveness. At the same time various politic, social, economic and institutional changes have affected in a negative way scientific and technological centers. Hence, there is an academic and practical value to examine how science centers can operate, even in a harsh time as the current financial crisis in Greece.

The research will examine a number of issues, such as the views of the main actors but also how the science center can communicate the science with the society and how it can contribute on creating a knowledge-based economy and create new opportunities for Greek people. For this reason, it is important to study the impact that a science center has in a given number of population and in a given geographical area, such as Athens.

1.3 Research questions

The research questions are:

- What is the current situation of science and technology in Europe and in Greece?

Having in mind the current situation, which is made from the economic crisis and austerity measures taken, it is important to study what can be the impact of such changes. In particular, the climate in Greece has been a negative one and the recent cuts on science and development have a negative impact on such situation. Furthermore, the failure of Lisboa Strategy indicates that the Europe has not given the appropriate focus on research and technology as it should have.

- What is the role of science and technology in Greece, having in mind the case of Eugenides foundation?

This research question focuses on the case of Greece and the Eugenides foundation which is one of the most important science centers in Greece, having in mind the current situation.

1.4 Expected results

The expected results of our study are that the current situation in the science and technology in Europe and in Greece is affected by the economic crisis and the negative climate.

The role of the science and technology in Greece, having in mind the government policy, the diffusing of the science and technology through informal learning environments and institutions (media, science centers, science events) and the case of the Eugenides Foundation is expected to be very important and beneficial to people and society in many levels. We will focus on the Eugenides foundation and how can improve the quality of life of the wider public and bring prosperity.

It is expected that the impact on the public would be personal, societal and political. As personal impact we assume the learning outcomes, the personal enjoyment, intellectual capital, career development etc. As societal impact we mean the effect on people, organisations, natural environment, in tourism, in leisure activities, partnerships, urban development and transport, volunteerism, and youth employment. As political impact we assume the government policies and the effect on economy.

For the actors of the Eugenides Foundation, the benefits can be:

On career

On acquiring a competitive advantage

On increase the intellectual capacity

On providing more scientific output from research and development

Improve skills of educators

Improve acceptance of sciences from the public

Increasing life quality

❖ **Literature review**

2. Culture, civilization and science.

The word "culture" has its roots in the Latin word "cultura", meaning "culture", and it was used during the 15th century in French, German and English only to determine the process of growth (culture of plants and animals). From the 18th century the importance of the term changes because of the evolution of German word "kultur", which is used for the culture of human spirit (William 1981). Using the narrow meaning of the term, culture declares the growth or the result of growth of certain abilities of the body or spirit with suitable exercise. With the wider meaning of the term, it is used to declare: a) the status of the educated person who, using his culture, developed his taste and critical perception, and b) the education that one has which results to the creation of this status. Some of the most representative definitions that are used in bibliography are the following:

1. Culture is a system of concepts, which has become massively accepted from a given group of people in a given time. This system is constituted of meanings,

categories, norms and pictures, which interprets the total situation in the members of a group.

2. Culture is constituted by the models of behavior that are received and propagated with symbols, and which constitute achievements of human groups (Kroeber 1963)

Schein (1985) supports, that culture is a structured total of basic hypotheses that have been invented or developed by a given group, through the course of learning in order to face problems of exterior adaptation or internal completion. These hypotheses have attributed satisfactorily in the past and, thus, are considered to be generally in effect; consequently, these hypotheses are taught to new group members as a correct way of perception, thought, and sense with regard to these problems. Hofstede (1981) supports that, because all persons belong simultaneously in more than one groups, inevitably they belong to different levels of intellectual planning, which levels correspond to different levels of culture.

 For instance:

1. The National Level: Each person is influenced by the country that he/she has been born, and the country or the countries in which he/she has lived and grew.

2. The Local, Religious and Linguistic Level: Usually, even in an individual country, one can observe the phenomenon of different groups due to geographic region, religious convictions, and local dialects.

3. The Sex Level: Men adopt different cultures than women.

4. The Level of Generation: Older generations have different cultures from the new ones.

5. The Level of Social Order: This concerns the level of education, profession, as well as the different castes that are created in a society.

6. Organizational Level: This is related to the socialization of workers in the organisms where they are occupied.

Summarizing the above mentioned definitions, Furnhum and Gunter support (Furnhum and Gunter1993) that the basic characteristics of Culture are the following:

1. It is difficult for anyone to apply a certain determination.

2. There are a lot of dimensions with a lot of different contents in each level.

3. Culture is relatively constant for small time interval.

4. Culture requires time in order to be formed and, also, in order for it to change.

Culture, as a central reference point of this study, is a broad concept which is often related or misunderstood with the concept of civilization. Regarding culture and civilization, they have been given different definitions which reflect the social and cultural processes of that time. Williams (1993) makes specific reference to the conceptual confusion between civilization and culture. Considering that these concepts are not outlandish and were systematically processed and implementation due to the lack of rich tradition in the social sciences. Very often even the translators tend to translate the word «culture» as a civilization. This is a simple example of the confusion between these two terms. For this purpose we will consider each term separately and will be critically evaluated to what the dividing lines between these concepts.

The term culture has changed many times its meanings depending on the historical period from which the approach is changing the meaning. For example, the term "civilized" first appeared in the British aristocracy in the 16th century and used them

to assert their superiority compared with the socially inferior citizens (Williams, 1993). Essentially culture expressed the few who lived in the main elite and in aristocratic families which it served to distinguish from ordinary citizens who considered it barbaric somehow.

The Chertner culture linked with the nation and the existence of culturally distinct communities. Based on the ideas of Chertner developed in the 19th and 20th century a series of national liberation movements created the concept of the nation state, where a political power was the guarantor of the cultural identity of nations. The state undertook the conservation of cultural traits through education and the creation of national consciousness and defending the ideological borders of nations. We must not forget that many authoritarian regimes like that of the Nazis in Germany based on this ideology. Indeed, the first movement of the Nazi was to take over Poland and Czechoslovakia. It had the excuse of defending the cultural and national identity of the German-speaking inhabitants of these countries.

During the mid 20st century the concept of civilization grow up and it managed to differentiate from culture. The culture is defined as an intellectual and aesthetic side of a society while civilization symbolizes the material and technical progress of the same society. Matthew Arnold (1932) in his work for Culture and Anarchy describes culture as the antidote to the disease of cultural decadence of modern civilization. During the First World War Spengler, (1971, p.31) stated that civilization is "the inevitable destiny of culture" and the transition of the western world from the stage of culture in modern civilization. Another approach was shortly thereafter that time is of the Weber (1998) stating that the culture has elements such as values, language, customs and traditions of a people and civilization includes a series of materials,

technical and scientific information that can be disseminated and communicated between communities. From this we see culture is made from elements that characterize a group of people and share them with each other, such as language and tradition, while on the other hand, civilization is referred to material goods, such as some scientific achievements.

In the second half of the 20th century poet Eliot (1980, p.37) states that culture includes "all the interesting features and all the typical activities of a people." Very simply are all those are the daily activities that characterize a people while Williams (1993) includes high art and mass culture in the definition of Eliot and tends to connect culture with civilization by having the example of genetics which is a scientific evolution governed from humanitarian values such as bioethics and human values (culture) and from evolution genetics (which is the part of civilization) (Weber, 1998).

Till this point we have investigated culture and civilization, which are two terms which have several identical issues but we conclude that they tend to have a distinctive nature. The third element studied in this project is science coming from the Latin word *scientia* which stands for "knowledge". Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. In an older and closely related meaning (found, for example, in Aristotle), "science" refers to the body of reliable knowledge itself, of the type that can be logically and rationally explained (Gaukroge, 2006).

Science in generally refers to a system of acquiring knowledge and usually called pure science in order to be different from applied science, which is the application of

research to human needs. Big fields of science are classified in formal sciences as logic, mathematics and statistics, natural sciences as the study of the natural world and phenomena and social sciences as the systematic study of the human behaviour and society. Natural sciences are chemistry, biology, earth science, astronomy and physics.

Today, those three terms, culture, civilization have come together under the roof of science centers / technological museums also well known as fourth generation museums (Friedman, 2010). If we try to seek the common ground which brings together those three elements, this is learning and the leverage of social capital. Science and Technology, which symbolize the most advantaged heritage of a nation, require culture and civilization in order to grow. Hence, all those terms are interrelated and their sum leads into the creation of new knowledge for the people who live in the society that has developed those terms.

Activities in museums that foster behavioral change, whether individual or social, necessarily involve learning, active engagement, awareness and participation. So the sector benefits individuals and communities by creating opportunities for learning about ourselves, our communities and our context. One can say museums have the potential or the responsibility to help people understand who they are and where they come from. (Generic Social Outcomes Indicator Bank for museums, libraries and archives, 2009)
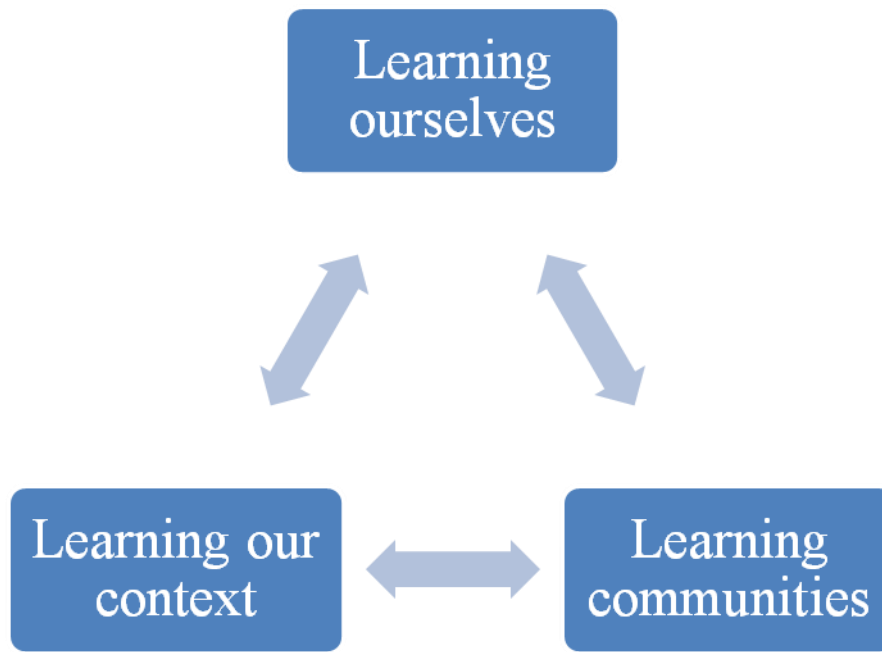
Fig.1: Learning in museums

3. Basic definitions

3.1 Science centers

Essential to move on is to provide the basic definitions. According to De Clerq (2003) during the past years the case of science and technology has created a number of bridges which bring those elements closers. Their link is the science centers. They are a type of museum. More precisely they belong to the fourth generation of museums which do not focus only on the presenting collections and art acts. On the contrary, they tend to combine the use of new technology with the traditional elements that a museum has, such as having narrators, collections and etc. Furthermore, a science center does not include only the exhibits and activities related with the exhibits but it also produces output in terms of research.

Bennet and Silva (2006) have mentioned that in today's world a science center can become more sustainable than a traditional museum. They argue that they can operate without depending so much on state grants like museums do. They have also a significant impact on many aspects such as:

- In political life since they can generate a new fresh ideas while many science centers are operating as think-tanks which affect global politics
- They have an impact on personnel development since they can create jobs for new scientists and they can help them on their personnel development and to generate new knowledge.

- The economical impact is not only in terms of attracting visitors and creating jobs but also on producing patents and innovations which can leverage the local economy and help local firms to become more competitive

- They have an impact on the society since they help to leverage the social capital. On many case science centers focus on social research

(Janousek, 2000)

3.2 Scientific culture

Around science centers it has been built a scientific culture. This is about creating a culture which promotes science on all local levels, such as in the local government, on local institutions such as schools and universities and so on. There is an abundance of definitions for this concept. Up until now, it has been mainly used in francophone countries (literally translated from French *culture scientific*). There are those who use this term to emphasize the affirmation that science is indeed culture: if there is a humanistic or literary or a musical culture, there must also be a scientific culture.

Another meaning to the idea of scientific culture was proposed by Godin and Gingras as follows: "Scientific and technological culture is the expression of all the modes through which individuals and society appropriate science and technology" (Godin and Gingras, 2000, p.43).

According to these authors, the common point of the various approaches to the concept of scientific culture lies in the (individual and social) *appropriation* of science, which occurs through three modes (learning mode, implication mode and socio-organizational mode). This meaning does not need to differentiate between

competence and participation in the study of the relationship between science and society, as it encompasses both.

Scientific culture (or science culture) also refers to, as agreed by the Scientific Committee, the presence of science in public life, public affairs and public discourses. (PLACES, 2012)

On many cases, on areas which have created a scientific culture, the next step is the creation of clusters of science where the scientific culture can be the link between the various activities. An example is the Silicon Valley and which is an area which has created a culture on innovation on high technologies. The local government provides all short of incentives on the firms that seek to invest in this area, including a strong scientific culture built on local people and local authorities that allow new firms to create new innovations and to cooperate with the local science centers (Friedman, 2010).

A key issue for science center is not only the leverage of sciences and development but also it is about learning. Friedman (2010) reports that the fourth generation museums do not focus only on preserving the exhibits but they focus mostly on generating new knowledge. This comes from establishing learning procedures and techniques which allow the science center to interact with its audience and provide the best possible knowledge. Nothing is secret on such institutions. Instead, they promote knowledge and the social capital through learning. Janousek (2000) claims, that modern museums and centers must produce knowledge so to help in creating a learning society, where science will be taken as a vehicle of development. This will pave the way for popularizing science which is disseminating information about the achievements of science and technology.

3.3 Science event

In the White Book "Science communication events in Europe" produced by the European Science Events Association (EUSEA), the concept is introduced in the following way: *"Since spring time 2001 in Goteborg a group of people, who organize something like science weeks, science festivals or science days, determined that it is time to put together ideas, guidelines, recommendations on how to organize such 'Science Communication events (SCE) ', as these events were called."* (PLACES, 2012). According to this meaning of the term science event refers to many group actions like festivals, exhibitions and etc.

The science event has the aim to diffuse the science knowledge in the society and make people feel more comfortable to take part in scientific actions. According to the White Book some diverse Science Event shares common goals and objectives*: The most widely recognized objective of a science communication event is to "raise public awareness of science". This is either explicitly said or implied in the presentations of all of the Events purpose and philosophy. The next most important objectives are "to promote the dialogue between science and society".*

The notion of "scientific culture" is mentioned in some Science Communication Events' purpose statements. The idea is to communicate and discuss not only the results of scientific work but also the way science is carried out as a wider concept.

The most commonly used expressions of objectives imply that a Science

Communication Event exists in order to market science positively. The general idea is to increase the status and attraction of scientific work and to recognize scientific results. Even though there are plenty of meeting-places and efforts to increase the dialogue between science and society, the principal idea is not to criticize or scrutinize the science itself, or to present alternative findings in other respects than as counter-weight to the scientific results.

The term "science event" (SE) is often used in lieu of the longer term "science communication event"(SCE). Even though the field of science communication continues to broaden, for the moment a precise definition of what does or does not constitute an SE does not exist. (PLACES, 2012)

4. The national context of Science & Technology in Greece

National context of science and technology in Greece consists of political developments, public debates and policy initiatives relevant to the place of science in society.

According to the Monitoring Policy and Research Activities on Science in Society in Europe (MASIS) initiative, a major undertaking under the SIS programme we can provide a general overview of the SIS situation in Greece. The "Science in society" (SIS) programme supports activities focusing on the governance of the research system, research ethics, public engagement in science, women in science and the promotion of scientific education and science communication(MASIS, 2011). The Monitoring Policy and Research Activities on Science in Society in Europe (MASIS)

initiate aims to map, steer and monitor the SIS landscape in the European Research Area (ERA) (http://ec.europa.eu/research/era/index_en.htm), in order for EU citizens and society to benefit the most from SIS efforts (MASIS, 2011).

