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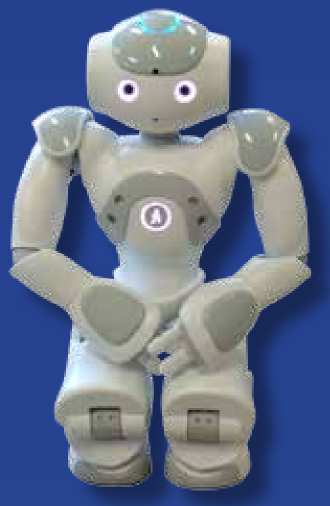

Thirst for science?

Social conceptions of the research activity, the factors influencing career choices and the social impacts of the Researchers' Nights

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I. Improving science-society communication: The Researchers' Night in Budapest

With the adoption of the Lisbon Agenda in 2000, the European Union set the strategic goal of becoming "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" (European Parliament 2000). The vision of knowledge-society signalled an important shift in European policy making, one that acknowledged the immaterial grounds of growth and development (such as education and innovation) as being of outmost significance in the context of the new, global economic order (Moniz 2011), variously characterised as post-Fordist, post-industrial, late-capitalist or information economy. These broad considerations had profound implications on European science and technology policy. In general, as Tlili and Dawson (2010:436) argue, they called for an "EU wide-approach to science, science education and public engagement with science, rooted in the premise that science is consubstantial with European modernity." In line with this, they also involved a profound reassessment of the role of science as a relatively autonomous institutional field and knowledge practice. This reassessment, according to Tlili and Dawson (2010), came to be based on a relational view of science, emphasising multiple relations between science and society, economy, and politics. As a consequence, the points where these spheres intersect became the main areas of policy intervention. On the science and economy interface this led to an emphasis on innovation, thus attempting to overcome what a 1995 European Commission Green Paper famously identified as the European paradox: namely that while "European science is good, the translation of knowledge into commercially applicable solutions is poor" (Bonaccorsi 2007:303). With respect to the relation between science and society, the problem of scientific communication came into focus, and policies became increasingly interested in the various ways in which different publics and audiences understand and engage with scientific work and knowledge[1].

The present book offers the summarised and synthesised results of three waves of sociological surveys carried out within the framework of the 2010, 2011 and 2012 editions of the Researchers' Night in Budapest. The Researchers' Night projects funded within the Seventh Framework of the European Union are defined means to improve communication between science and society, make scientific careers more available and attractive to the younger generations, and thus, narrowing the gaps between science and society. While the present report's larger focus is that of the intersection and communication between science and society, it also aims at revealing the role this project plays in improving the reception of science in Hungarian society. In this respect we provide quantitative empirical data regarding the public images of science and young people's professional aspirations. The survey comprised a "visitors' satisfaction study" that is aimed at improving each consecutive year's programme offer. To complement the surveys, focus group interviews were also carried out in order to understand the social construction of the researcher's image and the set of motivations and expectations that guide young people in their selection of the Researchers' Nights events.

The book is divided into two larger sections, but overall it comprises nine chapters. The first section consists of three chapters laying the theoretical, conceptual and methodological foundations of the analysis and, at the same time, putting the empirical results to be presented in the second section into the specific Hungarian context. The first chapter is a general introduction and a short description of the last three Researchers' Nights Hungary. It is followed by the second chapter dedicated to the presentation of the two main paradigms that discuss the relation between science and society, and the policy responses formulated to the gap existing between them. The first section is closed by a description of the Hungarian situation of sciences: the statistical analysis of the material and human resources allocated to scientific research is followed by the summary of previous studies that addressed the issue of public perception of research. The latter gives the opportunity to draw the methodological conclusions that were taken into account and built into the Researchers' Night 2010–2012 data collections. Section two presents the empirical results of the three waves of research. We start by sketching the parameters and characteristics of the methods used during our data collections, and then the following four chapters are dedicated each to a specific question regarding the event itself: the presentation of the visitors, career choices among high school students, popular concepts of research and the scientist and opinions regarding the programmes offered during the Researchers' Nights events. The last chapter summarises the conclusions of the study and embeds the results into the larger theoretical context of the dominant science communication paradigm.

1 For a general overview of science and technology policy in Europe after the Second World War see Delanghe, Muldur and Soete 2009.

