



Platform of Local Authorities and Communicators Engaged in Science

Modules used: A3, B1, B2, C3

Science City

2012

This is a standardised version of the original case analysis number 7. Specific names and locations have been substituted from the original document number 7 with generic references in order to preserve the anonymity of each participant.

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Contents

Abstract 4

Introduction..... 5

Methods..... 7

Results 10

Conclusions 21

Recommendations 23

References 24

Abstract

The case study of this city as a scientific city was carried out from October to December 2012. In total, three modules (two focus groups with ordinary citizens, semi-structured interviews with stakeholders, document analysis and one focus group with relevant actors) were applied.

Ordinary citizens associated the term 'science city' with local science communication institutions. They referred to three groups of people characterising a science city: scientists, tourists and students. Citizens found a science city to be positive by nature and a preferred place for living and working. They regarded the new science centre as one of the most popular local institutions.

Stakeholders described three types of added values emerging from the communication of science and technology: raising awareness of citizens on science, raising popularity of natural sciences, awareness of public expenditures. Interviewees believed that citizens perceive themselves as belonging to an innovative society. They noted that science communication institutions, like the new Science Centre, have led to an increase in tourism and activated the local economy. They expressed criticism that science communication initiatives are financed as project-based, which is not a sustainable financial measure for follow-up projects. Interviewees stressed that institutions dealing with science communication have established new courses for students and citizens.

The major objective of policies is to advance the position of this city as an internationally competitive education and research campus. In the future, a knowledge-based economy is expected to prevail. However, document analysis revealed that this country's public is still moderately informed about the usefulness of science and scientists.

Actors considered this city as a favourable environment, with networks that can be useful for themselves or their institutions.

Introduction

The current study investigates the impact of initiatives and policies related to science communication (SCIP) in this city. This city was chosen for the case study as the most representative science city in this country. This city has two public universities –the local university and the national university of life sciences– and eight scientific centres of excellence. A majority of national researchers and members of the academic teaching staff work in this city. There are also numerous science museums. This city has a tradition of science museums since the beginning of 19th century. In May 2011 the newest and salient enterprise, the new science centre, was launched. Science events and festivals take place regularly. Various international high-tech companies like Skype employ people in branches in this city.

This city, with its population of 97,600 (Population Census data from 2011) in an area of 38.8 square kilometres, is the second largest city of the country. Lying 185 kilometres south of the capital, this city is also the centre of the southern part of the country. Since 2001, the ministry of education and research has operated in this country.

The Eurobarometer series of surveys on life sciences (reference 2) portrays citizens as eager adherents of technological optimism in a European context. Results of the entrepreneurship study in this city (reference 4) indicate that local entrepreneurs see the image of the city as the most attractive aspect of the investment climate.

Historically, this city has been a prominent university town. After the foundation of the university in 1632, it educated mostly specialists for local needs until the country joined another kingdom. In the 19th century, it was one of the leading universities in the neighbouring country's empire. The university became a bridge between the neighbouring countries, being the neighbouring country's state university. A European language was the language of instruction. Many prominent scientists, like Karl Ernst von Baer (the founding father of embryology) and Wilhelm Ostwald (Nobel Prize in Chemistry), studied and taught at this city's university. After gaining independence in 1919, it kept a high reputation among citizens. For the national public, this city has had a continuous reputation as a "university town".

Nowadays, this city is an internationally prominent science city. Scientific institutions in this city represent practically all national research areas and specialities. Results of the researcher mobility study (reference 3) reveal that scientists themselves tend to be convinced that the best way to be up to date

with the newest developments in their speciality in a country like this is to be internationally open.

Methods

The current study focuses on this city as a science city and investigates the impacts of science communication initiatives and policies (SCIP) on the citizens, actors and political sphere. According to the PLACES Impact Assessment Toolkit, four given modules were applied (see table 1).

In the case study, qualitative methods and document analysis were employed to collect information about influences of SCIP. A focus group interview method was chosen for public and actors' spheres, because it allows multiple individuals to be interviewed simultaneously and enables shared discourses which emerge during group discussion to be gathered.