In Greece there are debates for SiS only when new laws discussed in the media and social networks. In the last year a formal consultation process for draft laws and debates organized under a strategic planning which for the next 3 years will form the basis for the effective use of funds of European Programmes for the benefit of the country. The GSRT shows special emphasis to financial measures and instruments under the operational Programme Competitiveness and Entrepreneurship, which is part of National Strategic Reference Framework (NSRF) for society and science. New policies are also under development (MASIS, 2011).

The Ministry of Education has also submitted a draft law with major changes in the organization, self-administration and quality of the public Higher Education Establishments (HEIs) at the end of 2010. The main issues discussed refer to the autonomy of HEIs, the way they are governed, their financial planning and the process of academic careers. The particular debate is epidemic and is expected to last only until the law passes through Parliament. University Councils and unions of academics are the most actively participating stakeholders. The key issues include the role and status of the public university, its missions and indirectly its role in society (MASIS, 2011).

A permanent issue in the economic policy in Greece is the vital role of the scientific progress in the economy and national competitiveness. Greece has serious structural

economic problems, ranks low and deteriorates in all competitiveness and innovation scoreboards and there is need to be addressed with more research and innovation. As a consequence "Science and Technology" is mainly seen as an economic development model tool. The focus is at trying to mobilize R&D resources and enhance the technological capabilities of the business sector at any cost, neglecting at that stage the debates of the role of science in society. The debate keeps coming back to Parliament and the media in irregular intervals (MASIS, 2011).

Ethics in biosciences is an epidemic debate that emerges in irregular time intervals in the press. In 2008 the Greek Bioethics Committee reacted to a new research framework in the country (which was adopted by the government but was never implemented) to launch an opinion on this matter. The opinion was communicated to the Parliament and the press reported about it. However, the debate remained limited in the academic society. The Committee debates internally and publishes opinions on a variety of bio-science topics, which are subsequently reported by the press. Topics include codes of conduct, the management of biodiversity, genetic issues etc. (MASIS, 2011).

4.1 Policy

S&T policy in Greece is strongly influenced by the development in the EU as well as the funding provided by the Structural Funds. After a long period of no specific activity in the area of SiS, the GSRT has announced a structured intervention for revitalizing the role of science in society. Although implementation has not started yet, 5 million Euros are earmarked; the provisions are already in place and include:

Familiarization with the production of scientific knowledge (gender and science, science as a profession, historical approaches to scientific knowledge, demonstration of scientific method)

Access to scientific knowledge (open access, scientific literacy through internet, Life-long learning and public understanding of science)

New scientists and society (social role and reputation of scientists, science in mass media, science ethics and deontology, improvement of science communication with innovative methods, products and services, development of communication skills for S&T)

Involvement of the civil society in science

Art and science (various types of tradition and audio-visual means

Concrete fields of application (MASIS, 2011)

A university reform including evaluation of the HEIs started also by the adopting of the Bologna Process. The research funding system and science-industry interplay remain largely unchanged in qualitative terms but have been enriched with new funding in the context of the "National Strategic Reference Framework" (NSRF), which recognizes research, technology and innovation to be the main drivers of the restructuring of the Greek economy towards a knowledge economy. It foresees support for research in areas that will contribute to the reorganization of the Greek economy and the strengthening of the country's competitive advantage, improved quality of life and an improved environment. The NSRF explicitly provides for the systematic evaluation of research centers. The Operational Programme Competitiveness & Entrepreneurship, which is part of the NSRF, foresees a large number of funding mechanisms (MASIS, 2011). Main target is the Knowledge-

intensive cluster promotion. Main measures that have not been launched are networking of business firms with technology centers, spin offs, spin outs, development of intermediary organizations and innovation vouchers.

Political debates about science in society are not important in Greece compared to other economic and societal issues. Specific science topics are discussed in closed audiences but there are no organized debates for the general public. The Parliament has a Technology Assessment Committee but it interacts only with specialists and its unknown to the general public.

The main advisory body for the development of national policy for research and technology in Greece is the National Council for Research and Technology (ESET). It consists of internationally known scientists with extensive experience and activity in research and technological development. ESET recommends thematic priorities and mechanisms for implementing the National Strategic Framework for Research and Innovation to the Ministry of Education, Lifelong Learning and Religious, advises on the final plan and carries out continuous evaluation of its implementation. ESET also participates in the evaluation of the research in the country (MASIS, 2011)

The National Bioethics Commission (http://www.bioethics.gr/) advises the government in topics like Management of Biological Wealth, Research Ethics Committees for Biological Research, Code of Research Ethics for Biological Sciences, Genetic Data in Private Insurance, Prenatal and Preimplantation Diagnosis, Umbilical Cord Blood Banking, Human Biobanks, Artificial Prolongation of Life (MASIS, 2011).

The Technical Chamber of Greece is the official adviser to the government, when it comes to technical problems, in particular construction and other engineering-related decisions. The Health Ministry, the Ministry of the Environment, Energy and Climate Change and other sectoral ministries form advisory committees, more often composed by academics, for broader topics or for ad hoc decisions. (MASIS, 2011)

4.2 Public engagement

Priority setting in science and technology is the responsibility of the General Secretariat for Research and Technology of the Ministry of Education. The formal procedure includes a mandatory public consultation system for all draft laws and suggested regulatory interventions. A very strong tool for citizen involvement is the informal consultation with researchers, unions, chairs of organizations, governing bodies etc ((MASIS, 2011).

University and industry cooperation is still insufficiently developed but the policy portfolio designed to enhance the collaboration.

4.3 Funding for research

A useful data is given on the following graph which shows the spending on research and development tin Greece for the past years along with the EU27average

	2000	2005	2006	2007	2008	2009	2010	EU27 average/total 2008
Gross domestic expenditure on R&D (GERD), in % of GDP	0,60	0,59	0,58	0,58	-	-	-	1,89
Business enterprise sector	28,3	31,1	-	-	-	-	-	55,0
Government sector	47,7	46,8	-	-	-	-	-	33,5
Higher education sector	1,8	1,7	-	-	-	-	-	0,9
Private non-profit sector	0,4	1,5	-	-	-	-	-	1,6
Abroad	21,2	19,0	-	-	-	-	-	8,9
Number or R&D personnel, %1000	-	7,4	7,6	7,6	-	-	-	
Number of R&D personnel by sector of performance, % of total R&D personnel	28.239	33.603	35.140	35.629	-	-	-	2.455.192
Business enterprise sector	35%	35%	32%	33%	-	-	-	52%

Government sector	16%	13%	13%	13%	-	-	-	14%
Higher education sector	56%	52%	54%	54%	-	-	-	33%
Private non-profit sector	0%	1%	1%	1%	-	-	-	1%

Statistical data sheet, Greece

Notes: 1) Data from EUROSTAT, 2) Data from the OECD, 3) Data from EuroBarometer

73.1 (2010) and EB 63.1 (2005) 4) Data from 2007

Source: Monitoring Policy and Research Activities on Science in Society in Europe (MASIS)

From the analysis made, it is obvious that the research and development in Greece lacks of funds. While it has the necessary human capital, which is on the same margin with the rest of EU's member states, the funds given for research and development are below the 50% of EU27's average. This means that the Greek state does not provide the necessary financial support on projects related with research and development.

5. Museums a mean of diffusing science and technology in Greece

The term 'museum' in Greece was for years associated with the field of archaeology. After the decade of seventies a new reality created by the increase of museums or science and Technology centers. Until 1989 established 36 museums, of which the vast majority are Science and Natural History. Most of them are places mere exposure

of the techno-scientific knowledge and its application and their extensive network in the whole country is an important channel of diffusion of the natural – technological knowledge to the public in general. The development is justified primarily by industrialization and socio-economic development and also by the Greek biodiversity. The geological wealth of the country justifies the crowd Museum of Natural History (from the 119 museums, 45 are Natural History), (Kafetzis, 2010).

The last three decades we have a doubling of the number of the museums. Seven in ten museums (69.5%) were established after 1990. Apart from this there was a creation of new spaces that can perform activities of their visitors. The development follow a general tend to a wider diffusion of the science and the technology in the Greek society. People started to be interested in science issues more often and not only by the formal ways or education. A redefinition of museums from simple exhibitions of objects in science centers with educational role is fact.

In the last decade were founded many Technological and Industrial Museums. Greece appears to follow a more modern version of the Science Museum in the direction of "Science for All" and "Science for the Citizen". Within this effort founded Museums - everyday places that are more hospitable to visitors, and in existing or new museums included activities of the visitors with the exhibits. Typical examples of such spaces are the Science Center and the Museum of Science-Technology Park "Noesis" in Thessaloniki, the Eugenides Foundation in Athens, the Goulandris Foundation in Athens, the Mining Park Vagonetto in Amfissa, and the Museum of the Olive and Greek Olive Oil in Sparta, or the Open Water Power Museum in Dimitsana (Kafetzis, 2010).

Part of the effort of modernization and greater openness in society is the creation of the museum web pages with information about their exhibits, their programs, their history, and activities. In recent years the museums or centers of science and technology, function as educational institutions complementary to the formal education shifting their interest from the exhibits themselves in the interaction of exhibits with visitors (especially students) and aiming at the learning that can resulting from this interaction (Dimopoulos, 2008).

According to the museums' web pages the Eugenides Foundation and the Center "Noesis" beyond the exhibits are places where presentate special tributes on topics relating to the relationship of Science-Technology-Society (e.g. "Café Science" - "Astronomical News" in Eugenides Foundation and "Science Cafe" - "The Faces of Science" in "Noesis"), and host multidimensional experiences that make them sites with significant lifelong learning opportunities. The Museums of Natural History Museum Goulandris has also a large number of educational programs and activities for students of all school classes.

5.1 Eugenides Foundation

The Eugenides Foundation, the case study of our research will extensively be presented in the methodology part. It hosts a digital planetarium, an interactive exhibition, mechanical-interactive exhibits that trigger visitors to play an active role, a library, scholarships and publications. It is also offering educational programmes to pupils and the general public, presentations and conferences, special science events and the Science Coffee House. (http://www.eugenfound.edu.gr/)

As the most popular science centre in Greece is very important as an informal learning environment. It diffuses knowledge, ideas and information about the achievements of science and technology. Indeed, it has lately grown rapidly and evolved into a centre for education, entertainment and assistance for all the sciences.

5.2 Goulandris Museum of Natural History

Goulandris Museum of Natural History is a public welfare institution, devoted to study, conservation and protection of natural environment. Ever since its foundation it has mapped a pioneer route, a new rapprochement between man and natural environment. In the meantime, it has formulated a new education of general interest for the re-integration of people into the functions and economy of Nature. The Museum works for the preservation of our natural environment, by:

1. Daily teaching hundreds of visitors, mainly children of school age.

2. Distributing knowledge into society through meetings, conferences, publications and exhibitions.

3. Developing high-technology workshops focusing on research of the life-giving natural resources: soil, water and air, in relation to nutrition and health.

4. Cooperating with other scientific centers and institutes in Europe and the USA, in the field of biotechnology, soil ecology and analytical chemistry.

The physical visit to GNHM is a multi-dimensional experience bringing visitors in touch with the kingdom of plants and animals and introducing them in an understandable and scientifically documented way to the function of vegetable and animal world, to the interdependence and balance of ecosystems. From 1975 until today, more than 3 million visitors, 70% of which were young people, passed the gates of the Museum and visited the exhibitions it has hosted. The museum has exhibition galleries of botany, zoology, entomology, marine biology, ornithology, herpetology and paleontology.

The Museum's educational activities contribute to the provision of reliable knowledge and the formation of environmental conscience. They target pupils, students, teachers, as well as the general public. They aim at familiarization with natural environment, at understanding of relations of interdependence developed in it, at sensitization of the public on the dangers ran by natural environment today, and at mobilization towards its preservation.

At the same time, the Educational Department of the Museum has been monitoring the new methodological approaches introduced in Education through Interdisciplinary Curricula of school year 2006-2007 and has forged educational programs targeting groups of pupils of elementary school that visit the Museum. The aim of such programs is to reinforce the connection with nature and to cultivate attitudes and

values favouring the preservation of natural wealth, not only through knowledge but also through the joy of observation and research, cooperation and creativity.

The Museum's research activity consists of field research and collecting, recording, and identifying species, introduction into data bank, publication of articles and papers in the Museum's scientific journal, ecological/landscaping studies of areas of particular environmental interest, thematic exhibitions in Greece and abroad and scientific research in cooperation with Greek and international scientific centers.

5.3 Gaia Centre

In 2001, the Goulandris Natural History Museum inaugurated the Gaia Centre for Environmental Research and Education, a pioneering European Institution that would develop scientific activities in cooperation with European and international research centers. The GAIA Centre consists of a large atrium, exhibition areas, research laboratories, a library, collections rooms, rooms for projections and non-permanent exhibitions, offices, a restaurant, a shop and a large parking area.

The Centre's main goals are environmental research and education. Concerning research- basic and applied- the laboratories of Soil Ecology and Bio-Technology, and Analytical Chemistry work in the vital fields of soil and water quality, the quality of nutrition and human health. The Centre's other objective is to produce educational material, printed and electronic, as well as to organize specialized seminars for educators. Its uniqueness consists of its ability to bridge with scientific accuracy the connection between research, education and culture.

Gaia Centre demonstrates to visitors the way planet Earth has been functioning for millions of years and how it functions today, with the interventions of modern people. The «Geosphere», which is unique in the world, is a hemispherical dome- monitor of 5m of diameter and of approximately 40 m2 of surface. It shows the rotating planet in 225,000 high resolution images. It also presents, in a brief and concise way, the geological evolution of the planet from its creation, 4.6 billion years ago, until today.

Ever since Goulandris Museum was founded, its main purpose has been and still is the research for collection, registration and study of the country's botanic, animal, geological and paleontological wealth, and the evaluation of biotopes in cooperation with research centers, museums and universities of Greece and other countries.

The Museum's research activity includes missions for collection of material, field studies, and workshops, publications etc. The findings of the Museum's research are a condition for rational management of natural environment as well as a means for other scientific researches. The creation of GAIA Centre in 1999 marked a significant expansion of the Museum's research interest in two new sectors, with the creation of fully equipped laboratories of Soil Ecology and Biotechnology and of Bioanalytical Chemistry.

The research interests of the GAIA Center's Bioanalytical Department are focused on aspects of quality of life, such as the investigation of the relation between dietary habits and health, assessment of the effects of various environmental factors on food and human health, and integrated utilization of waste produced by agricultural industry. The Bioanalytical Laboratory collaborates with several academic and research institutes in Greece, Europe and the USA.

The Greek Biotope –Wetland Centre – EKBY was created by the Goulandris Natural History Museum at the Thessaloniki University's Farm. Its mission is to promote sustainable management of renewable natural resources in Greece and in other areas of Europe and the Mediterranean. (http://www.goulandris.gr/)

5.4 Noesis

The Science Centre and Technology Museum "Noesis" is the biggest and more prominent science museum in the country, which is systematically updated and has a modern infrastructure to serve its visitors, including organized school visits. It is a non-profit, cultural and training organization, which promotes technology culture and creates an appropriate environment for informing the public of recent developments in Science and Technology. The main objective of the Centre is the popularization of modern knowledge and its dissemination to the public through exhibitions, movies, seminars and lectures. (MASIS, 2011) (http://www.noesis.edu.gr)

5.5 Technology-related museums

A large number of small technology-related museums are spread around the country, but they reflect the history of regionally embedded technologies rather than being a science museum. They include railway museums (in Athens, Larissa, Kalamata and Volos), the Telecommunications Museum (Athens), the Watermill Museum (Dimitsana) and the Hydroelectric Machinery Glavkos Museum (Kafetzis, 2010).

6. Science & Technology through mass media in Greece

The most serious newspapers in the country have science columns, which appear either irregularly or weekly. The coverage is made by journalists appointed for this purpose. Blogs are increasingly important.