A short history of the Researchers' Night in Hungary

The first event was organised in 2005 in thirteen European countries. In Hungary the organiser was the University of Omniscience ("Mindentudás Egyeteme") with two main programmes: an Experiments Marathon (at the Budapest Technical University, Institute of Physics) and an Astronomical Show (at the Astronomical Observatory). Other programmes included researchers' presentations, physics classes and debates on the topic of science and false science.

The Tempus Foundation organised the event in 2006 the first time. Almost each year new institutions joined the programmes, but the character of the event remained basically the same: universities opened up their campuses and visitors could attend scientific presentations and participate in experiments or games. Since 2010, two consortia have been organising the programmes: one led by the Tempus Foundation and a new consortium coordinated by the Bay Zoltán Foundation for Applied Research (Bay Foundation). The latter introduced a new concept: the aim of the organisers was to bring the research closer to the public by moving out of the universities to public places and secondary schools as well as by opening the doors of laboratories of different multinational companies, like the Ericsson Hungary Ltd.

The Bay Foundation had 6-10 venues with each one concentrating on the thematic programme of the year. In 2010 the venues were organised under the motto "The Fascinating World of Researchers in the Age of Technology". Each venue chose a different direction: fashion, gastronomy, literature, music and media linked to different branches of science to reflect the different aspects of the life of the researcher and to introduce them as everyday people. During the programmes scientists themselves "entertained" the audience. In 2011 all venues focused on the common theme of "A Day of the Researcher under the Magnifying Glass – in and out of Laboratory". All activities focused on researchers themselves and their scientific areas: health, biology, physics, chemistry, ICT, nanotechnology, computing systems, laser technology, aeronautics, space research and humanities. In 2012 the motto was "Researchers for the Future", to show how scientists contribute to a more comfortable and enjoyable life. Typical activities included shows, demonstrations, exhibitions, competitions, roundtable discussions, concerts, theatre plays and cooking. The events attracted more than 12 thousand visitors in 2012.

II. Science and society – a theoretical and methodological overview

Theoretical and policy approaches

This chapter discusses the problem of science-society mediation, and the theoretical assumptions of public policy initiatives undertaken in recent decades in this area.

Following David Guston (2000:39) we use the notion of *social contract for science* to denote "the institutional arrangements and their intellectual underpinnings" that govern the relations between science and society in different governance and policy regimes. In this chapter we offer a very broad outline of post Second World War science policy from this perspective, focusing on the problem of mediation between science and the public. Based on the work of Michel Callon (1999) we identify a shift from an educational model of this mediation towards a public debate model, and we argue that they are built on different visions of scientific knowledge, as well as on different understandings of the proper role of scientists and their expertise in a democratic society. The dominant status of a particular model in a particular historical period is dependent on a complex range of cultural and economic factors; the proper treatment of these, however, would go well beyond the scope of our paper. Nevertheless, we could not avoid touching on these broader economic and cultural conditions and their changes. Although seriously limited, our discussion on them is necessary in order to give a general sense of the context in which public-science mediation has gained the particular significance it has today, and of the terms in which it has come to be negotiated.

The autonomy of science and the educational model

Although educational and popularising activities have always been part of the scientific enterprise, the increased significance of publics and their opinion from the point of view of science and science policy is a relatively recent phenomenon. The social contract that laid the basis for post-Second World War science policies in the United States and Europe was a contract between the state and scientific communities, negotiated in the name of, but without the participation of the public (see Jasanoff 2005:225). Mostly due to its wartime achievements science gained an almost unprecedented cultural authority in this period, and the usefulness of science-based technologies for both military and civil purposes became unquestionable (see Shapin 2008:65). Science, as the title of a highly influential policy report in the period put it, was "an endless frontier," an infinite source of "new knowledge, new products, new industries, and more jobs," leading to social progress and well-being (Bush 1945, Dennis 2004).

Central to this vision of science was the idea of scientific autonomy as well as a distinction between basic and applied research. "New knowledge" was to be produced through basic research, in the institutional context of state-funded research institutes and universities. Pure science embodied the essence of the scientific enterprise, namely what science studies scholar Helga Nowotny (2008) identified as passions of science: insatiable curiosity and urge for knowledge, love and pursuit of truth with all costs, and without any external constraints. The costs, at least the material ones, were certainly high, and they were covered by public funds based on the promise of future social benefits. But in order for science to produce its discoveries, scientists had to be left alone. No immediate demand, let alone direct interference from the part of the state, the market or the general public was acceptable. Although such ideal condition were certainly never met in reality (see Ezrahi 2011), generally it remains true that science policy roughly between the 1940s and the 1960s was characterised by a centralised approach to government subsidised science, largely shielded away from political accountability and direct market pressure.