Table 1. Modules and method used in the study

| Dimensions | Module | Study method |
|----------------|-----------|--|
| Public Sphere | Module A3 | Focus groups (n=2) with ordinary citizens |
| Policy Sphere | Module B1 | Semi-structured interviews (n=6) with different stakeholders (5 personal interviews and 1 group interview) |
| | Module B2 | Document analysis |
| Actors' Sphere | Module C3 | A focus group interview with relevant actors |

Sample design and procedure of interviews

Public sphere

The aim of the focus group interviews was to investigate views and estimations of citizens on this city as a science city and the impacts on their life of living there. The following criteria were followed in the sample formation: a potential participant should have lived in this city for some time; he/she has at least secondary education, and he/she has no working experience at the universities or research institutions and is not engaged in the organisation of science communication activities.

The focus groups were designed so that both groups would include an equal number of males and females. Two focus group interviews were conducted, 6 to 7 people in each group. Altogether, 13 individuals (7 men and 6 women) participated in the interviews. The age of the participants varied from 25 to 42 years old, the average age being 35.

Policy sphere

The objective of interviews with stakeholders was to assess the impacts of SCIP on policies, quality of life and education in this city, and the socio-economic effects. Certain criteria were taken into account in the choice of interviewees. Stakeholders working or having a position in institutions related to science communication, research and science policy-making in this city were invited to the interviews. The sample included 7 experts whose names and affiliations are presented below:

- TTe (deputy mayor of the city government; her responsibilities are education, culture, science and youth work);
- RT (deputy mayor of the city government; his responsibilities are development plans, urban planning);
- TTu (head of the department of science communication, national research council);
- PK (board member, the new science centre);
- VP (editor-in-chief of a science e-magazine of the local university);
- KY (head of the department of coordination, institute of physics, faculty of science and technology, and mentor manager at the office of research and development, local university);
- EL (senior research fellow, head of department, department of field crops and grassland husbandry, institute of agricultural and environmental sciences, national university of life sciences).

Actors' sphere

The main goal of the interview with actors was to examine how involvement in the science city initiative has influenced them. The requirements for the selection of actors were that their daily work duties should be related to science initiatives and/or communication activities in this city. Nine people agreed to attend the interview but finally five of them could not participate because of inappropriate time, busy work schedule or illness. The sample consisted of four people:

- HJ (coordinator, astronomer, observatory museum).
- HH (project manager, new science centre).

- NK (project manager, local science park).
- UT (chief specialist, department of research policy, ministry of education and research).

All potential participants were sent an email with an introduction of the aim of the project and information about conducting the interview. The focus group interviews with citizens and actors lasted about 80 minutes. Duration of interviews with stakeholders was between 35 and 75 minutes. Focus group interviews were carried out in a separate room of the university and individual ones in the interviewees' workplaces. Interview questions, which are given in the Toolkit, were translated into the national language and supplemented with some questions (e.g. questions for experts about terminology of science communication and the personal role of the participant and his/her organisation in science communication). See translations of interview questions in Annexes 1-3 and interview invitations in Annexes 4-6. The interviews were tape-recorded and transcribed verbatim. Participation in interview was voluntary for everybody and remained anonymous for ordinary citizens. The quotations of the interviewees are presented in italics and quotation marks in the analysis.

Document analysis

The purpose of document analysis was to analyse documents related both to the objectives of science policies and existing evaluations and commentaries on science in society. Here, two types of documents were inspected:

- Those that set out plans, proposals and purposes for science policies at city and regional level.
- Those that display the results of scientific culture initiatives and policies. For the collection of the aforementioned documents, a web search from homepages of the city government, the new science centre, universities, science museums etc. was carried out.

At first the analysis focused on development plans, action programmes and strategies of science policies and initiatives. Then keywords, such as science, science city, science culture, science museum, science festival, science event, and science communication were used to find relevant documents. Then, documents containing possible previous evaluations and commentaries on science in society were collected.

Results

This city as a science city and its impact on ordinary citizens

The meaning of 'science city'

At first, the interviewees associated the term 'science city' with specific science facilities, science communication centres and non-formal education centres located in the city. They mentioned, for example, the local university, the new science centre and a youth centre. However, some participants thought in a more abstract way; they did not consider a science city to be certain institutions but rather an environment that contributes to doing science and research and the realisation of new ideas. This city would be a science-friendly place with innovative local authorities where many science communication events, festivals, exhibitions, and conferences are held and where creativity and thirst for knowledge are valued.

"It is a city where, at the government level, one keeps him/herself informed of the latest science achievements and useful aspects are applied."