6.1 TV and radio programmes

According to the MASIS, 2011 in Greece we can see films or documentaries related to science through the Nova membership TV channel which have access to the Discovery Channel, History Channel, Animal Planet and National Geographic. Educational TV is a development programme by the Ministry of Education addressed to schools.

According to Dimopoulos (Science &technology in TV -11th International Conference on public communication of S&T) - in Greece there are few currently under 20 TV programmes about science, technology and health produced by both public and commercial channels. Most of them are popularization informative programmes (documentaries) and advice. There are no edutainment programmes in contrast to other European countries where there are very popular (AVSA 2010). The lack of the variation of the programmes and the limited scope of topics used explain the very low audience numbers. The production of the programmes is done abroad and they broadcasted mostly by private channels.

National TV does not have often science and technology related programmes. More specifically, NET, the public television network offers documentaries and selected

films in cooperation with History Channel. ET1 and ET 3 have occasionally documentary films with scientific interest. Sky TV has programmes of scientific interest for children on weekends and broadcasts in cooperation with BBC, Discovery Channel and others scientific programmes. At the Sky TV website there is a link for technology, which informs about the most recent S&T news. (http://www.skai.gr/news/technology/).

In Sky Radio there is a daily broadcast called *Stigmiotypa* (snapshots), which is daily and includes technology news. There are no systematic science communication emissions in radio programmes.

6.2 Newspapers and magazines

Many newspapers and magazines have often short news on science and technology. The Greek Magazine Focus and the Vima science are very popular. They report on knowledge and the world and on scientific news.

6.3 National portals, blogs

According to MASIS, 2011 there is no national portal on science communication, but there are many blogs and sites. Most popular are:

The portal In.gr http://blogs.in.gr/section/?cid=626,

The blog "Science and Technology" Internet

http://www.hostdomain.gr/greek_bloggers/general_blogging/

According to AVSA 2010 Greece when compared with other countries lacks a clear segmentation of public broadcasters into big and small ones. The programme hours dedicated to science on the small channels, do not exceed significantly the average airtime dedicated to science on the big channels in countries with segmented markets. In addition, these programmes are relatively frequently scheduled outside primetime like in countries with non segmented markets. This unique pattern can be explained by the particular market position, which resembles that of the bigger public channels in segmented and non segmented markets. The number of science programmes per radio channel in Greece accounts on average for 1-2 due probably to particular economic factors affecting public radio.

7. Science events in Greece

The most successful science communication to the public is via the National Hellenic Research Foundation, which has an activity dedicated to science and society. It organizes cycles of presentations in cooperation with universities, the British Council, the French Embassy, museums and foundations dedicated to topics of current interest and related to the research institutes of the Foundation itself. Society and Health and Sunday Mornings are the most popular activities.

7.1 FEST11 - School Lab

FEST11 is a celebration of science and technology at which both children and adults can discover the beauty, the imagination and the secrets of scientific thought. The festival will give children the opportunity to become familiar with scientific concepts

and will help them understand their applications in our everyday life, while at the same time helping adults to find out about the challenges faced by scientists and researchers.

As part of the FEST11 programme of lectures, distinguished Greek and international scientists and researchers will present the latest technologies and the most recent scientific and technological discoveries, while science communication experts will highlight the tools that can be used to bring science to the general public. The morning activities are mainly aimed at school students, who can take part through organized groups. The programme includes a series of laboratory experiments and other educational activities. The evening presentations cover a wide range of scientific lectures and are aimed at young scientists, students, teachers and the general public.

The FEST11 programme will end with the final round of School Lab competition, which we are running for the first time in Greece. School Lab is an innovative programme designed to help young students between 10 and 15 to understand the exciting challenges of science, to develop critical and creative thinking through innovative activities, to gain the confidence and skills required to present their ideas, to see young scientists as role models and establish an online community that will bring students, teachers and researchers together. School Lab has been funded by the General Secretariat for Youth – Institute for Youth, through the Programme "Youth in Action" of the European Commission.

 Students that take part in the programme will form teams of 2–3 people, choose and present a scientific topic, record the presentation on video and upload the video to the school lab website. The students have mentors which are scientists, all finalists in FameLab, the science communication competition created by the Cheltenham

Festivals and organized internationally by the British Council. They guide the students throughout the programme via webinars delivered via the web platform and also via school visits that will run in major Greek cities (Thessaloniki, Athens). With their help and support, participants will develop their chosen scientific topic while at the same time becoming familiar with the research process.

(http://www.britishcouncil.org/greece-science-school-lab.htm)

After participants upload their final 3–5 minute video presenting the scientific topic they've chosen a panel of judges will vote for the participant's presentations. The judges are leading figures from the world of science and the media. The best teams will take part in a Science Fair in Athens where they will present their work on stage and the best team will travel to Cheltenham to attend the Cheltenham Science Festival.

7.2 The Beautiful Science project - FameLab Competition

The Beautiful Science project takes a unique approach to the challenge of improving science communication and has been developed through the combined efforts of colleagues in Azerbaijan, Austria, Bulgaria, Croatia, Greece, Israel, Romania, Serbia, Turkey, and our Science, Engineering and Technology team in the UK. It focus on two closely-related areas of activity – helping young scientists to develop the skills needed to communicate their work to a wide, non-professional audience, and demonstrating good practice in embedding science in popular culture through public events.

A Beautiful Science event is FameLab Competition 2011 Grand Final that cast vote for the winner of the Audience Award and find out who will be chosen to represent Greece at FameLab International taking place at the Cheltenham Science Festival this summer. Based on the highly successful UK FameLab model, FameLab is an international talent competition to find the best new talent in science communication.

Originally created by the UK's Cheltenham Science Festival the idea behind the competition is to take science out of the classroom and make it fun, and to encourage young people with a passion for science and technology to share their enthusiasm with the general public. The aim of FameLab is to encourage young scientists to inspire and excite public imagination with a vision of science in the 21st century. We are searching for the new faces of science in Greece, people who are able to develop their ideas and presentation skills for a non-specialist audience.

The competition is open to anyone aged 18 or over resident in Greece who has a university degree – or who is studying for one – in a science subject. The expectation is to inspire and excite public imagination by giving an entertaining and original talk that is scientifically accurate in front of a live non-scientific audience. The judges are looking for content, clarity and charisma. The finalists will be asked to give a new presentation of up to three minutes on a contemporary science topic that is different from that presented at the qualifying round. The judges, which are leading figures from the world of science and media will ask the finalists questions on the topic and give them feedback. The FameLab Greece winner chosen at the final will win an all-expenses paid trip to the UK for the Cheltenham Science Festival on 7–12 June 2011, where he/she will compete in FameLab International 2011 together with the winners of the other FameLab Competitions taking place around the world.

Beautiful Science provides a creative platform for science communication projects. Through arranging a high level of interaction between creative individuals and partner organizations in the UK and South East Europe it encourages young scientists to communicate with the wider public, in an inspired and interactive way, it inspires young people to consider a career in science and promotes science as part of popular culture. It uses master classes, competitions and interactive events to engage young scientists and the public in discussion of new science. It consists of three main elements: FameLab – a competition designed to identify and nurture talent in science communication. Visualize – a theatrical show demonstrating the wonder and beauty of science without using words and Debates – a series of intercultural dialogues exploring the nature of contemporary science and its significance for our lives.

(http://www.britishcouncil.org/greece-science-beautiful-science.htm)

7.3 International Science Film Festival of Athens

Another science event taking place in Greece is the International Science Film Festival of Athens will at Cervantes Institute in Athens in November 2011. Competition screenings will take place daily from 19:00 to 23:30 and also special morning screenings for high school children are on schedule. The President of the International Film Festival Teleciencia (Spreading Scientific Knowledge with Film) and International Association of Multimedia on Science Membership (Scientific Board Member) (Portugal) is Maria Joao Faceira which is Science Communication Consultant for Labtomedia in Brussels. Members are a film director, the Program Advisor at Hellenic Parliament Television in Greece, doctors in Cell Biology, Hellenic Pasteur Institute, in Artificial Intelligence, in Physics and in Art Sciences,

the President of IAMS (International Association for Media in Science), a Journalist and a Pathologist. The organizer is the Centre of Science, society and art in collaboration with Institute Cervantes Atenas. Themes of movies are physics, biology, chemistry, genetics, medical, astronomy, nature, environment, science of behaviour, psychology, psychiatric, technology, culture, anthropology, civilization, geology, nanotechnology, industrial design, biodiversity, climate change, cosmology, sustainable development etc.

7.4 The International Thessaloniki Film Festival

Another event for which Thessaloniki is renowned is the International Film Festival which held each November and includes a variety of artistic happenings related to cinematic art. The International Thessaloniki Film Festival has become the Balkans' primary showcase for the work of new and emerging filmmakers, as well as the leading film festival in the region. Since 1992, the International Thessaloniki Film Festival has striven to present the most innovative independent films from around the world. The International Competition section consists of new directors' first or second films. A number of other events organized by the same institution take place all year round, such as the Documentary Festival in March and the Videodance Festival in September featuring films about dance.

7.5 "Open Doors"

The Hellenic Pasteur Institute highly responds to the need of the diffusion of Cutting Edge Scientific Knowledge in Biology to Teachers of the Secondary School education

took upon the initiative and organized a series of training courses for secondary school Biology teachers (2006 -2007).The courses were focused on "Cutting-edge technologies in the Bio-sciences".

These activities were organized in the context of a larger project entitled "Open Doors" having as main goal the communication between science and society. This project was funded by the Greek Secretariat for Research and Technology. The basic scope of the courses was not only to transfer new technical information concerning the new knowledge to the Biology teachers but, as well to present the new knowledge and its applications in an interdisciplinary way. The initiative was to transfer the message for a new, not only scientific but social reality to the teachers who can act as vehicles of this new reality to the high school students. To achieve this goal researchers of the Hellenic Pasteur institute in a unique collaboration with the European Learning Laboratory for the Life Sciences have organized for the first time in Greece three 3 day courses. The instructors teaching in the courses came from the Hellenic Pasteur Institute and other Greek Research Institutes and Universities.

The activities were held in the amphitheater of the Hellenic Pasteur Institute and the participants realized that they were not alone in this need but they constitute a central interest of the European politics and of the scientific community. It also became obvious to them that new ways of communication are opening between the researchers and the educators of the younger generation. Each course had duration of three days. It was consisted of a theoretical part and a practical training. The theoretical part consisted of lectures with an interdisciplinary character, designed to comprise recent advances, corner-stone discoveries, basic principles, applications and

social reprecautions of cutting edge technologies in Biosciences. Social and ethical implications of the new knowledge were also discussed.

7.6 Other events:

Athens Summit on Climate Change and Energy Security which demonstrate that Climate Protection and Energy are not contradictory or separate objectives. Its purpose is to bring together the energy and environmental communities in order to forge a common understanding of the challenges facing the Mediterranean region's sustainable development, as well as to provide a unique networking opportunity for all interested parties.

The Athens Video Art Festival 08 in Athens that aims at the support of digital culture and the promotion of this modern and innovative form of expression. Furthermore, it gives the artists additional motives to create and a platform to share their artistic vision with the public. (www.athensvideoartfestival.gr)

The Ecocinema International Film Festival that take place in Piraeus at the Town Hall Square. The films cover a wide range of vital issues the world is facing today - man and the environment, globalization, societies in crisis, and war – and the creative ways that people have found to deal with them. (www.ecocinema.gr)

The exhibition ENERGY for Renewable Energy Sources at Exhibition Centre MEC Paiania under the aegis of the Ministry of Development and the Ministry for environment, physical Planning & Public Works. Together take place the exhibition PHOTOVOLTAIC.

A science fair on solar energy was organized by the 9th Primary school of Rethymno, Crete. The class was split in 3 big groups of 12 children with 6 pairs of children in each big group. Each of the three big groups had their own set of projects, which was solar water heaters for the first group, solar cookers for the second and solar toys for the third. The children worked in pairs and developed projects and constructions which had to be functional and tested; therefore they had to develop certain techniques and deal with particular problems throughout the development of their projects. Apart from the coordinator's supervision and assistance, children also received some help from two more teachers from the school staff. Most of the supervision in the afternoon sessions for each pair of children was conducted with the aid of four 3rd year student-teachers from the local University Department. The science fair received some funding from an EU project on environmental science education, which helped us purchasing some of the materials needed in the science investigations and projects.

Free science fair at Rhodian school in Rhodes Town has interactive experiments, games, shows and modeling contests with the aim of giving children a positive attitude towards science.

There are also Annual International Conference on Tourism, Annual International Conference on Mediterranean Studies, workshops on Astronomy, Astrophysics and Cosmology, Meetings on Complex Systems, Chaos and Self-Organization, workshops on Analytical Chemistry, workshops on Calculus, Differential Equations and Integration, workshops on Graph Theory and Combinatorics, workshops on Probability and Statistics, workshops on Applied Maths: Economics and Finance, workshops on Applied Maths: Dynamic Systems, Control and Automation,

workshops on Applied Maths: Neural Networks and Artificial Intelligence, workshops on Robotics & Automation, workshops on Information Security, workshops on Medicine (in general), workshops on Molecular Biology, international conference on artificial intelligence, global security, safety and sustainability, symposium on intelligent interactive multimedia, oracle days etc.

8. The context of Science & Technology in EU – views of citizens

Europe is in a critical condition due of the changes on its external environment but also due of the economic crisis. Beginning 12 years ago, it was when the Lisboa Strategy was launched. It hoped that by 2010 EU would be the most competitive strategy in the world and its competitiveness would rely on its human capital and innovations. It is obvious that the concept of this strategy was the ideal for the development of initiatives regarding science and technology in EU.

The Lisbon Strategy set some ambitious objectives so to create a knowledge-based economy which would give priority on research and innovations. The major driver of changes and development was science and technology, along with the appropriate investments on those sectors. However, something went wrong and EU missed those targets. It is not easy to blame and find what went wrong. For example, the economic crisis surely derailed any attempt of EU to concentrate on science and development while at the same time some member states did not have the necessary infrastructure so to focus on research and science. Furthermore, the agenda has not take into consideration the impact of accession of 10 new members in EU along with the

technological leadership of USA, Japan and China which continued investing into new technologies. (Lisbon Strategy evaluation document, Brussels, (2010), 114, final) (http://ec.europa.eu/growthandjobs/pdf/lisbon_strategy_evaluation_en.pdf).

In 2010, while EU was in the middle of an economic turmoil and it had realized the failure of Lisbon Strategy decided to renew its interest on science and technology as forces which lead to competitive advantage through the Europe 2020 strategy. The focus of the new strategy was to get EU out of the crisis and to prepare her to meet the challenges of the new decade but also at the same time to develop by creating new jobs in a greener and more innovative economy. (Lisbon Strategy evaluation document, Brussels, (2010), 114, final)

(http://ec.europa.eu/growthandjobs/pdf/lisbon_strategy_evaluation_en.pdf)

Eurobarometer has made two surveys in order to investigate the interest of European citizens on science and development. More precisely, according to the Eurobarometer (2008) there was a survey made in 2000 and in 2005 which focused on the views of EU's citizens on science and technology. The researches indicated a divergence between the views of EU's as an institution and its citizens. On the conclusion of both surveys it was mentioned that EU needs to increase the awareness of its citizens about science and technology as a vehicle of development. The research have also identified that citizens were calling for more information on such projects and better transparency so to know where their money was going to (Eurobarometer, 2008).

Regarding the Lisbon Strategy itself, it managed to increase the share of money given on research and technology on 20 out of the 27 member states. However, the outcome

was disappointing and the overall research and development performance was much lower than the expected one. Overall while the investments in science and technology was the average 1.82% of EU's member states GDP in 2000, in 2008 it reached 1,9% which is a narrow development and out of the targets set from EU, which was 3%. Hence, besides the efforts made from EU, there was a lack of consensus while many countries, due of the economic crisis, have shifted their interest on the sustainability and the recovery of their economies along with austerity measures which affected science and technology in a large extend (Eurobarometer, 2008).