The dominant form of science-public mediation in this period may be characterised in terms of the public educational model outlined by Michel Callon (1999). One of the main elements of this model is a clear separation between scientific and lay knowledge[2]. According to Ezrahi (2004:255-256) Western culture perceives knowledge in the scientific sense "as organised and formalised," and it associates to it "values such as clarity, logical rigor, sharp distinction between truth and error," and the like. Moreover, the content of such knowledge is seen to be separated from "emotional, ethical, religious or political dispositions" of scientists and non-scientists alike. The intellectual authority of science rests on its objective, universal knowledge-claims that are value-neutral in the Weberian sense of the term: they are not being concerned with questions of *ought to*, only with questions of *is*. According to this view science is a distinct source of certified, authorised knowledge, one that depends on an autonomous, self-regulating institutional structure, and is governed by a specific ethos[3].

As a logical consequence of this clear separation of scientific and everyday knowledge, the only way for the public to legitimately participate in the process of certified knowledge-production was to educate itself into a member of the scientific community and internalise the scientific ethos. Every other form of science-public mediation is indirect, occurring through the intermediaries of the state and the market, entities representing the will of the public qua citizens, and their demands as consumers. What goes as science popularisation outside the proper educational context in these conditions falls dangerously close to vulgarisation, simplification or distortion.

2 In a sense the difference between certain, universal knowledge and volatile, common belief or opinion (episteme and doxa), a distinction between "the learned and the rest" is constitutive to the very idea of science (see Bensaude-Vincent 2001:100). But, as Bensaude-Vincent (2001) shows, the peculiarity of our modern notion of this knowledge gap is that it is not absolute and static, but a dynamic, expanding one, related to the idea of scientific progress.

3 This scientific ethos was described by the founder of the sociology of science Robert K. Merton (1996) as consisting in a specific set of values internalised by the scientific community, and orienting the behaviour of its members. Merton`s original, so-called CUDOS norms were communism, universalism, disinterestedness and organised scepticism, he later added to these the norms of originality and humility.

The Public Debate Model: public understanding of science (PUS) and public engagement with science (PEST)

The emergence of what Ulrich Beck (1992) in a widely influential book called risk society brought about the substantial renegotiation of the social contract between science and society. The far-reaching consequences of this second great transformation are too many to be recounted here. From our point of view the most important development was the progressive "demonopolisation of scientific knowledge claims (Beck 1992:156)." In a sense, as Beck (1992:163) notes, it was "not their failure but their success that has dethroned the sciences." Beck describes this process as an outflow of potentially valid scientific truth-claims into areas external to the scientific domain, due to the increasing differentiation and the accumulation of hyper-complex, hypothetical and underdetermined knowledge within the sciences. As a result, non-scientific parties become free to appropriate the language of scientific expertise, and manipulate according to their values and interests the "heterogeneous supply of scientific information" (Beck 1992:157). According to Beck`s (156) diagnosis: "science becomes more and more *necessary*, but at the same time, *less and less sufficient* for the socially binding definition of truth."

Without taking issue here with Beck`s ideas, there are at least two developments that convinced policy makers about the decisive role public opinion may play in shaping and influencing science policy. The first was the transformation of objects of spectacular scientific achievement into objects of heated controversy, and the emergence of various social movements around such controversial objects (widespread protests against the use of nuclear energy as source of electricity, or against genetically modified foods are the immediate examples). Second, and perhaps more mundane were the increasing financial and budget constrains experienced by governments. This made formerly high levels of investments into basic research mostly out of reach, and the remaining public funding an issue that requires justification in the eyes of the public. As a result, "the model of research and development governed by a largely self-regulated scientific community (representing truth), by policy makers (representing the public interest), and by industrial actors (representing consumer`s needs) seemed no longer acceptable" (European Commission 2007:54).