The participants referred to three groups of people that characterise a science city more than other cities. These groups are scientists, tourists and young people (students). Most of the interviewees named the presence of a university as an important aspect of a science city.

Positive and negative connotations of science cities

Generally, the participants found a science city to be positive by nature and saw it as a preferred place for living and working. A science city was perceived as offering citizens diverse opportunities to be educated and spend their leisure time. It attracts a number of qualified and innovative people, which in turn means a fast and efficient development of science and business.

"When they [scientists and educated people] get together, then synergy will be created. Then 2 plus 2 is not 4, but even 5, 6 or 7. If there is a critical mass of "the sharpest pencils" or "the brightest brains" together, then added value will already be produced."

However, some negative aspects were mentioned during the interviews concerning science cities. One of them is unemployment among people with higher education due to overproduction of professionals in certain (narrow) specialities. Therefore, some of them will have to retrain or leave the city. Another opinion indicates a reverse situation where an increase in science-based business and activities can result in a lack of human capital which may hinder the progress of science and technology.

“For example, free people who are competent and want to engage in science aren’t available in the (labour) market.”

The participants also mentioned that the excessive concentration on science-related fields might lead to mono-functionality and insufficiency in other branches of the economy (e.g. the service sector). The introduction of new technologies can bring about a gap between generations. For instance, older people are less able to cope with ICT devices and digital services than younger people, and there is thus a need to consider different age groups on elaborating and implementing new technologies.

This city as a science city

Although we started the interviews with a general question about the meaning of science city without referring to the city, the participants started to talk about institutions in this city. When questioned about possible science cities in this country the interviewees could mention, the first response was this city. Some interviewees, particularly those who were born in the capital, presented the capital as a competing city in some aspects (like its emerging university), but according to the dominant opinion, this city is still a leading science and education centre in the country. They emphasised that there are many science-related institutions in this city, but the oldest university (local university), modern science centre, the ministry of education and research, and the old observatory have a symbolic meaning.

“We [citizens] always have such a polarisation of power versus spirit [that is represented in the images of the capital and this city]. In this city, we have always seen more such spirit and science. In addition, the local university belongs to a national group and is among the 1% of best universities in the world.”

The interviewees compared this city with other towns in the country, declaring that the ratio of scientists and science objects per citizen is the highest in this city. Moreover, more science communication activities have been organised than in other towns. The advantages of this city are its small size and compactness, so that people can notice science institutions, museums and events easily and visit them.

Influence of this city as a science city on the participants

The interviewees admitted that living in this city has affected them in several ways. Primarily, they pointed out educational aspects. The local university attracts students from all over the country but it is the first option for young people living in this city and surrounding areas. Thus, the participants found that living in/moving to this city has motivated them to attain higher education.

"Obviously, if I had not lived in this city, then going to university wouldn't be so convenient and natural. There is a modern expression in this city which is lifelong learning. I think that it is self-evident. If a person has a will and wisdom and a little ambition, then there are no limits to study."

The proportion of intellectuals is high in this city; therefore, it is quite likely to belong to a social network with a researcher or scientist. The respondents argued that communicating with such people has made them become more interested in science and participate in science events. In addition, they found that this city has influenced their choice of profession and offers better job and career opportunities.

The participants regarded that there are quite a few recreational activities in this city that provide knowledge of science. They mentioned the new science centre as the most popular institution of that kind in this city and even in the country. The centre is a popular place for people of all ages, especially for children and families offering educational and useful entertainment. The science centre is also rapidly becoming an important tourist attraction. Different science communication institutions play a central role in the citizens' everyday life. The participants have visited the observatory, the local environmental education centre, zoological museum, and a centre on the ice age. They liked these institutions because they offer interesting exhibitions, courses and lectures.

In relation to science events, they considered the night of scientists festival and local festival days with their science exhibitions as outstanding. The interviewees liked going to museums and events with friends and family because they saw these visits as motivating and such experiences gave them an opportunity to discuss exhibits and exchange impressions. Many participants have organised visits to museums themselves and brought along acquaintances and family members.

The participants expressed that they were proud of this city as there are universities, the science centre, museums, many hobby circles and activities. They pronounced the city's slogan, 'city of good thoughts', as representing that there is a pleasant atmosphere for learning, working, implementation of new ideas, and for living in general. To summarise, it can be said that living in this city has influenced citizens' daily life and choices, impacted their attitudes towards science, made them more intellectually curious and inspired them to participate in science centres and activities.