Another survey was made from Eurobarometer (2010) which asked the views of the EU's citizens on the need of research centers. The answers were the following:
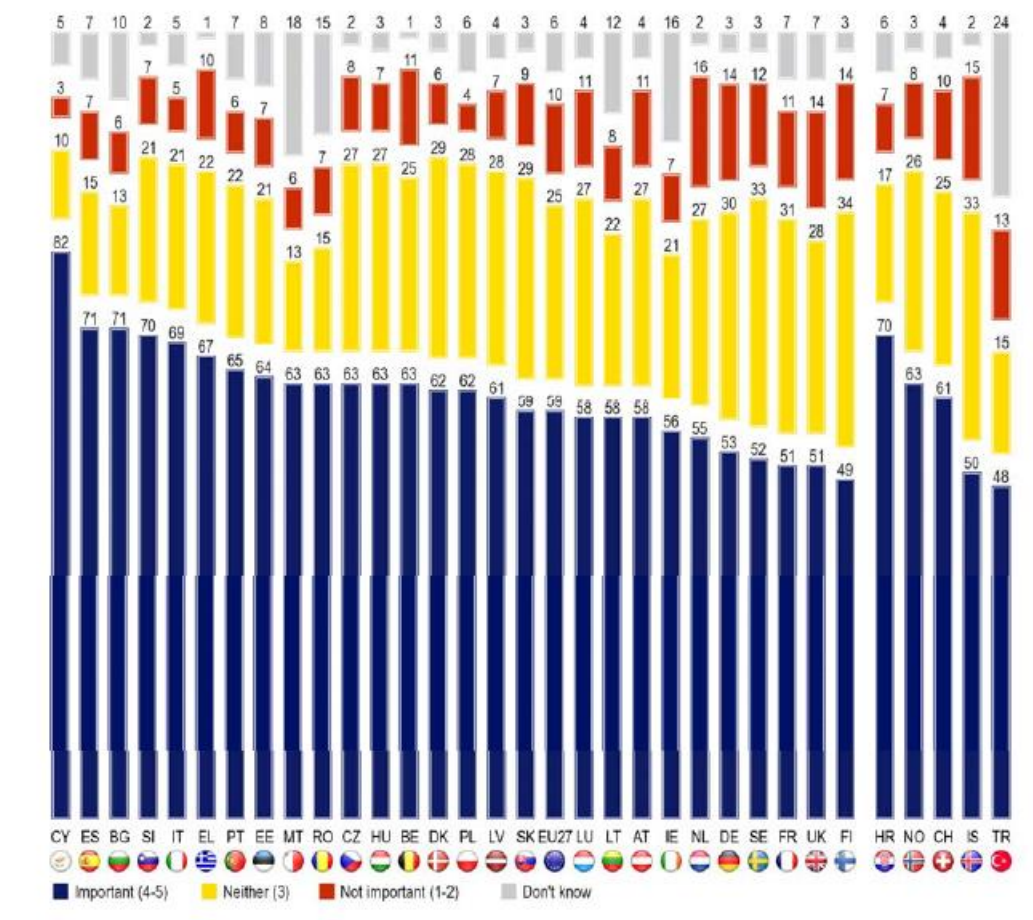
Source: Eurobarometer, 2010

From the survey's results we can see that those who have the most positive view on such issue are the Cypriots with 82% while Turks (48%) and Finnish (49%) are opposing in such an initiative. However, the average in EU and its linked countries is 59%. Further analysis shows that men are more positive than women on the creation of research centers. Furthermore, those who have an interest in science are more positive with such institutions along with those who feel that they are pretty informed on such issues. On the other hand, there is the case of having persons who have declared that in general they are not concerned about science in Europe and they have a negative or neutral view on the operation of such institutions (Eurobarometer, 2010).

As it was mentioned before, EU has set a number of targets regarding science and technology. As a matter of fact, in order to meet those targets and push forward for more changes towards research and development, there is a need to put the consensus and better knowledge of EU citizens and of major actors so to promote science and technology in EU.

9. The assessment framework for Science & Technology

At this point it is essential to mention that there is not an official toolkit or framework for assessing the impact of science and technology into the society and development in general. One of the on-going projects in EU is called PLACES and it is run from 27 researchers from EU's member states.

The main goal of PLACES (Platform of Local Authorities and Communicators Engaged in Science), a four-year European project, is to offer to a wide and diverse community of actors a common platform to structure their science communication activities, at city/regional level.

The PLACES project aims to contribute to the creation of instruments that allow for the study of the impact of initiatives and policies related to science communication (SCIP). All of this contributes to the definition of the concept of "Cities of Scientific Culture".

The project is based on three fundamental elements:

- City Partnerships will foster functional interactions, between local stakeholders to develop effective, science communication policies. City Partnerships arise from science communication and institutions forming alliances with local policymakers. There, are currently 67 City Partnerships in PLACES representing, 27 European countries. These cooperative relationships will yield Local Action Plans, targeting science communication policies in European cities and regions. City Partnerships will also grow to involve media, nongovernmental, organizations, universities, research institutions, companies, and more.

- Local Action Plans (LAPs) will target key challenges in cities, using scientific problem- solving. LAPs are strategic visions that will inform science communication policy at the local level for many years to come. Developments of LAPs are led by City Partnerships and they address science

and technology-related issues, relevant to their respective city or region. This is why citizen, consultation is also a key step in drafting LAPs.

- Pilot Activities will test innovative approaches to communicate science-based solutions in cities. Pilot Activities will be developed in connection with Local, Action Plans, to test innovative practices on how to address controversial or problematic local issues in a way that actively involves citizens.

At the heart of this project lies the fact that there is a need to bring together the research with regional and local development. Therefore, there is a need to bring together the concept of science and technology with local communities. For this reason, the PLACE project tries to build networks within the cities which will leverage the value of those projects. Bennett & Savage (2004) have argued that science and development need to go side by side with the needs of the society. Friedman (2010) have also claimed that in today's economy competitive advantage does not derive from traditional scientific management, which was to improve the production by various methods, such as to use more labour or make intense the production line, but lies on the ability of a society – economy to produce innovations which will rely on high technology and they would not be able to be copied from other sources.

Emphasis on the PLACE project is given on the tools of research. In general terms it can be said that social scientists use quantitative and qualitative methods for data gathering. Quantitative methods represent data numerically, while qualitative methods use descriptions and texts (or images, in some cases). A survey is normally considered a quantitative method, particularly when it contains closed questions. Other

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quantitative methods in the field of SCIP could include institutional data about the number of visitors, budget, jobs created by the SCIP, etc. Examples of qualitative methods are interviews, focus groups, and observation. The following list presents instruments or study modules that have been selected to analyze each level of impact. Decisions have taken into account both adequacy of the method as well as practical considerations related to the available resources within the framework of this project (Neuman, 2011).

Study modules to analyze the impact on public

Module A1: Semi structured interviews with visitors (including module for repeated visitors about long term impact)

Module A2: Standardized survey of visitors

Module A3: Focus group with ordinary citizens

Study modules to analyze the impact on political sphere

 Module B1: Semi structured interviews with observers at science center at city level

Module B2: Document analysis

Study modules to analyze the impact on actors

Module C1: Semi structured interviews with relevant actors at science center

Module C2: Focus group with relevant actors at science center

Module C3: Focus group with relevant actors at city level

Indeed, we can see that there is a plethora of tools used which rely on the concept of triangulation. At this point it is important to analyze the options that we have when we have to set the tools used for a framework of research. The related literature provides us with numerous approaches on who to find the answers that we are looking for. A researcher who seeks to come up with an investigation which will give answers to his questions but it will also be reliable accurate on its findings, he must be able to defend his research choices. A researcher can choose from a variety of research approaches which are using quantitative or qualitative approaches. On some case he can even use

triangulation. Authors like Bryman (2004) suggest that triangulation is the best possible choice for a researcher due to the ability to cross check the results using different approaches.

The two key concepts are the qualitative and the quantitative data. Eisenhardt (1989) writes that theory can come up from the findings of the qualitative research, while quantitative research can be used to verify the newly found theory. So, what we propose is to use qualitative methods to obtain concerning the views of the actors about a project combined with qualitative data taken from secondary sources, such as industry reports but also from primary sources such as the views of visitors.

From the above paragraph we have mentioned several research methods. The qualitative part will take place in two phases; a focus group and then interviews. The test of the proposed framework of assessment will take place with the use of a questionnaire.

The reason for using qualitative research on such occasions is because qualitative research "treats theory as something that emerges out of the collection and analysis of data" (Bryman, 2004:270). Indeed, the practitioners of grounded theory, always according to Bryman (2004), believe that it is important to allow the creation of new knowledge and theories while, the contribution of the quantitative research is on testing those theories (Punch, 2006). Therefore, we conclude that based on the concept of grounded theory, we will use qualitative research to create a new theory and then we will test this new theory with quantitative research. In our case this is the creation of a assessment framework.

The key instruments that can be used so to acquire newly primary data are:

- Focus groups: A key question here is why to use those research methods and how they can combine each other. Focus group relies on the concept that people need to be interviewed in a rather unstructured way in order to expose their experiences about the examined topic. Hence focus group is used on examining ways on which a group of people, in conjunction with each other, can construct a general topic in which the researcher is interested to investigate. It allows the research to study how the subjects of the survey collectively understand the examined phenomena (Bryman and Bell, 2007). At this point it is interesting to refer on Bryman (2004) who claims that focus group has being the key research method used on social studies, as a method to avoid decontextualization, since they do not want to treat the individual as a separate social entity but they rather looking for the collective opinion. At this point focus group can be used in order to gather the views and perceptions of the interest groups and actors on the examined issue. Nevertheless, a focus group has some limitations which have to be presented. The researcher has poor control over the research process, while it is difficult to organize and analyze the data. The researcher may have to deal with participants coming from different backgrounds and having different ideas that may argue each other, while the group effect may mean that there may be persons who would like to say something that their opinion may be lost as they will not feel comfortable on exposing in public their views or experiences (Saunders et al, 2007). Focus group will be used on the early stage of the research in order to receive a first feedback from the interest groups so to conclude on some key findings which will be generic but they will constitute the early stages of the research.

- In-depth interviews. The focus group will reveal us some generic arguments. However, we will have to go forward in order to gather more specific data. This will occur with in-depth interviews. The advantage is that it has a greater breath of coverage; the researcher can look his subject on his / her eyes and make questions that the persons may not want to expose them on public. Also in-depth interviews can have a much more specific focus than focus groups, and therefore to constitute a central point on the survey (Punch, 2006). Bryman (2004) points that social research are also using in-depth interviews since female subjects of the survey can reveal their experiences, such as from a visit to a museum or from a development project. Having in mind that our research focus on science and technology as vehicles of development, the in-depth interviews will have a useful role for examining the views of the public on the examined issue. An important part of the process will be to gain the trust of the subjects of the survey. The researcher will have to prove his ethos and his ability to keep safe the records of the interviews. Therefore, in-depth interview can cover some of the disadvantages of focus group. Some of the limitations of in-depth interviews are they are taking too long as a process, while the data record and analysis is also lengthy and it can be affected from the biased view of the author. For this reason, in order to minimize the impact of the researcher's bias on qualitative researcher, we will use quantitative in order to cross check the model that we will develop.

- Structured questionnaire. The structures questionnaire is the key practice of quantitative methods. Measurements are useful to identify the casual relationships between the constructs of the framework that we examine. The

statistical survey can overcome a number of disadvantages that appear on qualitative data, such as the researcher's bias and the use of statistics to interpret the subject's views on the examined issue (Saunders et al, 2007). Therefore the research will help us to examine the validity of the proposed theory but also to cross check the results of the qualitative research. Despite the above mentioned advantages, Bryman (2004) mentions some limitation which will have to be considered, such as the overreliance on instruments and statistic methods which ignore the connection between the everyday life and the object of the research. However the combination of qualitative and quantitative methods can help the researcher to overcome this issue.

As a matter of fact, the PLACES assessment framework has combined the use of different approaches and methods. Those have been recorded on the next table and given as an example.

Public	**Institutional Sources:** about visitors (documents, website, information from organizer)	**Institutional Sources:** about visitors (documents, website, information from organizer)	**MODULE A3 (4-8 people per group x 1 or 2 groups):** focus group with (ordinary) citizens:
(local) Policy	**MODULE B1 (n≥ 5 people):** semi-structured interviews with observers or	**MODULE B1 (n≥ 5 people):** semi-structured interviews with observers or	**MODULE B1 (n≥ 5 people):** semi-structured interviews with observers or
Actors	**MODULE C1 (n≥ 5 people):** semi-structured interviews with relevant actors	**MODULE C1 (n≥ 5 people):** semi-structured interviews with relevant actors	**MODULE C3 (4-8 people per group x 1 or 2 groups):** focus groups with relevant actors

From the above table, we can see that there is a plethora of tools used. The combination of the tools used can provide to the researcher a holistic view of the research and science framework.

❖ **Methodology**

10. The science center

Eugenides foundation is a science and technology center which offers a variety of activities to visitors. Specifically, the most popular feature of Eugenides foundation is the planetarium which presents shows on several topics with an emphasis on space and astronomy. Another important feature is the interactive science and technology exhibition which contains three distinct themes 'matter and materials', 'sound and image', 'biotechnology'. A very informed library is also in operation and there are a number of other activities, science cafes, talks and lectures that are organized regularly.

The Eugenides Foundation is a place where apart from the exhibits special tributes are presented on topics relating to the relationship of Science-Technology-Society (e.g. "Café Science" - "Astronomical News"), and host multidimensional experiences that make it a site with significant lifelong learning opportunities. Eugenides Foundation is also offering educational programmes to pupils and the general public, presentations and conferences, special events and the Science Coffee House, open discussions on new research results of relevance to everyday life. The Eugenides Foundation was established in 1956 in the form of a private legal entity, implementing the will of the late national benefactor Eugene Eugenides. The first activity of the Foundation was the granting of scholarships to students and the writing and publishing of textbooks for students of vocational training centers. It grants 20 scholarships each year amounting up to a total of $300,000. It has 3 permanent science and technology exhibitions and conference facilities including an auditorium, a conference hall,

meeting rooms and the new digital planetarium. Its scientific library has 53.000 books and the new digital planetarium offers 3000 shows each year.

The planetarium is a synthetic training device that became a pole of attraction for students and general public. It is a scientific centre with an essential mission and objective goal of popularizing and disseminating information about the achievements of science and technology. Indeed, since its initial steps, it grew rapidly and evolved into a centre for education, entertainment and assistance for all the sciences. The public that visited its facilities was satisfied on the one hand, but the services offered were limited to the projections, regardless of how impressive they had become in the meantime. This realization gradually led to a change in the philosophy guiding its activities, and so the Planetarium ceased to be limited to just its physical facility, but expanded its activities beyond it with informative articles and interviews in the periodical press, with popularized science programmes on television and with educational lectures throughout the country. It was then decided that it should be turned into an informative, popularized educational centre, participating - in activities as part of social development, as only through broad cooperation with society could its function truly achieve its goal and grow.

Forty years after the creation of the first planetarium in Greece, the New Digital Planetarium, opened to the public in November 2003. With a dome diameter of 25 meters it is one of the largest and best-equipped digital planetariums in the world. It also has provided access to disabled persons. It is a scientific centre with the important mission of communicating scientific achievements to the general public and enlightening people about the nature of scientific research and technology. It is

internationally active as a part of various scientific organizations like the International Planetarium Society, the Euromax and the Giant Screen Cinema Association.

The Eugenides Foundation's Physics Experiment Collections and the Technical Exhibit Halls were created in 1966 and renovated 30 years afterwards creating the space for an interactive exhibition. The first periodic exhibition, titled Science of Sports, was held there in November 2003, staged by the General Secretariat for the Olympic Games in cooperation with the Eugenides Foundation in light of the 2004 Athens Olympic Games.