These background considerations launched the issue of scientific communication into the very centre of science-policy interest. One of the first signals of this shift of emphasis was a 1985 report of the Royal Society in London, whose title *The Public Understanding of Science* became the general label for the emerging policy paradigm (Bodmer 1985). The Bodmer Report (1985:9) put forward as a basic thesis that a "better public understanding of science can be a major element in promoting national prosperity, in raising the quality of public and private decision making, and in enriching the life of the individual." This statement placed the problem of "understanding" at centre-stage, as an important mediating element through which science may realise its beneficial effects on society and the economy (Irwin and Wynne 1996, Felt 2003). As many researchers have pointed out since then, it also implied that inadequate understanding is a major obstacle in the realisation of these beneficial effects. At least in their earliest formulations, public understanding of science sought to correct somehow the dangers inherent in public misunderstandings of science.

This view, generally presented as the deficit model of PUS, falls close to the educational model of science-public mediation in that it builds on the premise of an epistemic gap, or discursive distance between scientific and everyday forms of knowledge and understanding. However, it differs from it in the sense of urgency with which it turns to the supposed misunderstandings of the public, and the keen interest it takes in precisely measuring, assessing and correcting them. This is mainly because,

unlike the educational model, this public debate model contains the presumption that inadequate public understanding of science may have potentially serious political effects (Callon 1999). Gaps in knowledge may have a great variety of sources: inadequate education and lack of interest in science, the complexity of scientific matters brought about by increasing specialisation and dynamic evolution of scientific knowledge, distorted media representations of science and scientists to name just a few. Inadequate information as well as unfavourable presentation by the media of a technological object, such as genetically modified food, are seen as the causes of irrational fears and open scepticism among the public, while changes in such hostile attitudes are hoped to be achieved through better communication and providing adequate information (Bucchi 2004).

Within the deficit model of PUS understanding science is conceptualised first and foremost in terms of scientific literacy (Bucchi and Neresini 2008:450). The notion of scientific literacy refers to a minimum, threshold level of understanding of basic scientific concepts and methods "needed to function as citizens in modern industrial society" (see Miller and Prado 2000:83). Since the mid-1980s a range of survey methods and question-sets have been developed with the aim to measure the level of understanding of basic scientific constructs and the nature of scientific inquiry (see Miller and Prado 2000 for a detailed review of these). On a European level such question-sets have come to be included in the Eurobarometer surveys since 1989, and some of their results came to portray the average European citizen as quite ignorant (arguably the most notorious one was a 2002 result, according to which 36% of Europeans agreed with the statement that "ordinary tomatoes do not contain genes, while genetically modified ones do").

One of the main criticisms formulated against the deficit model is that it treats the difference between expert and lay knowledge as something reducible into a simple matter of possessing or not factual information (Bucchi and Neresini 2008:451). This, however, is a very inadequate representation with respect to both ends of the epistemic divide. There is a great deal of controversy and disagreement within scientific communities about particular scientific "facts," and in turn, a great deal of factual information may simply be irrelevant for those who are asked for its reproduction[4]. In general, different evaluations of the deficit model seem to agree by now that its underlying vision of science as "a relatively unproblematic knowledge" and the public as "a body of more or less ignorant laypeople" does not do justice to the complexity of the situation (see Durant et al. 2000:135-136). These critics rather suggest a contextual approach to understanding, and based on this, a more complex and problematic relationship between scientific knowledge and attitudes towards science (Irwin and Wynne 1996, Felt 2000, Durant et al. 2000).

4 There was no scientific consensus on the causes of acid rain in 1991, when this question was asked in a National Science Foundation survey, as Bucchi (2004) observes. With respect to tomatoes, one may reason that their genetic makeup is completely irrelevant from the point of view of their consumption, so far as this makeup is not artificially modified (see Jasanoff 2005:88-89).

Out of scholarly criticism of the deficit model behind PUS a new policy approach has started to develop in recent years, emphasising public engagement with science (PEST). Within this new, emerging frame, concerns over understanding and scientific literacy are being replaced by concerns over ways to involve citizens in science and technology related decision-making processes, and experimenting with various forms of participatory democracy (such as citizen panels, consensus conferences, public hearings, inquiries and debates). As Bensaude-Vincent (2001:363) notes, there are basically two roles ascribed to citizens in this contexts: they are seen either as assessors of technology, or as co-producers of knowledge. In both cases, the underlying idea is that lay people may have knowledge and competences relevant to the issue at hand, that interaction between specialists and non-specialists has to take the form of a dialogue, and that decisions have to be based on the outcome of such deliberative processes. The changing vocabulary suggests a shift from the practice of science communication *in the name of science* to new practices of interaction *in the name of democracy* (Bensaude-Vincent 2001).