Stakeholders' views on impacts of SCIP

Impacts of SCIP on initiatives and policies

The participants described three types of added values, which may emerge concerning communication of science and technology. First, communication of

science will help to raise awareness of citizens; thereby, they will be able to make informed decisions and improve their quality of life. Secondly, science communication activities will make natural sciences and technologies more popular among young people. The more they prefer these specialties for admission to university, the better the scientists will be in the future.

"The more we have people who study these specialties, the more we will have a labour force that will be able to develop new and innovative solutions in this field. And, considering the fact that this country is such a small country, our competitive advantage can never be a soft discipline. This should be a thing based on knowledge, so we can compete in the world." (PK)

Finally, communication of science and technology achievements serves to inform the taxpayers about the use of money and to influence their attitudes to make them favour election candidates whose platforms comprise financing of science and technology.

The interviewees stressed that local authorities have played an important role in the process of fostering a culture of science and technology in this city. The city government has initiated and coordinated science communication activities and made investments in infrastructure. The participants mentioned that the construction of the new science centre and local environmental education centre have been initiated and partly financed by local government. In addition, the local authorities have financially supported non-formal education (e.g. robotics and space hobby circle), activities of the local science park and the research school of the local university, (international) scientific conferences held in this city, different Olympiads of science and technology, etc.

Other remarkable science-fostering policies mentioned were the nomination of scientists for Citizen of Honour of the city and rewarding pupils for good performance in the Olympiads. Establishing the new science centre was regarded as a major achievement and one of the most effective policies in this city which contributes to the development of a culture of science.

Public participation in debates and taking into account their views in the final decision process about science and technology-related issues was regarded as deficient in this city and this country as a whole. The interviewees said that citizens have been informed about future developments of the city. However, a majority of interviewees cannot offer an example where the public had a voice in final decision-making. Deputy mayors mentioned that some scientists and experts have been engaged in debates on the elaboration of development plans.

Impacts of SCIP on quality of life

The interviewees agreed unanimously that science and research institutions, science communication centres and activities have influenced the cultural identity of this city. Particularly, they found that the local university and the new science centre are institutions with symbolic meaning, which have essentially shaped the reputation of the city.

Due to the activities of the aforementioned and other science and technology institutions, the participants believed that citizens perceive themselves as belonging to an innovative society which values new science initiatives highly. Many science communication activities (science cafe, tea party with scientists, stellar observations, etc.) held in this city make the citizens feel that they form part of a local tradition of science and technology. As a positive sign, the participants noticed the increasing interest of young people in science and their active and enthusiastic participation in science communication events.

“There are quite a lot of these opportunities, including science festivals, where the citizens could feel that they are a part of all these. There is a corner with a science exhibition in many public events. Science is in the picture.” (TTu)

The participants argued that the media have begun to report more science news. They mentioned that the national research council has organised several media conferences; there have been more broadcasts on science and technology on public and private TV channels and radio stations; scientists have been invited to comment on social problems and the occurrence of natural disasters in the media. In the future, the media, especially the online media, will be more attentive to science news.

The interviewees explained the increase in media interest by growth of demand (people would like to read more articles on science), as well as improvement of journalists' competency when dealing with scientific topics. The participants noted that students of journalism have been trained to write on science and technology and PhD students have been taught to communicate their research results in a more simple and understandable way for common people.

Social and economic impacts of SCIP

The activities related to SCIP have had a direct and indirect social and economic impact on this city and citizens. In relation to building new institutions, carrying out projects and organising events, many temporary and permanent jobs have been created. For example, the new science centre provides jobs for about 70 individuals. Spin-off companies of the local university, science park and IT companies received positive attention from the participants as innovative and profitable businesses bringing new jobs and partnerships with universities and schools.

New interactions through science communication activities have also come about between science centres and museums, NGOs, universities, schools and the media. In particular, the new science centre has cooperated with many educational, research, and technology institutions in this city. The participants predicted an increase in public and private interactions henceforth. Schools especially would be more interested in cooperation with universities, companies, and science communication institutions.

According to the interviewees, science communication activities in this city, precisely the new science centre, have led to an increase in tourism and activated the local economy. Although the primary interest aroused after the opening of the new science centre in 2011 has abated, the ongoing renewal of exhibitions, organisation of events, and advertising in foreign markets will keep the number of tourists on the rise.