A permanent Interactive Science and Technology Exhibition has been on display in this new exhibition wing since December 2006 and is divided in three themes, "Matters and materials ", "Communication " and " Biotechnology". The Interactive Exhibition on Science and Technology seeks to bring the general public closer to the world of science and technology offering educational stimuli and seeking to contribute to teaching young people in particular.

The planning and implementation of the exhibited collections are based on the use of advanced museological tools, with high priority assigned to mechanical-interactive exhibits, interactive multimedia and audiovisual sources which are explicitly theme-oriented. The most important aspect of the exhibition is its interactivity. Visitors play an active, rather than passive, role: they are invited to touch, combine images and sounds, assemble various parts, observe and, in a word, to intervene in the exhibition environment. Visitors are able to repeat, to delve deeper and thus to gain motivation for further exploration. In this way, the exhibition cultivates and develops visitors' imagination and creativity. For the youthful audience the Interactive Exhibition on

Science and Technology constitutes an alternative approach to scientific laws and principles, complementing the methods and practices of schools.

The Café Scientifique/ Science cafe concept provides a unique forum for the discussion of topical and thought-provoking scientific issues in a way that is much more relaxed, informal and accessible than a public lecture. No scientific background is necessary – just an interest in the topic for discussion. The Eugenides Foundation, the French Institute and the British Council present a series of open dialogues among scientists-researchers and the general public with contemporary issues in science and technology. Participants have the opportunity to explore the latest developments in contemporary issues such as cosmology, biological evolution, consciousness, ecology, artificial intelligence and genetically modified foods. Meanwhile, scientists are partakers of the concerns of anxiety and expectations of citizens about the major scientific issues.

11. Research Method

For the Greek pilot study, 'Science centers and Museums' were chosen for investigation at two levels namely 'Public' and 'Actors' (see Table 1). A qualitative approach was used to carry out the interviews. Content analysis was employed for the analysis of the transcripts. Specifically, all the main themes identified in participants' responses are presented and discussed in the results section below.

Table 1: An overview of the PLACES evaluation scheme (in bold the areas selected for this pilot study)

	Science Centres and Museums	Science Events	Science Cities
Public	Institutional Sources about Visitors (documents, website, information from organizer) **Semi-structured interviews with visitors (including module for repeated visitors about long-term impact): MODULE A1 (n≥ 5 people)** Standardized survey of visitors: MODULE A2 (n=200 people)	Institutional Sources about Visitors (documents, website, information from organizer) Semi-structured interviews with visitors (including module for repeated visitors about long-term impact): MODULE A1 (n≥ 5 people) Standardized survey of visitors: MODULE A2 (n=200 people)	Focus group with (ordinary) citizens: MODULE A3 (n=2 focus groups, 4-8 people per group)
Policy Sphere	Semi-structured interviews with observers or stakeholders: MODULE B1 (n≥ 5 people)	Semi-structured interviews with observers or stakeholders: MODULE B1 (n≥ 5 people)	Semi-structured interviews with observers or stakeholders: MODULE B1 (n≥ 5 people) Document analysis: MODULE B2
Actors	**Semi-structured interviews with relevant actors: MODULE C1 (n≥ 5 people)** Or alternatively, focus groups with relevant actors: MODULE C2 (n=1 focus group, 4-8 people per group)	Semi-structured interviews with relevant actors: MODULE C1 (n≥ 5 people) Or alternatively, focus groups with relevant actors: MODULE C2 (n=1 focus group, 4-8 people per group)	Focus groups with relevant actors: MODULE C3 (n=1 focus group, 4-8 people per group) Or alternatively, semi-structured interviews with relevant actors: MODULE C1 (n≥ 5 people)

12. Procedure

Semi-structured interviews were conducted for both levels (i.e. public and actors) using the appropriate interview schedules from the toolkit already developed. All sessions were recorded and none of our recruits denied taking part in the pilot study. All sessions took place within the premises of the science center Eugenides Foundation either in the offices or the coffee shop. Data collection lasted approximately two weeks. The duration of each interview was between 30 and 45 minutes.

13. Sample

A. Public level

<u>Visitors</u>

Five visitors were interviewed. Two were students and three were parents accompanying their children. Four of the participants were repeat visitors and one was a first time visitor. Individuals who visited the Foundation can be differentiated into laypeople and members of the scientific community.

Laypeople are mostly students that visit Eugenides Foundation as part of a school visit or parents that accompany their children in order to spend quality time with them. The visit to the planetarium is a traditional informal learning activity. There are also university students or scientists, which are much more aware of what they are going to see. The planetarium enables both scientists and those with just a

basic education to enjoy exactly the same show and share the sensation of the overall general development in events and the relation between cause and effect.

B. Actors

<u>Representatives of science center/ museum</u>

Representatives of science center/ museum were one individual who was responsible for the science and technology exhibition and one individual responsible for the public relations of the science center.

<u>Scientist</u>

The scientist was one astrophysicist who worked as part of the team and who was responsible for the content of the science and technology exhibition and the lectures/ talks given in that context.

<u>Journalist</u>

The journalist who worked as a science journalist collaborated with the science center on a number of occasions – most recently as a contributor for the science café activities.

<u>Teacher/educator</u>

Teacher who had accompanied students in school trips four times in the past.

14. Results of the research

A. Visitors

<u>The image of Eugenides Foundation</u>

The public expressed its admiration about the pioneering work of the Foundation and its uniqueness. It is virtually the only place one can see scientific issues in the city. It is an informal learning environment which popularizes science and especially astronomy. Characteristically, a medical student said:

"*I come often to the planetarium because is the only place in town that offers this kind of issues to the public and popularizes science and especially astronomy…It's perfect that it can illustrate the issue that it talks about because you can see this in 3d and the shows are always such good quality*".

A mother accompanying her child told us:

"*In the planetarium I can do and see things that I cannot see anywhere else*".

A teacher who also accompanied as parent her child mentioned:

"*Planetarium is important for each citizen because it brings science and especially astronomy close to everybody*".

The Planetarium is a pole of attraction for students and the general public with an objective goal to popularise and disseminate information about the achievements of science and technology.

Eugenides Foundation is identified with the planetarium. The dome of the planetarium attracts most of the visitors while the interactive S & T exhibition is the least known aspect of the Foundation (probably due to its more recent opening in comparison to

the planetarium). Most of the interviewees from our sample when asked a question concerning the Foundation, answered having the planetarium in mind.

Characteristically a medical student asked:

"*When you say Foundation do you mean the planetarium?*"

She told us she had visited the planetarium and she did not know the other aspects or activities of the Foundation. Another student mentioned:

"*The advantage of the foundation is the planetarium with its dome*".

Enjoyment of the 3D scientific shows is the main attraction for most of the Foundation's visitors. This is probably the reason the Foundation is mainly identified with the planetarium.

The public highlights the sophisticated and high quality presentation of science in a very pleasant environment. When asked why she has visited the foundation one participant, a teacher answered:

"*We choose it for the child, because the planetarium is impressive for the children also… it's something unique, it's not just a museum…*"

Indeed the way that knowledge is transmitted in the planetarium is a memorable learning experience for the visitors, which increases visitors' knowledge and their understanding of science. Characteristically one interviewee says:

"*I have seen many shows about the universe…most of them are memorable…*".

In Greece this is an experience that most children can enjoy in the context of educational school visits. Most people remember the first time that visited the

Foundation because it was an experience that generated powerful emotions and awe for the immense universe. This kind of experience can have a long lasting impact.

<u>Lack of science communication in general and of science centers and museums in particular</u>

In Greece there is very little communication of scientific events, issues etc. Part of this problem is also evident for example in the public's notion that Eugenides Foundation is the planetarium. There is need for communicating the appropriate information with regards to the Foundation as a science center and not only as a planetarium. Furthermore, there is considerable need for advertising other scientific activities and the very important interactive Science and Technology exhibition. The interactive exhibition is unknown despite its intention to inspire love for teaching and learning about scientific topics in an enjoyable way. It could be as famous as planetarium because it offers visitors of all ages educational stimuli, seeking to contribute to teaching, particularly of young people, in the science and technology field and to promote a spirit of ongoing scientific and technological exploration. Its interactivity is one more advantage for visitors to play an active role and develop imagination and creativity. Characteristically, a teacher accompanying her child mentioned:

"*I would like it to be more open to citizens…*"

Furthermore, there are not so many debate or discussion events about contemporary science issues between scientists and the public in order to promote science and technology in society. There are no actions or events that are effectively communicated to the public. There is no context within which to organize events for

example and give society access to science. Characteristically a teacher accompanying her child answering our question whether she can compare the Foundation with other places where someone can deal with science said:

"*It's for sure the best…I can't think of another place where someone can deal with science…I haven't visited any other institutions of pure science… except museums…*"

In fact, none of the interviewees knew or had visited other science centres in the city. When asked about his expectations with regards to the museum he said:

"*…I would prefer more scientific interactive activities…not only shows but also to invite people to exhibitions and dialogue events….to propose things…*"

The role of the Internet as a mean of science communication is vital as it is universally accepted as the main way of advertising and communicating science. Indeed, most of the interviewees mentioned that get updated and informed about science issues mostly via the internet and less so via traditional media. This is evidence that in Greece, science issues and events are not so popular and it is up to the individual's personal interest, cultural, socio-educational background to look for them in libraries, science centers and the internet. Internet is the easiest, most accessible and cheapest medium.

Eugenides Foundation as a source of knowledge

The public indicates knowledge as a value. It is a way of life, of thinking and behaviour. They visit the Foundation in order to gain knowledge and information in an alternative way that can be effective and have a long lasting impact on attitudes. A student said:

"I have a personal interest in scientific issues and for this reason chose the planetarium as an enjoyable way to learn things…".

Learning in formal education is different from informal museum-based learning, as it is driven by visitors' own interests and most importantly they have personal choice and control over the experience. According to our observations visitors that come to the Foundation because they have a personal interest are much more conscious with regards to scientific issues and have a scientific culture.

Visitors' expectations of museum learning outcomes included gaining information, developing knowledge and skills, changes in attitudes and self-perceptions. A student said:

"The issue of the show can make me think...or seek information in the internet…"

Eugenides Foundation can promote some interest in S&T issues

Visits to the Foundation do not necessarily contribute to the audience's participation in scientific events due to lack of general scientific context-background. None of the interviewees had taken part in scientific events as a result of the visit to planetarium. A teacher said:

"Science is not an attractive topic we talk about…It does not concern many people and even if it does the context is not helpful".

Visitors of the Foundation watch relevant news in the media look for science information and discuss relevant issues more than before. Characteristically a medical student mentioned:

"The planetarium helped to increase my scientific interest."

However, there seems to be a change in their attitudes in the context of the affective learning. They develop intellectual curiosity and social capital. They share ideas, information, culture and values. It is possible that this impact will fade away without subsequent reinforcing experiences. People without a university education are not sure when to discuss scientific matters and find some scientific expressions of the planetarium presentations difficult to understand. They do not have such confidence in order to have a discussion on a scientific issue. A mother, who accompanied her child when asked whether she was likely to talk about scientific issues as a result of her visit to the planetarium said:

"I did not learn it all...some words of the show were difficult to understand...could be simpler."

While most of the visitors admit that the science exhibited in the Foundation is relevant to everybody, it was difficult to provide examples drawn from everyday life or to connect science with daily life. A mother who accompanied her child said:

"I can't give you specific examples… isn't everything explained by science…?"

Participants believed that the science is important for the development of contemporary society and highlight the negative aspects of science like nuclear energy and the bad effects of mobile.

Children who visit the Foundation are not appropriately prepared for their visit and they do not gain as much as they could. Teachers should have been trained or have acquired special skills in order to communicate issues of science and technology to their students. The impact of the visit can be affected dramatically by the quality of the teacher's preparatory and post-visit work with the children. Furthermore if the

children were encouraged by their parents at home about the ability of a science centre to enrich their existing knowledge, they will be probably more stimulated and positive to visit it.

Knowledge and Entertainment are the main motives for the visitors

The most common motive of the visit was the uniqueness of the issues raised by the Foundation, and the impressive way of their presentation. There is nowhere else in the city where issues about astronomy, universe etc is provided. A mother who accompanied her child told us:

"*…however all these (things) are beyond us but we have to learn about them for our own good*". Another one said: "*we choose the planetarium to visit because of the issues, the pleasant environment…you can see things that you cannot see outside…it makes your mind travel …the quality…*"

Another motive our participants mentioned was escape from everyday problems and routine. An interviewee said:

"*The planetarium can make your mind travel ….*"

Knowledge was also mentioned as an important motive. A student said: "*the planetarium is the only place where someone see good shows and in the same time learn things*".

Another motive mentioned was a comfortable and alternative way of gaining information and knowledge. Parents especially choose to visit it traditionally in order to promote intergenerational learning and strength the family bonds. The planetarium is as an enjoyable and effective learning environment. Visiting the planetarium is an

excellent way for people to learn things that they believed were beyond their learning abilities, for older generations to share their knowledge with younger ones and for experts to come into contact with the laypeople. A teacher when asked for which reason she has visited the Foundation answered us:

 "*We choose it for the child…and in the past we have chosen it again for educational purposes, for my nephew…*"

Finally another motive mentioned was curiosity. A mother who accompanied her child when asked for which reason she has visited the Foundation answered:

"*I was curious to see what the planetarium is exactly because my mother has been a lot of times and I came so….*"

B. Actors

The image of the Foundation and its personnel

Eugenides Foundation is one of the top destinations for a primary school in Athens as the activities it hosts and organizes are primarily targeted for this age group. During visits they go to the planetarium rather than the interactive S&T exhibition. The choice of Eugenides Foundation is very traditional one for school and family visits.

All of the interviewees expressed admiration about the institution and the work being done there. One of our participants characterized the institution as someone dealing with '*…true science…*'

He mentioned that one important criterion according to which Eugenides Foundation can be viewed as the top or at least amongst the three top science centers/ museums in the country is time. Eugenides Foundation has been in the forefront of science communication firstly with the planetarium and secondly with the interactive science and technology exhibition for decades. Its mission is to affect both children and adults specifically to help them understand science better and creatively motivate them. Overall, its mission is to promote science and technology in society.

The exhibition offers/ provides activities (talks, experiments) that target an audience of a certain age group and above 5, 6 or 7 and above. The planetarium aims to attract even younger children while the library targets an older audience. Some exhibits have been there for a long time even before the interactive exhibition was introduced in 2000. These are now displayed in the café of the Foundation. Several proposals with

regards to the set-up of the exhibition were considered and the Villette Paris proposal was chosen. The project manager of the interactive science and technology exhibition commented

'*The French placed a lot of emphasis on the aesthetic part of the exhibition however if I were to choose again I would prefer the emphasis to be on functionality*'.

There is no issue with regards to competiveness since the foundation is a non-governmental organization. The exhibits of the interactive science and technology exhibition are not being renewed however compared to other science and technology institutions abroad the exhibition has more activities. However, the community has a higher level of involvement in science and technology institutions abroad.

Lack of science communication skills in Greece

Most of our participants were of the opinion that there is virtually no science communication in Greece. There is no formal education or training for science communication either for scientists or journalists. Specifically the journalist interviewed told us that he never received any formal training before he started developing an interest in science communication and working as a science journalist. Furthermore, he mentioned that the online journal he works for is the only one who has a devoted science and technology section. None of the traditional media have shown such commitment to science.

Two participants commented on the fact that there is almost no science programmes broadcasted in the popular media (TV and radio). Furthermore, none of them are produced in Greece. Some participants mentioned that Greek people have brilliant minds but unfortunately not the context within which to operate and progress.

Those participants who worked in the science center stated that they do have communication skills although they have not received formal training for this. They feel they know how to talk to an audience but think that the level of difficulty depends on the topic or subject one has to communicate. The scientist working in the exhibition center said

'*...By coming into contact with the public, students and non expert audience you understand more about the average level so you can adjust the way you say things*'.