The problem of science popularisation within the educational and the public debate models

In spite of all their weaknesses and drawbacks, one of the main practical achievement of PUS policies was that they introduced a range of new communication requirements upon scientists, science mediators (such as journalists and museums) and the public (see Sava 2011:9). The spirit of this requirement was well-captured by the call the Bodmer Report (1985:36) addressed toward scientists: "Learn to communicate with the public, be willing to do so and consider it your duty to do so" (Bodmer 1985:36). More than anything else, this call was a sign of a profound reconfiguration within the structures of scientific communication, and an indirect acknowledgment of the breakdown of the existing communication paradigm (see Felt 2003:111).

Within what we identified earlier as the educational model of science-public mediation, science communication was conceived as a relatively straightforward two-step linear process: first, scientists developed genuine knowledge, and second, mediators diffused and disseminated that knowledge in some modified form among the public. As Hilgartner (1990:519) points out within this model communicating amounts to popularising scientific knowledge. This, at its best, occurs through "appropriate simplification – a necessary (albeit low status) educational activity of simplifying science for non-specialists". At its worst it means "pollution, the distortion of science by such outsiders as journalists, and by the public that misunderstands much of what it reads." At stake here, as Felt (2003:20) has shown, was a specific type of translation, the major function of which consisted in fixing the boundaries between scientific and non-scientific knowledge. "Getting involved with science was most of the time being told about the complexity and its inaccessibility for non-scientists," giving people access to science was meant to (re)construct their distance to science (see Felt 2003:20)[5].

5 This relates to the idea of a dynamic, widening epistemic gap caused by the progress of science (see Bensaude-Vincent 2001). The gap was arguably perceived as being the widest at the time the greatest advancements in physics, during the early decades of the 20th century, and it was far from being just a simple knowledge-gap between scientists and non-scientists. This is captured well by an 1919 remark attributed to Einstein: "at most, only a dozen people in the world can understand my theory" (Bucchi 2004:108).

Public understanding of science (and its behest: thou shall communicate!) came upon scientists as the result of growing public scepticism towards, and controversies around science. The emergent deficit of trust and legitimation made a shift from the educational model towards a public debate model necessary, and while scientists did not give up easily the idea of communication as simplification and/or distortion, such approach to communication proved to be completely ineffective in these new conditions.

With all its emphases on adequate information and correcting public misunderstandings, the deficit model of PUS may be interpreted as an attempt to replace science communication focused on translation with something what Ulrike Felt (2003:21) has identified as the performative character of science communication. As she formulated it, the central message was that "popularising science should not be seen as a mere simplification of knowledge, but as a highly complex attempt of constructing both a public as well as their vision of science." With this, the problems of how to educate the public through appropriate translation-processes moved to a secondary plane, and the problems of how to intervene into and shape the public image of science gained prominence. Growing interest in the perceptions of and attitudes towards science among various segments of the public, as well as the sustained efforts to assess, measure and interpret such public perceptions and attitudes are in this sense a symptom of a profound politicisation of the public image of science.

One important consequence, well described by Sava (2011), was that science communication thus re-conceptualised as an instrument of a more general science promotion platform turned towards the well-established field of Public Relations for ideas and methods. Furthermore, it started to make conscious use of various popular cultural elements and mechanisms in its promotion activity. Science communication, according to Sava (2011:10), increasingly manifests itself through deploying a repertoire of "public relations actions instrumented with the means of popular culture in order to achieve specific image objectives." One specific popular cultural mechanism Sava (2011:11) draws attention to is the construction of the figure of the scientist as a hero and role-model "in the key of Public Relations for celebrities." Star-scientists, such as Richard Dawkins, best exemplify such "shield-images built according to the rules of popular culture" (Sava 2011:11)[6].

There is certain appeal to the idea that the image of the scientist-hero comes to be constructed similarly as the image of the popular star-celebrity, through strategic and well-orchestrated PR interventions. However, the particular content of such constructions as well as accounting for the effectiveness of such constructed images remains to be explained. The notion of civic epistemology may prove to be useful in this respect, perhaps more than the notion of popular culture, which to an extent still carries with it associations with something low and vulgar. Introduced by Yaron Ezrahi, and developed by Sheila Jasanoff (2005:249) in a widely influential study, the notion of civic epistemology refers to "culturally specific, historically and politically grounded, public knowledge-ways," shared understandings and cultural expectations that orient the assessment of various claims as credible, properly articulated, represented and defended. As Jasanoff (2005:249) notes, "science, no less than politics, must conform to these established ways of public knowing, in order to gain broad-based support." Seen from this perspective, the range of popular cultural mechanisms employed by various science promoting activities appear less as necessary misrepresentations and distortions, and more as attempts to locally adjust and negotiate around cultural meanings shared by virtually everyone (scientists, politicians, media representatives and the public at large) in a given society.