“The new science centre, which has set a record for the number of tourists visiting, enriches the economy of the city. When a group of tourists comes from outside the city, from the neighbouring country or from other cities of the country, the science centre is like a magnet that pulls. But they do not come only here; they go shopping, to restaurants. And the swimming pool and water park next to the science centre have increased their visits.” (TTe)

The interviewees were quite critical of financial support measures implemented for science communication activities in this city and also in this country. They considered project-based financing that has been dominant in these activities as less sustainable. It was suggested that new science communication initiatives may be financed as project-based, but this is not a reasonable financial measure for follow-up projects. Finally, especially successful and popular activities will need permanent funding to be continuous. The participants found that combined financial schemes, including both permanent and project-based financing, would also be effective, as in the case of the new science centre and local environmental education centre.

The impact of SCIP on education

The participants said that institutions dealing with science communication and/or research have prepared new courses for pupils, students and also the citizens. As an example, the school pupils have done their practical training in the new science centre and received lectures on Chemistry and Physics from academic staff of the universities. In addition, scientists from universities have supervised pupils in their research work.

There has been an increase in visits of school pupils to science museums, centres and science events, and this may become more frequent in the future. The participants believed that cooperation between schools, universities and science communication institutions will increase henceforth and

more courses will be offered to pupils. Moreover, the pupils may attend lectures at the universities in order to improve their knowledge and be more competitive on admission to university.

The interviewees mentioned that scientific laboratories of universities and technology companies are interested in visits by students and citizens. Some laboratories have organised open days for the public, such as the national genome centre, the institute of technology, and the institute of chemistry of the local university.

“For example, when I organise a conference, then I’ll call the genome centre and ask whether we could come to visit. People have even been hired in the genome centre to do guided tours and offer courses for interested people.” (PK)

Almost all research and science communication institutions located in this city have produced interactive and digital learning materials for school subjects (e.g. in science and chemistry), compiled worksheets for guests, organised games (e.g. planets game), exhibitions and other activities related to science and technology. For instance, the national research council has financed the production of two TV programmes, one which introduced science and technology achievements, and another which was especially targeted at young people. The participants emphasised the contribution of the local university’s research school in organising nationwide Olympiads in various subjects for pupils.

Document analysis

Objectives for science in society

At first we analysed documents concerning the objectives of science in society initiatives and policies at city level. We did not find separate documents explicitly stating objectives for science in society. However, different science in society initiatives can be formulated in different development plans and strategies. A majority of them are contained in the local development strategy 2030 (reference 6). The elaboration of this strategy was initiated by the city council in 2005 and five thematic expert groups were involved. Citizens were also invited to express their opinions about the future of the city on the city’s homepage and at the conference “The Vision of the city 2030” workshops in September 2005.

The objectives of this strategy consider the future of this city as oriented to the development of science and technology. The city is seen to function as an innovative leader of the national knowledge-based society. The central political aim is to keep the leading position of intellectual capital of this country and to ensure the city’s status as the regional centre. The desired future image

of this city is expected to be based on the values favouring innovation, openness, participation, cooperation and a future-oriented mentality.

Explicitly mentioned target groups are people being educated in the city: national engineers and other specialists who have studied in this city, internationally recognised researchers, PhD and post-doc students.

Thus, the role of this city is expected to be that of a creative city of knowledge, as the city's biggest employers are expected to be educational and research establishments.

The central economic objective is entrepreneurship. As the country itself is small, the knowledge-based economy is expected to prevail, and future enterprises must be vital and internationally competitive. Modern support structures for entrepreneurship enable new technologies to be created and implemented. Entrepreneurs are expected to contribute to the establishment of experimental and licensing laboratories, independent expertise centres and spin-off companies. This city is seen to be an attractive destination for tourists with its modern infrastructure. The national research results are known by the wider public thanks to the new science centre that is a scientific cultural establishment introducing people with a science-based mentality to the work of researchers.

The development plan foresees the importance of public participation in the decision-making process. A rising importance of voluntary organisations and an expanding cooperation between the public and private sector is also expected. Inhabitants are expected to think in terms of local and wider identities. This city is seen to be a caring city of socially active inhabitants where quality of life, care and participation in the life of society is guaranteed for all inhabitants regardless of their status.