<u>Difficulties in communicating the center's activities</u>

Certain such problems with communication are: the term 'Foundation' is usually used for institutions dedicated to illnesses, disabled individuals etc. while the term 'exhibition' refers mostly to commercial exhibitions. Other problems are: access to the Foundation which is problematic as there are no metro / bus stops nearby. Also, there are no funds which can be used to renew exhibits.

<u>Personal gain/ motive for participating in the center's activities</u>

Participants' motivations were very similar. For example the journalist interviewed found belonging to a community of science or a science network to be the greatest motive for him personally and this in turn led him to get involved in several activities and events that the Eugenides foundation has organized in the past or currently hosts. He also stated that he shares a common goal with the Foundation namely the transfer of knowledge or helping the public learn about science and technology. This is the reason why he is proud to be associated with the center and continues to help with the center's activities or advocates the center's work. In response to our question as to what his motivation is he replied '*the love for science*'.

The scientist interviewed also stated that her motivation partly derives from the fact that her work is directly relevant to her area of expertise as the interactive exhibition deals with subjects such as astrophysics, technology and biology. Furthermore, the work environment is excellent and the colleagues are also exceptional. Finally, the work involves offering extra stimuli to kids which is very close to what she used to do before as a teacher. This is an informal education activity which makes learning fun where both parties enjoy it more.

The relationship between Science and the public as viewed by the actors

Most participants stated that they receive positive feedback from the public. One made the differentiation into two segments: laypeople and the scientific community. Communication with both segments is two-way. He stated that his science journalism helps open the mind of laypeople while their questions help to open his. Meanwhile his audience is getting larger. He stated that his relationship with the scientific community has also developed. Members of the scientific community now request his skills to communicate their work to the wider public.

One participant differentiated between the general public from school students as the reasons for visiting are not the same. Students generally visit Eugenides Foundation as part of a school visit and they are negatively predisposed a priori. However, the way the science exhibition is set up with the interactive displays wins them over. Conversely, members of the general public are much more aware of what they are going to see and their motive is purely personal. Often the public's ideas are used to create activities or conduct experiments. Usually they help generate a new topic list for activities however no ideas ever helped her with her research as it is a very specific topic in astrophysics.

Actors have collaborated with the British Council and the French Institute to coordinate and host the Café Scientifique. Individuals from the media as well as teachers contact the staff to ask for information with regards to the organization of the visit. These were all new contacts which however are not followed up. The publicity office is more suited and responsible for contact with the press etc.

Schools do not network with other institutions apart from the science center itself. Other institutions that schools might visit are the Goulandris museum which has an exhibition on dinosaurs dealing with the evolution of species and the disappearance of dinosaurs. Also, the naval museum which has an exhibition on the ancient warships and a three dimensional depiction of the Olympic Games is a popular destinations for schools.

Individual Differences in the roles played by the various actors

The role of the teacher

The role of the teacher is to accompany children but also take part in the activities with them. Afterwards, his role is also to conduct a discussion with regards to what they have seen, what made an impression on them and what they did not understand.

The school tries to use these cultural and educational visits and connect with society as well as other educational institutions outside the school environment. It is within the role of the teacher to accompany the students and therefore is not evaluated. In general, teachers are not evaluated by the school unless it is a private school.

The gain for teachers is the same as the students namely learning and how this evolves. Until a few years ago the only way to learn was through a book, the narration

of teaching staff and state channels. Thus personal status is not a motive. Doing the job well and having positive responses from the children after the visit constitutes a big motive. Furthermore, the encouragement and promotion of the love for science, technology and surrounding issues also constitute a big motive.

Role of scientist

The scientist employed in Eugenides Foundation is responsible for the interactive science and technology exhibition and the visits of the general public to the exhibition. Furthermore, the scientist is also responsible for the organization and implementation of the different activities which accompany the exhibition.

Role of the project manager

The project manager of the science and technology exhibition is an engineer. What he believes he has contributed to this project is his experience from the US where he completed his studies. Among other things he visits frequently other science and technology centers and museums and keeps up to date with their events and activities.

The role of the journalist

According to the journalist who was interviewed, the role of the journalist is very important. He strongly believes that journalists are key actors with regards to the communication of science to the public. He believes that they function as 'transmitters of knowledge' and have the power and authority to influence things. He sees himself as somebody who can show the public that there is still hope in Greece and good things are still happening.

15. Conclusions

According to our study science and technology is a basic element of civilization, society, culture, economy, education and policy of every country. Places that promote science and technology at local level contribute to the development of a country and at the same time are important means of diffusing scientific culture through society. For these reasons a survey in science centers could provide data that can strengthen science culture at local level and be useful in a long term for policy makers. In today's knowledge economy and considering the current economic situation in Greece a cohesive policy on science and technology could be a base for the increasing of a country's competitiveness.

The aim of our study was to collect data about the personal, public, economic and political impact of the Eugenides Foundation on people and society and to investigate the role of actors who collaborate with it. Eugenides Foundation is a science center which hosts a planetarium, an interactive exhibition, science events, scholarships, publications. It is one of the top science centers in Greece and relies on staff and volunteers for its daily functioning.

Personal impact might include learning outcomes, personal enjoyment and career development. Public impact can be thought of as the societal impact. Societal impact of the Foundation is defined as the effect that it has on people, organisations, and natural environment. It can affect youth employment, in local, regional and international tourism, in leisure activities, partnerships, volunteerism, urban development and transport. Political impact is related to government policies while

the economic impact can be defined as the effect on employment and the local economy, like income brought in by visitors and the creation of jobs.

The impact of the Foundation on its visitors is primarily personal and could be defined as the change that occurs as a result of the visit to it. Visitors gain scientific knowledge and as a result change attitudes towards science. A learning that can guide to an attitude change can be assumed as an affective one and this has to be the outcome of every kind of formal and informal way of learning.

Some have said that they come closer to science in a very pleasant and alternative way and started to show more interest for scientific issues. Most of them can easy recall their first visit describing it as an experience that generates powerful emotions. A memorable visit can have a long lasting impact that can contribute in the building of scientific culture.

Specifically, in our sample visitors and actors both expressed their admiration about its pioneering work and its uniqueness. The planetarium is mostly famous for a high quality and sophisticated presentation of science in a very pleasant environment. The Eugenides Foundation is very important for the city of Athens but also the whole of Greece. However, most of the participants also stated that the interactive science and technology exhibition is not as well- known as the planetarium. In fact, Eugenides Foundation is identified almost exclusively with the planetarium.

Participants who collaborated with the staff of the center also stress that the staff are all highly qualified, with a strong interest in science and technology, the activities of the museum, the status and the future of the center. Certain problematic areas were highlighted by participants such as the minimal publicity of the center's activities,

lack of resources, difficult access etc. A science center can contribute in the building of a closer contact among scientists and the public and bridge the differences through events and dialogue. Social cohesion and a different identity can emerge through sharing knowledge, ideas, culture and heritage. On a more personal level creativity and innovation can be benefited. The popularization of the science needs not only institutional but also financial and political support. It has also to be relevant to the citizens' reality and interests. There is need for dialogue events that can effectively communicate science to the public and in this way can help internet and advertising.

Many of the visitors of Eugenides Foundation were school students, parents or teachers accompanying these students. Learning that occurs after a visit to the center depends on prior knowledge and interest of the learner is mediated by other people like parents, teachers and peers and is influenced by other sources of information like books, TV programs, school and the Internet. The experience and learning which has resulted from a visit to the foundation is highly personal. It would be worthwhile the visits in the Foundation and the planetarium shows to be supported by the proper preparatory and post-visit work and with encouragement at home or school.

The visit in the Foundation also was very encouraging for the family ties. Parents want to spend quality time with their children and they strengthen their bonds through participating in their learning and their personal enrichment by an alternative way. Activities in museum demand active engagement and awareness. In a general way emerges a supportive climate for science and 'scientific culture'. Knowledge is central issue for the Foundation not only as gaining information but as way of life and thinking as well. The diffusing of science culture through these visits is aimed to help people to understand the world they live in and improve their ability to make choices

and participate in an active manner in the management of their communities and society as a whole

A general observation which has resulted from this case study is that there is a lack of science culture and context. Citizens are not interested in science and this can be confirmed though the weak presence of science in public life, public affairs and discourses in the media. Our findings show that citizens believe that science is something difficult to understand and use in their daily life. However a knowledge society is based on a Science and technology, the political vision does not support this idea. There is the need for a greater institutional commitment in Greece but also and across Europe in raising the profile of science as an integral part of society and development. There is need for networks that can strengthen the promotion of scientific culture as a basic item on the cultural agendas of European cities and regions

There is a need for further long-term study and research of the impact of museums and science centres on people and society. It would be useful to examine data relating to other initiatives and policies with regards to science and society and investigate whether these would be transferable to this country.

16. Limitations

A key limitation which underlies within this survey is the line between evaluation and assessment often is not well clear. A key distinction is that the evaluation refers on the outcome while the assessment on the impact of an action. At this case, the focus was given in assessing the key impact of a science center such as Eugenides foundation.

A key issue, like it happens on each research is to identify the scope and the nature of a series of research objects which can become the key point of the research. In our case, a key limitation was the lack of research centers in Greece and more precisely, the lack of en extensive network of research centers which would allow the wider linkage of science with the public. Indeed, there is the perception that science centers can link the public and development with science. However, in Greece there is limited number of research centers. This created a big issue for the research since the author has to restrict her research into only on center. The ideal would be to have a set of research centers but this was not done due of the lack of such research centers Hence the researcher had to limit herself only in one research center which creates a deficit for this research.

Another limitation was that the research had to go into mostly a qualitative one. In future research it would be vital to use a quantitative tool of research so to reach only the key actors but also a wider audience, mostly the average citizen, so to see what they are thinking of this issue and how we can capitalize their knowledge and perceptions.

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Appendix I – Questions of in-depth interview in Greek

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MODULE A1:

Semi-structured interviews with first-time visitors, immediately after visit

</div>

1. Γιατί επιλέξατε να επισκεφθείτε αυτό το μουσείο / επιστημονικό κέντρο συγκεκριμένα [το Ευγενίδειο]; Ποιες ήταν οι προσδοκίες σας (ως προς το περιεχόμενο, τη μορφή, κ.λπ.) αυτού του μουσείου / επιστημονικού κέντρου [το Ευγενίδειο];

2. Τώρα, μετά την επίσκεψη, σε ποιο βαθμό οι προσδοκίες σας έχουν εκπληρωθεί; Τι είχε ιδιαίτερο ενδιαφέρον για σας και γιατί; Ποια αντικείμενα, ποιοι τομείς ή τρόποι παρουσίασης δεν είχαν επιτυχία ή θεωρήσατε ότι παρουσιάζουν κάποιο πρόβλημα;

3. Εάν συγκρίνετε τώρα αυτό το μουσείο / επιστημονικό κέντρο [το Ευγενίδειο] με άλλα πιθανά μέρη όπου θα μπορούσε κανείς να ασχοληθεί με την επιστήμη - πώς θα το αξιολογούσατε; Ποια είναι τα πλεονεκτήματα και οι αδυναμίες αυτού του επιστημονικού κέντρου / μουσείου κατά τη γνώμη σας; σε σύγκριση με άλλα που έχετε επισκεφθεί; (Αφήστε τους ερωτηθέντες να εκφραστούν ελεύθερα, σύμφωνα με τα δικά τους κριτήρια).

4. Εάν σκεφτείτε άλλα πολιτιστικά και επιστημονικά ιδρύματα σε αυτή την πόλη - ποια νομίζετε ότι είναι η σημασία αυτού του μουσείου / επιστημονικού κέντρου [το

Ευγενίδειο], σε σύγκριση με αυτές; Γιατί πιστεύετε ότι αυτό το μουσείο / επιστημονικό κέντρο είναι [το Ευγενίδειο] σημαντικό για την πόλη;

5. Πώς σας αφορά προσωπικά η επιστήμη που παρουσιάζεται σε αυτό το επιστημονικό κέντρο / μουσείο; Θα μπορούσατε να μου δώσετε μερικά παραδείγματα από την καθημερινή σας ζωή, όπου η επιστήμη που παρουσιάζεται εδώ έχει παίξει σημαντικό ρόλο;

6. Κατά τη γνώμη σας, πόσο σημαντική είναι η επιστήμη για την ανάπτυξη της σύγχρονης κοινωνίας; Για ποιες περιοχές η επιστήμη παρουσιάζει ιδιαίτερο ενδιαφέρον; - Θα μπορούσε να μου δώσετε μερικά παραδείγματα;

7. Κατά τη γνώμη σας, υπάρχουν χαρακτηριστικά / πτυχές της επιστήμης που βρίσκετε προβληματικά; Θα μπορούσατε να μου δώσετε μερικά παραδείγματα; Υπάρχουν παραδείγματα που μπορείτε να σκεφτείτε, όπου ανεπιθύμητες συνέπειες της επιστήμης γίνονται ορατές για σας στην κοινωνία;

8. Θα αισθάνεστε πιο σίγουροι να συζητήσετε επιστημονικά θέματα, ως αποτέλεσμα της επίσκεψής σας στο επιστημονικό κέντρο / μουσείο; (Αισθάνεστε περισσότερο ενημερωμένοι σχετικά με το υλικό που παρουσιάζεται από το επιστημονικό κέντρο / μουσείο με αποτέλεσμα να έχετε περισσότερη αυτοπεποίθηση;)

MODULE A1:

Semi-structured interviews with past / recurrent visitors to investigate long term impact

Ιδιότητα του πολίτη

1. Από την τελευταία επίσκεψη σας στο μουσείο / επιστημονικό κέντρο έχετε συμμετάσχει περισσότερο σε εκδηλώσεις επιστημονικής και τεχνολογικής πολιτικής (π.χ. εθελοντισμός στην οργάνωση σχετικών εκδηλώσεων, διαδηλώσεις) στην πόλη σας; (συγκρίνετε με την κατάσταση πριν την επίσκεψη).

2. Από την τελευταία επίσκεψη σας στο μουσείο / επιστημονικό κέντρο και μετά παρακολουθείτε ειδήσεις σχετικά με την επιστήμη και την τεχνολογία στα μέσα ενημέρωσης περισσότερο;

Καταναλωτισμός

1. Από την τελευταία επίσκεψη σας στο μουσείο / επιστημονικό κέντρο έχετε αγοράσει περισσότερα προϊόντα σχετικά με θέματα της έκθεσης; (π.χ. οργανικά, βιοδιασπώμενα / φιλικά προς το περιβάλλον, μη γενετικά τροποποιημένα, κλπ).

Πνευματική περιέργεια

1. Οι επισκέψεις σας στο μουσείο / επιστημονικό κέντρο σας έχουν ωθήσει να σκεφτείτε περισσότερο σχετικά με επιστημονικά τεχνολογικά θέματα -προκλήσεις;

2. Έχετε ψάξει πληροφορίες σχετικά με επιστημονικά τεχνολογικά θέματα ως αποτέλεσμα της επίσκεψής / των επισκέψεών σας στο μουσείο / επιστημονικό κέντρο;

3. Έχετε συζητήσει θέματα σχετικά με την επιστήμη και την τεχνολογία με άλλους, ως αποτέλεσμα της επίσκεψής σας στο μουσείο / επιστημονικό κέντρο; Γιατί επιλέξατε να επισκεφθείτε αυτό το μουσείο / επιστημονικό κέντρο συγκεκριμένα [το Ευγενίδειο];

Άλλο

1. Ποιες ήταν οι προσδοκίες σας (σε σχέση με το περιεχόμενο, τη μορφή, κ.λπ.) αυτού του μουσείου / επιστημονικό κέντρο [το Ευγενίδειο];

2. Ποια ήταν η πιο αξέχαστη εμπειρία για εσάς, ως επισκέπτη του μουσείου;

3.Εάν συγκρίνετε τώρα αυτό το μουσείο / επιστημονικό κέντρο [το Ευγενίδειο] με άλλα πιθανά μέρη όπου θα μπορούσε κανείς να ασχοληθεί με την επιστήμη - πώς θα το αξιολογούσατε; Ποια είναι τα πλεονεκτήματα και οι αδυναμίες αυτού του επιστημονικού κέντρου / μουσείου κατά τη γνώμη σας [το Ευγενίδειο], σε σύγκριση με άλλα που έχετε επισκεφθεί; (Αφήστε τους ερωτηθέντες να εκφραστούν ελεύθερα, σύμφωνα με τα δικά τους κριτήρια).