6 Craig Venter and the entrepreneur-scientist

III. Research and Development in Hungary

The aim of the present chapter is twofold: on the one hand, we set the Researchers' Night programme against the background of scientific life in Hungary, emphasising the need for such an event; while on the other hand, we introduce the previously conducted studies dealing with the conceptions of science and research in Hungary. The latter endeavour offers us the possibility to reflect upon the methodological strengths and weaknesses of these research attempts, and at the same time to make a connection with the following chapter discussing our own research.

According to all measures, the evolution of Hungary's R&D sector since 2000 shows cyclical, but generally expansive trends. Most of this growth is attributed to the business enterprise sector. While the country's overall research and innovation profile has remained largely unchanged in recent decades, the bulk of such activities are concentrated in large foreign-owned enterprises and in a few sectors (European Commission 2011:99). Research intensity (the GDP ratio of research expenditures from all sources) – although still far from the 3% EU goal set by the Lisbon Strategy, and aiming to reach 1.8% in 2020 – grew from 0.92% in 2001 to 1.2% in 2011 (HCSO 2011:2, European Commission 2011:99). 45% of total expenditure in 2011 was spent on experimental development, mostly carried out by the business enterprise sector, while 21% of expenditures were used on basic research conducted in higher education research units and research institutes (HCSO 2011:2). The role of business enterprises in financing has generally increased (their share in R&D expenditures was 47.5% in 2011, lower than the 54.1% EU average), while the role of the government sector has diminished (38.1% in 2011, but still high compared to the EU average of 34.9%).

There has been a 20% growth in the number of research units since 2005, and the business enterprise sector accounted for 90% of this increase (HCSO 2011). From the 2983 research units in 2010, 1384 were located in the business sector, while 1409 were tied to higher educational institutions (HCSO 2011). R&D personnel in headcount have grown by 11.4% since 2005; the increase in their working time is even greater, the amount of personnel in full-time equivalents has increased with 46.1% in this period. Research units within higher educational institutions maintain a strong lead in publication activities. In 2011 their output of books was double of the publication rate of government-related institutions and 60 times higher than the output of the business enterprise sector (HCSO 2011:4).

Table 1: Main indicators of research and development in Hungary (%)