A major objective of policies is to keep and advance the position of this city as an internationally competitive education and research campus. Strategic directions indicate the importance of the involvement of teachers and researchers in future policies that are drafted to encourage partnerships between the public and private sector and the active involvement of its citizens in shaping the urban environment. Universities in the city are expected to make a considerable contribution to the development of the innovation system. An important objective is the creation of the support system for those leading researchers who deal with fundamental and applied research having an industrial potential.

This city is expected to be an internationally open network of educational establishments. One of the educational objectives is the establishment of an international gymnasium for talented young people. On the level of

postgraduate education, considerable expansion of Master's and PhD studies in cooperation with foreign higher schools is planned. Another aim is to promote extensive international exchanges of students between universities, applied higher schools and research establishments.

Educational objectives also stress the importance of access to lifelong learning for all inhabitants. This city is seen to be a centre for continuing education and qualification that involves educational establishments of different levels. Special attention is paid to the development of further education in entrepreneurship. Such objectives are intended to assure the economy of this city at the high-technological level. Relevant measures presuppose the creation of a system of cooperation for roundtables and quality circles between enterprises, research institutions and local municipalities.

Commentaries on science in society

There are no previous explicit evaluations on the efficacy of policies on science in society. However, some commentaries can be found. For example, local centres of excellence issue press releases on their activities that are sometimes published in the media as well.

Obstacles to science communication issues were inspected comprehensively in the local university journal (reference 5). They interviewed prominent scientists and science journalists involved in the field. Scientists noted that science is not self-popularising; it is not possible to promote the image of science publishing articles just in peer-reviewed scientific journals. They argued that the public of this country is still moderately informed about the usefulness of science and scientists. They admitted that the students' scientific association did a good job in the initiation of young scientists' careers. They saw that the source of the problems is in the European and national media's tendency to prefer sensational news. They explained that media stories quite often stress attractive, but second-rate aspects of research, and this can reduce scientists' desire to communicate with the media.

Science journalists noted that national science journalists are self-made people, who pulled themselves up by their bootstraps in defiance of editorial offices. As journalists' educational background is usually different to the scientific topic related, this turns out to be a barrier. They stressed that a great deal of stories are translations or non-checked press releases. In their opinion, it is important for journalists to keep good relations with their sources due to the smallness of this country. Thus, it is difficult for journalists to pressure reluctant scientists. They suggested that a useful way to popularise results could be briefings where top national scientists could talk about their own current topics, international developments and major issues.

Impacts of SCIP on actors

The participants' role in science communication

The project manager of a science park has a duty to introduce the activities of scientists to entrepreneurs and to promote partnerships between them. The daily work tasks of the specialists from the observatory and the new science centre are closely related to science communication, including the organisation of hobby groups (astronomy circle), science cafes, stellar observations, giving lectures on science, etc.

During the focus group interview, the participants described the impacts of their engagement with science communication in this city directly on themselves and the effects on their institution.

Impacts on the participants

This city offers a favourable living, studying, working, and development environment for the participants, contributing to their career choices.

"This city has offered me many opportunities and there are enough attractive environments for work, life and interaction." (NK)

Development of competency: The participants said that they have developed their communication skills, improved knowledge, and broadened the mind through its activities. For example, they have enhanced skills to talk about science and their work to visitors and other people using simple and understandable terms and definitions.

Enlargement of personal networks:

"I think that through my job I have got a lot of interesting information that I could not notice otherwise. But thanks to the work, I read more about science and I'm interested in it more. And I have a lot of good contacts both in this country and abroad." (TTu)

The participants have experienced positive feelings due to their work. The interest of visitors and partners and their positive feedback has especially made the participants enjoy their work. The participants recognised that their work is interesting and diverse.

Impacts on their institution

Obtaining feedback and attention

The interviewees talked about positive public attention to and media coverage of their institution's activities. They added positive feedback from partners both in this country and abroad. In particular, the new science centre has earned considerable approval; however, the project manager of a science park admitted that they have obtained positive feedback and recognition from partners outside the country rather than from people in the homeland. In this country, the meaning and function of the science park is somewhat unclear; therefore companies, research institutions and the media cannot associate with them.