4. Γιατί πιστεύετε ότι αυτό το μουσείο / επιστημονικό κέντρο είναι [το Ευγενίδειο] σημαντικό για την πόλη;

ΟΔΗΓΟΣ ΓΙΑ ΕΚΠΡΟΣΩΠΟΥΣ ΕΠΙΣΤΗΜΟΝΙΚΩΝ ΙΔΡΥΜΑΤΩΝ

Μέρος 1: Η συμμετοχή του ερωτώμενου

Στην αρχή της συζήτησης μας, θα σας ζητούσα να μου εξηγήσετε τη συμμετοχή του ιδρύματός σας στην προετοιμασία και υλοποίηση της διαδραστικής έκθεσης. Ίσως θα μπορούσατε να αρχίσετε να μου λέτε πώς ξεκινήσατε συνεργασία με το συγκεκριμένο ίδρυμα;

Επακόλουθα ερωτήματα:

- Γιατί αναμειχθήκατε; Ποια ήταν τα κίνητρά σας;

- Ποιος είναι ο ρόλος σας σε εκδηλώσεις του ιδρύματος και συγκεκριμένα στη διαδραστική έκθεση; Πώς συνεισφέρετε;

- Τι είδους προσπάθειες και επενδύσεις κάνετε από την άποψη του χρόνου ή προϋπολογισμού;

Μέρος 2: Επιπτώσεις

Θα ήθελα τώρα να μάθω αναλυτικά τι σημαίνει η συμμετοχή σας στο ίδρυμά για σας. Υπάρχει κάτι που έχετε κερδίσει;

Κύρος και προβολή / δημόσια εικόνα

Αρχικό ερώτημα: Έχει αλλάξει η δημόσια προβολή και η εικόνα σας μέσα από τη συνεργασία σας με το κέντρο ή τη συμμετοχή σας στη διαδραστική έκθεση;

Προαιρετική ακόλουθη ερώτηση:

Με ποιο τρόπο; Πώς μπορείς να είσαι σίγουρος-η;

Ανταγωνιστικότητα

Αρχικό ερώτημα: Με ποιο τρόπο επηρεάστηκε η ανταγωνιστικότητα του κέντρου από τη συνεργασία σας ή από τη συμμετοχή σας στη διαδραστική έκθεση;

Επακόλουθα ερωτήματα:

- Πρόσληψη ερευνητών και άλλου προσωπικού;

- Πρόσληψη των φοιτητών;

- Οικονομικά οφέλη;

Αύξηση δημόσιας αποδοχής από την ερευνητική περιοχή σας

Αρχική ερώτηση: Έχετε προβλήματα με τη δημόσια αποδοχή του κέντρου σας;

Προαιρετική ακόλουθη ερώτηση:

- Υπάρχουν συνέπειες από τη συνεργασία σας με το κέντρο;

- Έχετε κάποια ένδειξη για αυτό;

Υπεράσπιση

Αρχικό ερώτημα: Σε ποιο βαθμό η συμμετοχή του ιδρύματός σας στην διαδραστική έκθεση, σας επέτρεψε να μοιραστείτε τους στόχους και τις προθέσεις του ιδρύματος με το ευρύτερο κοινό;

Προαιρετική ακόλουθη ερώτηση:

- Έχετε συγκεκριμένο στόχο με τη συμμετοχή σας στη διαδραστική έκθεση / τη συνεργασία σας με το κέντρο;

- Υπάρχουν στοιχεία που αποδεικνύουν ότι έχετε καταφέρει να πείσετε το κοινό;

Ανατροφοδότηση σχετικά με ανταπόκριση του κοινού στην έρευνα + νέα ερευνητικά θέματα και ερωτήσεις

Αρχικό ερώτημα: Τι έμαθε το ίδρυμά σας από τη διαδικασία; *Προαιρετικά επακόλουθα ερωτήματα:*

- Ανατροφοδότηση σχετικά με την ανταπόκριση του κοινού;

- Ιδέες για νέα θέματα (π.χ. ερευνητικά);

- Ευκαιρία να σκεφτείτε για τη θέση του κέντρου σας στην κοινωνία;

Δικτύωση μεταξύ φορέων των διαφόρων κατηγοριών

Αρχική ερώτηση: Εκτός από το ευρύ κοινό, με ποιον άλλο συνεργαστήκατε ή αλληλεπιδράσατε κατά τη διάρκεια της προετοιμασίας και της υλοποίησης της έκθεσης;

Προαιρετικά επακόλουθα ερωτήματα:

- Γνωρίζατε ήδη αυτούς τους ανθρώπους ή κάνατε νέες επαφές;

- Είναι οι επαφές που μπορέσατε να κάνετε ή να ενισχύσετε χρήσιμες για εσάς;

- Από ποια άποψη είναι χρήσιμες;

- Κάνατε κάποια σχέδια για συνεργασίες πέρα από την υπόθεση;

Θετική ανατροφοδότηση και κίνητρα

Αρχικό ερώτημα: Πώς θα αξιολογηθεί η συμμετοχή του κέντρου σας στην διαδραστική έκθεση μέσα στο πλαίσιο του ίδιου του κέντρου;

Προαιρετική ακόλουθη ερώτηση:

- Θα συμμετάσχει το κέντρο σας ξανά σε τέτοιες δραστηριότητες ή ήταν μια αποτρεπτική εμπειρία;

- Σε ποιους παράγοντες βασίζεται αυτή η εκτίμηση;

- Μέσα στο κέντρο σας - ποιος βαθμολόγησε την εμπειρία θετικά και ποιος κριτικά;

<u>ΟΔΗΓΟΣ ΓΙΑ ΔΗΜΟΣΙΟΓΡΑΦΟΥΣ</u>

Μέρος 1: Η συμμετοχή του ερωτώμενου στην υπόθεση

Στην αρχή της συζήτησης μας θα σας ζητώ να μου εξηγήσετε τη συνεργασία σας με το κέντρο/ συμμετοχή σας σε εκδήλωση του κέντρου. Ίσως θα μπορούσατε να αρχίσετε να μου λέτε πώς ξεκίνησε η συνεργασία σας.

Ακόλουθα ερωτήματα:

- Γιατί αναμειχθήκατε; Ποια ήταν τα κίνητρά σας;

- Ποιος ήταν ο ρόλος σας; Πώς συνεισφέρατε;

- Τι είδους προσπάθειες και επενδύσεις κάνατε από την άποψη χρόνου, προϋπολογισμού ή άλλο;

Μέρος 2: Επιπτώσεις

Θα ήθελα τώρα να μάθω αναλυτικά τι σήμαινε η συμμετοχή σας για σας. Υπάρχει κάτι θετικό που προέκυψε;

Ανταγωνιστικότητα

Αρχική ερώτηση: Η συμμετοχή σας είχε πλεονεκτήματα ή μειονεκτήματα (σε σχέση με συναδέλφους που δεν είχαν συμμετάσχει);

Προαιρετικά επακόλουθα ερωτήματα:

- Ποια πλεονεκτήματα ή μειονεκτήματα;

- Η εφημερίδα σας (ή το πρόγραμμα ή η ιστοσελίδα), θα είχε όφελος από τη συμμετοχή σας λαμβάνοντας υπόψη τον ανταγωνισμό ανάμεσα στα μέσα μαζικής ενημέρωσης ή όχι;

Απόκτηση δεξιοτήτων επικοινωνίας & βελτίωση προσόντων για την υποβολή εκθέσεων σχετικά με την επιστήμη

Αρχικό ερώτημα: Είχατε εσείς προσωπικά όφελος από την συνεργασία σας π.χ. αποκτώντας νέες δεξιότητες ή προσόντα;

Προαιρετικά επακόλουθα ερωτήματα:

- Τι μάθατε;

- Πώς θα επηρεάσει αυτό τη δουλειά σας;

Δικτύωση μεταξύ φορέων των διαφόρων κατηγοριών

Αρχική ερώτηση: Εκτός από το ευρύ κοινό, με ποιον άλλο συνεργαστήκατε ή με κάποιο τρόπο αλληλεπιδράσατε κατά τη διάρκεια της συνεργασίας ή της προετοιμασίας και της εφαρμογής της συγκεκριμένης εκδήλωσης;

Προαιρετικά επακόλουθα ερωτήματα:

- Ξέρατε ήδη αυτούς τους ανθρώπους ή κάνατε νέες επαφές;

- Οι επαφές που μπορέσατε να κάνετε ή να ενισχύσετε είναι χρήσιμες για εσάς;

- Από ποια άποψη είναι χρήσιμες;

- Κάνατε κάποια σχέδια για συνεργασίες πέρα από την συνεργασία σας με το κέντρο;

Κύρος και προβολή / δημόσια εικόνα

Αρχικό ερώτημα: Με ποιο τρόπο η συμμετοχή σας επηρέασε την προσωπική δημόσια

Προαιρετική ακόλουθη ερώτηση:

- Υπάρχει κάποια ένδειξη για αυτό;

Περισσότερο βάρος για επιστημονικά θέματα

Αρχικό ερώτημα: Τι βάρος δίνει ο οργανισμός σας σε επιστημονικά θέματα όσον αφορά στην κάλυψη του χρόνου στον αέρα / χώρου ή οι πόρων;

Προαιρετικά επακόλουθα ερωτήματα:

- Έχει αλλάξει αυτό το βάρος από την συνεργασία/ συμμετοχή σας;

- Με ποιο τρόπο; - Έγιναν κάποιες οργανωτικές αλλαγές ως συνέπεια της συνεργασίας σας/ συμμετοχή σας; (νέοι δημοσιογράφοι, νέοι ελεύθεροι επαγγελματίες, τροποποιημένη δομή του γραφείου σύνταξης, κ.λπ.);

- Για ποιο λόγο (ή γιατί όχι);

Συμμετοχή / δέσμευση για τη δημόσια επιστημονική επικοινωνία

Αρχική ερώτηση: Κοιτάζοντας πίσω, πώς σκέφτεστε σήμερα για τη συμμετοχή / συνεργασία σας ;

Προαιρετική ακόλουθη ερώτηση:

- Σχεδιάζετε να κάνετε κάτι παρόμοιο στο μέλλον ή αυτή η εμπειρία σας έχει απογοητεύσει;

Ενίσχυση Σταδιοδρομίας

Αρχική ερώτηση: Θεωρείτε ότι η συνεργασία σας / συμμετοχή σας θα έχει κάποια επίπτωση στην επαγγελματική σας σταδιοδρομία;

Προαιρετική ακόλουθη ερώτηση:

- Τι είδους επιπτώσεις;

Appendix II – Questions of in-depth interview in English

> **MODULE A1:**
>
> **Semi-structured interviews with visitors, immediately after visit**

The following grid for semi-structured interviews should be interpreted as guidelines. For technical details on how to conduct semi-structured interviews please refer to Methodological Considerations Chapter (p.24).

> **Important note:** Please retain the general term 'science and technology' throughout the interview scheme only in the case that the museum or science centre you are using covers a broad spectrum of science and technology topics. If the museum or science centre you are collecting data from has a very specific scope please replace the term 'science and technology' with a more specific relevant term or rephrase questions accordingly.

SCIENCE CENTER OR SCIENCE EVENT'S IMMEDIATE IMPACT

Questions to visitors of science centres/museums immediately after their visit about learning of key concepts, understanding principles, attitudes towards S&T, attitudes towards the science centre, motivation, inspiration, interest in following S&T news/events/innovations, beliefs about controversial issues, self-esteem, confidence.

1. Why did you choose to visit this museum / science centre in particular [fill in the name of the science centre]? What were your expectations (towards the content, the format, etc.) of this museum / science centre [fill in the name of the science centre]?

2. Now, after the visit, to what extent have your expectations been realized? What has been of particular interest to you and why? Which objects, areas or formats have been not successful or you found to present a problem?

3. If you now compare this museum / science centre [fill in the name of the science centre] with other possible places where one could engage with science – how would you appraise this? What are the strengths and weaknesses of this science centre /museum in your opinion [fill in the name of the science centre]? compared to others you have been to? (Allow respondents to express themselves freely according to their own criteria).

4. If you think about other cultural but also scientific institutions / activities in this city / region – what do you think is the significance of this museum / science centre [fill in the name of the science centre] in comparison to these? Why do you think this museum / science centre is [fill in the name of the science centre] important for the city / region?

5. How is the science exhibited in this science centre/ museum relevant to you personally? Could you provide me with some examples from your everyday life where the science presented here has played a role / was of relevance to you?

6. In your opinion, how important is science for the development of contemporary society? To which areas is science of particular relevance? – could you give me some examples?

7. In your opinion, are there any characteristics/ aspects of science which you find problematic? Could you give me some examples? Are there any examples you can think of where undesirable consequences of science become visible for you in society?

8. Would you feel more confident discussing scientific issues as a result of your visit to the science centre/museum? (Do you feel more informed about the material presented by the science centre/ museum to the point where it gives you more confidence?)

Questions to past visitors with regards to long term effects (memorable experiences, changes in behaviour and participation in public events). What we are looking for is long - term changes observed between two consecutive visits (at least six months apart). By past visitors we mean recurrent visitors or visitors who have come to the museum at least two times.

Potential respondents need to be asked 'Is this your first visit?' If the answer is no, then the second question needs to be asked 'how long ago was your last visit'. In order to be recruited at least six month should have passed between the first (or last) and the current visit.

[Citizenship]

1. Since your last visit(s) at the museum /science centre have you been more involved in S&T policy related events (e.g. volunteer in the organization of relevant events, demonstrate) in your city? (compare with the situation prior to the visit).

2. Since your last visit(s) at the museum / science centre have you followed news stories about science and technology in the media more closely?

[Consumerism]

3. Since your last visit(s) at the museum / science centre have you bought more products related to topics of the exhibition? (e.g. organic, biodegradable/ eco-friendly, non-genetically modified, etc).

[Intellectual curiosity]

4. Have your visit(s) to the museum/ science centre prompted you to think more about science and technology issues and challenges?

5. Have you searched information about science and technology topics as a result of your visit(s) to the museum/science centre?

6. Have you discussed issues around science and technology with others as a result of your visit(s) to the museum/science centre? Why did you choose to visit this museum / science centre in particular [fill in the name of the science centre]?

[Other]

7. What were your expectations (with regards to the content, the format, etc.) of this museum / science centre [fill in the name of the science centre]?

8. What has been the most memorable experience for you as a visitor of this museum?

9. If you now compare this museum / science centre [fill in the name of the science centre] with other possible places where one could engage with science – how would you appraise this? What are the strengths and weaknesses of this science centre /museum in your opinion [fill in the name of the science centre] compared

to others you have been to? (allow respondents to express themselves freely according to their own criteria).

10. Why do you think this museum / science centre is [fill in the name of the science centre important for the city/ region?

Module C2:

Focus group with relevant actors

(case studies "science centres" and "science events")

Here is the specific guideline to conduct the focus group corresponding to Module C2. For further technical details about this technique in the framework of PLACES project please refer to Methodological Considerations Chapter (p.24).

In this module, **one focus group** with 4-8 participants from the most important actors (or representatives of these actors in the case of institutional actors) should be conducted. If several actors of the same type were involved in the case (e.g. a group of scientists) one or two representative members of that actor type should be invited for the focus group. The main goal of this focus group is to measure the impact that participating in the event has caused on the actors represented in the focus group.