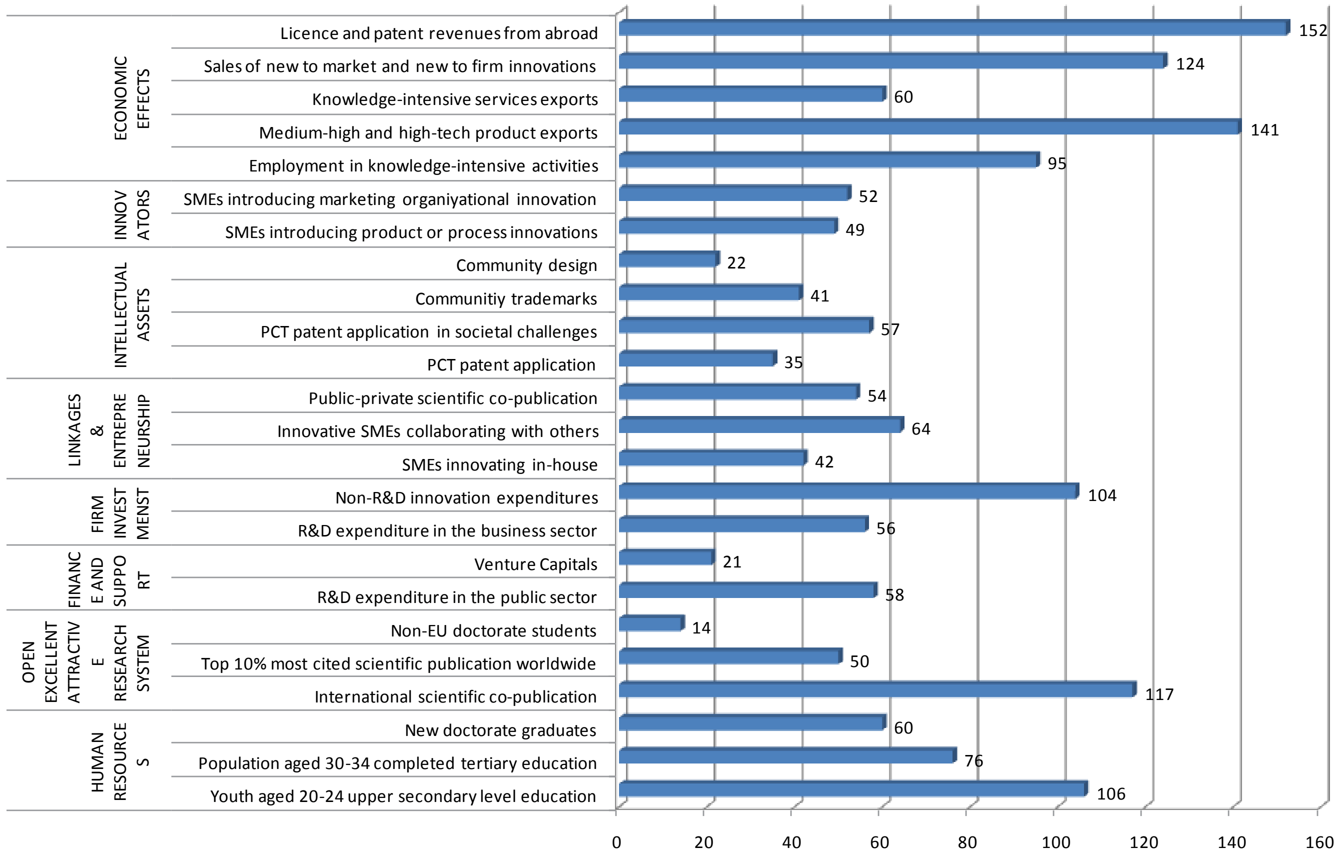
Source: Hungarian Central Statistical Office 2012:3.

Year	Research and development units			
	FTE staff number as a percentage of total employment	of which researchers:	capital expenditure as a percentage of total investments in Hungary	expenditure as percentage of gross domestic product
2005	0.60	0.41	0.73	0.94
2006	0.66	0.45	0.90	1.01
2007	0.66	0.44	0.60	0.98
2008	0.71	0.48	0.62	1.00
2009	0.79	0.53	0.75	1.17
2010	0.83	0.56	0.82	1.16
2011	0.89	0.60	0.88	1.20

The 2011 Innovation Scoreboard rated Hungary as "one of the moderate innovators with below average performance." The indices of the Scoreboard in general show a good potential in human resources, intellectual assets and a good positioning with respect to new, knowledge-based sectors (see the above EU average results in table 1).

Figure 1: Innovation Scoreboard, Hungary, 2011

Source: European Commission 2012:40



Even from this very general overview it becomes evident that knowledge and its bearers are major strategic assets of the Hungarian research, development and innovation system. Not the country's knowledge capacity, but the translation of such capacities into useful innovations is seen as relatively inefficient, and therefore, a stronger and more sustained collaboration between science and economy would be needed. In a sense, as the Hungarian Academy of Sciences (2005:4) has noted, the situation exemplifies particularly well the so-called European paradox (see Bonaccorsi 2007:303) of high level theoretical knowledge combined with a relatively low level of practical applications[7].

The tasks of maintaining a steady supply of young researchers and a highly-educated workforce, while securing viable and attractive career options for them in Hungary remain important priorities. Knowledge and innovation are treated as major break-out points in Hungary's current national development plan. Particular emphasis is laid on the role of the natural sciences and engineering, areas where the rate of researchers and experts as well as newly acquired PhDs is relatively low compared to the EU average. The new national development plan explicitly takes up this issue with the aim to create and secure favourable conditions as well as attractive career models for current and future researchers in these areas (Government of Hungary 2010). Favourable perception of the sciences in general as well as the attractiveness of scientific careers among the younger generations is treated as an important and politically relevant issue in this context.