"Entrepreneurs see us as a unit of the university and the university sees us as an incomprehensible company. The state sees us as a big business. We have such an identity issue. Thus, journalists cannot communicate with us either." (NK)

Network enlargement between actors and other relevant agencies

All participants reported the formation of new partnerships inside and outside the country due to their own and colleagues' activities. The collaboration between actors and other institutions (e.g. companies, universities, schools) has led to new projects, initiatives and the development of new research topics.

Economic benefits

The participants talked about the direct economic benefits which consist of visits to science communication events by tourists, creating profit. However, the benefits may also be indirect and difficult to calculate in monetary value. Precisely, the participants expect to make their area or speciality more attractive to young people and founders by means of science communication activities and thereby will recruit new employees and conclude partnerships in the future.

Increase of prestige and promotion of public image of research area/speciality

The interviewees mentioned that their/their institution's activities have raised the prestige of their speciality and institution. In particular, the specialist from the observatory said that her institution and speciality (astronomy) have had a good reputation in the country as well as on the international level for long time. But the project manager of the new science centre indicated that in public this science centre is regarded as a popular and avowed amusement park rather than the serious science communication centre that the staff of this science centre would like it to be.

Conclusions

The case study on this city as a scientific city was carried out by researchers from the local university in the period from October to December 2012. In total, three modules (two focus groups with ordinary citizens, semi-structured interviews with stakeholders, document analysis and one focus group with relevant actors) were applied.

Focus groups with ordinary citizens revealed that they associated the term 'science city' with local science communication institutions. Ordinary citizens referred to three groups of people characterising a science city: scientists, tourists and students. Citizens noted that the meaning of a science city is positive by nature and that this city is a preferred place for living and working. They regarded the new science centre as one of the most popular institutions in the city. The citizens expressed worries that overproduction of professionals in certain specialities could produce unemployment among people with higher education and thus some qualified people must leave the city. Ordinary people also mentioned easier access to education.

Stakeholders described three types of added values emerging from the communication of science and technology: raising the awareness of citizens that leads to them making informed decisions, raising the popularity of natural sciences among youth and raising awareness of public expenditures. Interviewees believed that citizens perceive themselves as belonging to an innovative society. They noted that science communication institutions, like the new science centre, have led to an increase in tourism and activated the local economy. The participants believed that cooperation between schools, universities and science communication institutions will be increased. Interviewees stressed that institutions dealing with science communication and research have created new courses for students and citizens. They expressed criticism that science communication initiatives are financed as project-based, but this is not a sustainable financial measure for follow-up projects. Interviewees stressed that institutions dealing with science communication and research have prepared new courses for students and citizens.

Document analysis indicated that the major objective of policies is to keep and advance the position of this city as an internationally competitive education and research campus. The desired future image of this city is expected to be based on the values favouring innovation, openness, participation, cooperation and a future-oriented mentality. In the future, a knowledge-based economy is expected to prevail. However, document analysis revealed that this country's public is still moderately informed about the usefulness of science and scientists. Sometimes it is difficult for the media to

distinguish paramount aspects from second-rate aspects of research, and this can inhibit successful science communication.

Actors considered this city to be a favourable environment. They mentioned that their own and colleagues' activities led to the formation of new partnerships inside and outside this country. Such networks proved to be useful for themselves or their institutions. Some of them complained that sometimes their activities remain incomprehensible for the wider public and thus companies, research institutions and the media cannot associate with each other as effectively as one might expect. Others worried that sometimes the public tends to see that kind of institution as a popular and avowed amusement park rather than a serious science communication centre.

Recommendations

The participants were dissatisfied with the financing mechanisms of science communication activities, considering them to be unsustainable and restraining development.

- To improve financing schemes of science communication activities to ensure their sustainability.
- To enable a permanent financing method for effective follow-up projects.

The results referred to the low participation of the public in debates on science and technology and people's lack of awareness of the opportunity to have a voice in the final decision.

- To promote public participation in debates and discussion about science and technology by local authorities.
- To inform citizens more about their opportunity to have a voice on important issues for the city's development.

Public awareness on the usefulness of science can be enhanced through improvement of communication between scientists and science journalists.

- To organise the popularisation of science briefings where top national scientists could talk about their own research and current issues.
- To educate competent science journalists.

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4. Here the author refers to an article about entrepreneurs' opinion on the investment climate in the city where this case study was performed. The name of this book has been suppressed in order to maintain the anonymity of this case report. If you need more information or wish to know more about it, please send a message to occ@upf.edu.
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