This module C2 is an alternative to conducting the semi-structured interviews of C1. However, the advantage of doing the semi-structured interviews of C1 rather than the focus group of C2 is, first, that the interviews will result in more detailed answers as respondents have more time to talk. Second, in most cases it will be easier to make individual appointments with several actors than a joint appointment with them. The main advantage of a focus group, different participants providing different views on the same subject, is not so important in this case as each participant would have to talk about impacts on himself/herself, and the other actors cannot reasonably add to that as they have no own experience about impacts on other actors.

For the purpose of identifying impacts on actors it may thus be preferable to use module C1 (individual interviews) rather than module C2 (focus group).

Selection of participants

Based on general knowledge of the case gathered in the preparation of the case study, the most important actors from the list of actors (see Table 2 at p.19) should be selected. The prospective participants have to be contacted and asked to agree to participate in the group.

Conducting the focus group

For the current case it seems useful to begin – after an introduction by the moderator – with a round of statements, giving each participant about 5 minutes to talk about his/her response and the respective institution's response to participating in the <case>.

After these statements the moderator should introduce the rather general question to stimulate the discussion: "What has changed for you by your involvement in <case>?"

The moderator's task is then to structure the debate, and – if necessary – to introduce key words from the list of potential areas or effects on actors (see above, p.21) in order to have the group think about a broad spectrum of possible effects.

Analysis

Ideally, the analysis of the focus group should be based on transcripts of the audio recording. It is less possible than in the case of individual interviews to do listening and summarizing in one step thus saving the need for transcription. As described in module C1, the analysis should focus on the explicit and implicit comments of the interviewee of how he/she or the institution they represent were affected (e.g. acquired skills and new insights, had benefits for their work, made useful contacts etc., see on p. 21 for a list of potential areas of impact or effects on actors). Indicators for such effects could be the self-reporting of the participants, but also information about follow-up activities or consequences of the participants' involvement in the case.

The analysis should thus result in a selective, structured summary of the focus group. It should identify the impact dimensions mentioned by the participants and the participants' description of the kind of impact, the size of the impact in the speakers' own words. The analysis should also include the required context information (e.g. about the participants role in the case) necessary to understand why this impact has occurred and why it is important to the participant. If the participant mentions that a particular kind of impact has not occurred, this should also go into the analysis.

Reporting

The analysis of the focus group will be a section in the case study report. It should consist of a verbal description of the impacts on the relevant actors structured by actor and impact type.

Scientists

Part 1: The interviewee's involvement in the case

At the beginning of our talk I would ask you to explain to me your involvement in <event>/ cooperation with <centre>. Perhaps you could start telling me how you became involved.

Follow-up questions

- Why did you become involved? What were your motives?

- What was your role in the event? How did you contribute?

- What kind of efforts and investments in terms of time budget or other did you make?

Part 2: Impacts

I would now like to learn in more depth about what your involvement meant for you. Is there something you got out of it for yourself?

*[Learning/getting feedback about public response to research + raising new research topics and questions]*Your involvement in <case> certainly contributed to the visitors' better understanding of science or science-related issues. However, did

you yourself also learn something by the interactions with visitors or got some ideas that are relevant for your work and - if yes - what did you learn?

Optional follow-up questions:

- Did you learn something relevant about "the public"?

- Can you remember what you learned and how?

- What about your research?

- Any ideas that crossed your mind when talking to laypeople that might lead to an interesting research question or some other advance of your research?

[Acquiring communication skills]

Starting question: Talking to laypeople about a subject is probably quite different from talking to colleagues about the same subject. What experiences did you make when you talked to the visitors of <case>?

Optional follow-up questions:

- Was it difficult for you to talk to the visitors?

IF YES:

- What was difficult?

- What did you learn about how to communicate with laypeople about science from your experience?

- What skills are you still lacking for communication about science with the general public?

- Have you received some training for public communication?

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[Networking between actors of different categories]

Starting question: Apart from the general public, with whom did you collaborate or otherwise interact during preparation and implementation of <case>?

Optional follow-up questions:

- Did you know these people already or did you make new contacts?

- Are the contacts you were able to make or intensify useful for you?

- In what respect are they useful?

- Did you make any plans for further co-operations beyond the <case>?

[Creating and using relevant expertise]

Starting question: Apart from explaining research and disseminating knowledge, do you remember talking with people about issues or problems, and offer - or receive yourself - advise or useful information related to those problems?

Optional follow-up question:

- What kind of problem were you discussing with people?

- Did the visitors that you talked to have some useful information to offer that contributed to your own understanding of an issue or problem?

- Can you explain that in more detail?

[Advocacy]

Starting question: Could you please explain to me the reasons and motives why you participated in the <case>?

Optional follow-up questions:

- In your interactions with the visitors, did you try to convince them of something? Of what?

- How did the visitors react to your attempts to persuade them?

- Do you remember talks where you were successful in your goal to persuade your dialogue partners?

Science institutions representatives

Part 1: The interviewee's involvement in the case

At the beginning of our talk I would ask you to explain to me your institution's involvement in <case>. Perhaps you could start telling me how you became involved.

Follow-up questions

- Why did you become involved? What were your motives?

- What was your role in the event? How did you contribute?

- What kind of efforts and investments in terms of time budget, money or other did you make?

Part 2: Impacts

I would now like to learn in more depth about what your involvement meant for your institution. Is there something you got out of it?

[Prestige and visibility/public image]

Starting question: Has your public visibility and image changed by your involvement in <case>?

Optional follow-up question:

- In which way? How can you be sure? Any evidence for that?

[Competitiveness]

Starting question: In which way was the competitiveness of your institution affected by your involvement in <case>?

Optional follow-up questions:

- Recruitment of researchers and other staff?
- Recruitment of students?
- Economic benefits?

[Increase public acceptance of their research area]

Starting question: Do you have any problems with public acceptance of your institutions or its research?

Optional follow-up question:

- Are there any consequences from your collaboration with <case>?

- Do you have any evidence for that?

[Advocacy]

Starting question: To what extent has your institution's involvement in <case> allowed you to share the institutions aims and intentions with the wider public?

Optional follow-up question:

- Did you have a particular aim with your participation in <case>?
- Evidence that you succeeded to convince the public?

[Getting feedback about public response to research + new research topics and questions]

Starting question: What did your institution learn in the cooperation with <case>?

Optional follow-up questions:

- Feedback about the public's response to your research?
- Ideas about new research topics?
- Opportunity to think about the institution's place in society?

[Networking between actors of different categories]

Starting question: Apart from the general public, with whom did you collaborate or otherwise interact during preparation and implementation of <case>?

Optional follow-up questions:

- Did you know these people already or did you make new contacts?
- Are the contacts you were able to make or intensify useful for you?

- In what respect are they useful?

- Did you make any plans for further co-operations beyond the <case>?

[Positive feedback and motivation]

Starting question: How is your institution's involvement in <case> assessed within your institution?

Optional follow-up question:

- Would your institution participate again in such activities or has this been a deterrent experience?

- On what factors is this assessment based?

- Within your institutions - who is rating the experience positively und who critical?

Schools (assumed interview with a teacher as representative of the institution)

Part 1: The interviewee's involvement in the case

At the beginning of our talk I would ask you to explain to me your school's involvement in <case>. Perhaps you could start telling me how you became involved.

Follow-up questions:

- Why did you become involved? What were your motives?

- What was your role in the event? How did you contribute?

- What kind of efforts and investments in terms of time budget, money or other did you make?

Part 2: Impacts

I would now like to learn in more depth about what your involvement meant for your school. Is there something you got out of it?

[Enhancing learning opportunities for students]

Starting question: In which way has your school's involvement in <case> enhanced learning opportunities for your students?

Follow-up questions:

- How many students were involved?

- What is different from "every day" teaching?

- Has the quality of the teaching improved? In which respect?

- Any evidence or examples?

[Competitiveness]

Starting question: In which way was the competitiveness of your school affected by your involvement in <case>?

Optional follow-up questions:

- Recruitment of teachers?

- Recruitment of students?

- Economic benefits?

[Networking between actors]

Starting question: Apart from the general public, with whom did you collaborate or otherwise interact during preparation and implementation of <case>?

Optional follow-up questions:

- Did you know these people already or did you make new contacts?

- Are the contacts you were able to make or intensify useful for you?

- In what respect are they useful?

- Did you make any plans for further co-operations beyond the <case>?

[Positive feedback and motivation]

Starting question: How is your involvement in <case> assessed within your school?

Optional follow-up question:

- Would your institution participate again in such activities or has this been a deterrent experience?

- On what factors is this assessment based?

- Within your school - who is rating the experience positively und who critical?

[Career enhancement]

Starting question: At the end of this interview I would like to ask about the consequences of your school's involvement in <case> for yourself. Which advantages and disadvantages did you yourself have by your schools involvement?

Optional follow-up questions:

- Consequence for your image and status within the school?

- Any ideas about moving jobs or doing something else?

Media/journalists (assumed interview with a journalist as co-organiser – not just reporter)

Part 1: The interviewee's involvement in the case

At the beginning of our talk I would ask you to explain to me your or your media organization involvement in <case>. Perhaps you could start telling me how you became involved.

Follow-up questions:

- Why did you become involved? What were your motives?

- What was your role in the event? How did you contribute?

- What kind of efforts and investments in terms of time budget, money or other did you make?

Part 2: Impacts

I would now like to learn in more depth about what your involvement meant for you or your media organization. Is there something you got out of it?

[Competitiveness]

Starting question: Your involvement in <case>, did this lead to advantages or disadvantages relative to colleagues who were not involved?

Optional follow-up questions:

- Which advantages or disadvantages?

- And your newspaper (or program or website), will it profit from your involvement (or reporting) relative to competing media or is there not such an effect?

[Acquiring communication skills & Enhance qualification for reporting on science]

Starting question: Did you personally profit from your involvement in <case> by acquiring new skills or qualifications?

Optional follow-up questions:

- What did you learn?
- How will this affect your work?

[Networking between actors]

Starting question: Apart from the general public, with whom did you collaborate or otherwise interact during preparation and implementation of <case>?

Optional follow-up questions:

- Did you know these people already or did you make new contacts?
- Are the contacts you were able to make or intensify useful for you?
- In what respect are they useful?
- Did you make any plans for further co-operations beyond the <case>?

[Prestige and visibility / public image]

Starting question: In which way did your involvement affect your personal public image and reputation or that of your media organization?

Optional follow-up question:

- Any evidence?

[More weight for scientific topics]

Starting question: What is the weight your organization gives to scientific topics in their coverage in terms of air time/space or resources?

Optional follow-up questions:

- Has this weight changed by <case>?
- How? - Any organizational changes as a consequence of <case> (new reporters, new freelancers, modified structure of the editorial office etc.)?
- Why (or why not)?

[Involvement / commitment for public science communication]

Starting question: Looking back, how do you think today about your involvement in the <case>?

Optional follow-up question:

- Are you planning to do similar things in the future or has this experience put you off?

[Career enhancement]

Starting question: Do you expect any effects of your involvement in <case> on your professional career?

Optional follow-up questions:

- Which effects?

Politics & public administration

Part 1: The interviewee's involvement in the case

At the beginning of our talk I would ask you to explain to me your and your institution's involvement in <case>. Perhaps you could start telling me how you became involved.

Follow-up questions

- Why did you become involved? What were your motives?

- What was your role in the event? How did you contribute?

- What kind of efforts and investments in terms of time budget, money or other did you make?

Part 2: Impacts

I would now like to learn in more depth about what your involvement meant for your institution. Is there something you got out of it?

[Competitiveness]

Starting question: In which way was the competitiveness of your institution (or yourself) affected by your involvement in <case>?

Optional follow-up questions:

- Political advantages over competitors?

- Impact on public image?

[Image of research]

Starting question: Your involvement in <case> - did it have any consequence for how you think about science, scientific institutions or a particular research field?

Optional follow-up questions:

- What did change?

- What caused this change?

- Does this change have any consequence for your decisions?

[Learning about scientific expertise]

Starting question: Was there anything you learnt from science during your involvement in <case> that might be useful for your policy-making?

Optional follow-up questions:

- What did you learn?

- In which way does it affect your policy?

[Networking between actors]

Starting question: Apart from the general public, with whom did you collaborate or otherwise interact during preparation and implementation of <case>?

Optional follow-up questions:

- Did you know these people already or did you make new contacts?

- Are the contacts you were able to make or intensify useful for you?

- In what respect are they useful?

- Did you make any plans for further co-operations beyond the <case>?

[Involvement / commitment for public science communication]

Starting question: Looking back, how do you think today about your involvement in the <case>?

Optional follow-up question:

- Are you planning to do similar things in the future or has this experience put you off?

Companies & industry

Part 1: The interviewee's involvement in the case

At the beginning of our talk I would ask you to explain to me your company's involvement in <case>. Perhaps you could start telling me how you became involved.

Follow-up questions

- Why did you become involved? What were your motives?

- What was your role in the event? How did you contribute?

- What kind of efforts and investments in terms of time budget, money or other did you make?

Part 2: Impacts

I would now like to learn in more depth about what your involvement meant for your company. Is there something you got out of it?

[Competitiveness]

Starting question: In which way was the competitiveness of your company affected by your involvement in <case>?

Optional follow-up questions:

- Impact on public image?

- Economic advantages over competitors? Marketing?

- Recruitment of researchers and other staff?

[Getting feedback about public response to R & D]

Starting question: Did you have a chance to inform about your own R & D activities in the <event>?

Optional follow-up questions (IF YES):

- What was the public's response?

- Was the feedback useful for your? E.g., did you learn about concerns of the public?

- Will this feedback have any consequence, for example for your public communication activities?

[Networking between actors]

Starting question: Apart from the general public, with whom did you collaborate or otherwise interact during preparation and implementation of <case>?

Optional follow-up questions:

- Did you know these people already or did you make new contacts?

- Are the contacts you were able to make or intensify useful for you?

- In what respect are they useful?

- Did you make any plans for further co-operations beyond the <case>?

[Advocacy]

Starting question: To what extent has your company's involvement in <case> allowed you to share the company's aims and intentions with the wider public?

Optional follow-up question:

- Did you have a particular aim with your participation in <case>?

- Evidence that you succeeded to convince the public?

[Involvement / commitment for public science communication]

Starting question: Looking back, how do you think today about your involvement in the <case>?

Optional follow-up question:

- Are you planning to do similar things in the future or has this experience put you off?

Third sector

Part 1: The interviewee's involvement in the case

At the beginning of our talk I would ask you to explain to me your and your institution's involvement in <case>. Perhaps you could start telling me how you became involved.

Follow-up questions

- Why did you become involved? What were your motives?

- What was your role in the event? How did you contribute?

- What kind of efforts and investments in terms of time budget, money or other did you make?

Part 2: Impacts

I would now like to learn in more depth about what your involvement meant for you and your institution. Is there something you got out of it?

[Advocacy]

Starting question: To what extent has your institution's involvement in <case> allowed you to share the institutions aims and intentions with the wider public?

Optional follow-up question:

- Did you have a particular aim with your participation in <case>?

- Evidence that you succeeded to convince the public?

[Getting feedback about public response]

Starting question: Did you have a chance to inform about your own activities in the <event>?

Optional follow-up questions (IF YES):

- What was the public's response?

- Was the feedback useful for your? Will this feedback have any consequence, for example for your public communication activities?

[Networking between actors]

Starting question: Apart from the general public, with whom did you collaborate or otherwise interact during preparation and implementation of <case>?

Optional follow-up questions:

- Did you know these people already or did you make new contacts?

- Are the contacts you were able to make or intensify useful for you? In what respect are they useful?

- Did you make any plans for further co-operations beyond the <case>?

[Competitiveness]

Starting question: In which way was the competitiveness of your institution affected by your involvement in <case>?

Optional follow-up questions:

- Impact on public image?

- Economic advantages – sponsors, donations?

- Recruitment of new members?

[Involvement / commitment for public science communication]

Starting question: Looking back, how do you think today about your involvement in the <case>?

Optional follow-up question:

- Are you planning to do similar things in the future or has this experience put you off?