Some researchers, however, have described the current condition of Hungarian higher education as "mulish," affected by more general trends of massification, but "still operating in an indefinable quasi market framework, which is just as much determined by customary habits, as by the pressure of meeting global market expectations" (Vincze and Harsányi 2012:502). During the last 20 years higher education in Hungary has been in expansion, with a concomitant increase in the general educational level of the population (Kozma 2010). While it still does not reach the EU21 average of 28%, the percentage of the 25-64-year-old Hungarian population with tertiary education rose from 12% to 20% between 1997 and 2010 (OECD 2012:38).

Table 2: Students of the Hungarian higher education system, 2005–2011

Source: HCSO 2011: 37

Year	Applicants (thousand)	New entrants (%)	Students in full time form (thousand)
2005	91.7	57.8	231.5
2006	84.3	64.1	238.7
2007	74.8	68.1	242.9
2008	67.0	77.8	242.9
2009	90.9	67.4	247.7
2010	100.8	65.0	240.7
2011	101.8	65.6	241.6

361,347 people pursued their studies in higher education institutions in Hungary in the 2010/2011 academic year, out of which 240,727 in a full-time and 120,620 in a part-time form (Csécsiné, Hagymási and Könyvesi 2011:147). This number was the highest in the 2005/2006 year, when it reached 424,000. Looking at the time series of matriculating students reveals that matriculation rates were the highest between 2000 and 2005, they steadily decreased between 2005 and 2008 and have started to rise again since 2009. As part of this trend reversal, both numbers of applicants for a full-time student position, and the number of those accepted reached a 20 years' peak in 2011 (HCSO 2012a:37).

7 On the general state of Eastern European science policies see Balázs, Faulkner and Schimank 1995.

Table 3: Fields of training in the Hungarian higher education, 2005–2011

Source: HCSO 2011: 38

	2005	2008	2011
Teacher training and education science	11.8	7.0	4.7
Arts	2.2	2.7	2.9
Humanities	9.6	10.4	8.5
Social and behavioural sciences	13.8	9.4	10.2
Business and administration	14.9	19.7	17.8
Low	4.5	4.2	4.0
Natural Sciences	3.2	4.8	5.3
Computing	4.4	4.3	3.5
Engineering	16.8	17.3	20.2
Agriculture forestry and fishery	3.1	2.5	2.4
Health and social services	8.9	10.1	11.5
Services	6.6	7.8	8.6

Since 2005 a number of changes may also be observed with respect to educational preferences. Career choices for teacher training and educational sciences, social and behavioural sciences, business and economics have become somewhat less popular at the expense of the natural sciences and engineering (HCSO 2012b:38). This change of preferences in general seems to be in line with the declared goal of Hungary's current government to achieve a better alignment between the structure of higher education and the requirements of the labour market through supporting natural science and engineering education at the expense of social sciences and humanities education (see Vincze and Harsányi 2012:501).

The Researchers' Night can be considered a major science popularisation event in which various universities, museums, major researchers and academics, laboratory scientists and other experts participate in order to present science to the public in an entertaining form. The particular format of the event - comprising a series of science shows, guided visits, learning activities and experiments - assures markedly different conditions for science popularisation than traditional contexts could offer. The accent is on fun learning through direct experience, on stimulating curiosity, reason and imagination, and through these on the transmission of a scientist role and career model that young visitors may find appealing.

As science popularisation and raising the attractiveness of scientific career are among the major aims of this programme, we inquired into the perception its audience has on scientists. Given that several studies of professional prestige have shown great respect and preference among Hungarians for natural scientists, we attempted to measure the level of familiarity of the audience with famous Hungarian scientists and researchers. We considered this a promising starting point in the light of the known tendency of Hungarian media channels to under- or misrepresent achievements in natural sciences and natural scientists, mostly at the expense of human- and social scientific work (Fábri 2006b).

The basic premise of our research was that Hungarian society has a general, diffuse interest in scientific work and its results, as well as the contexts in which such work takes place. As there is a rather complex connection between levels of scientific knowledge or literacy and general attitudes towards science, we attempted to address this problem in our research. However, this correlation between knowledge and attitude, as most of the scholars emphasise, does not point towards any causal link. „Attitudes may influence attention structures and attention levels, in turn affecting information-seeking and, finally, the level and structure of a person's knowledge" (Peters 2000: 272). With respect to the Researchers' Night it seems safe to assume that the public participating in this event, through the very act of participation, attests certain basic ideas about the nature of scientific knowledge, combined with a generally positive attitude towards science.

According to Wynne (1995), relations with science cannot be reduced to a precisely measurable possession of factual scientific knowledge, or to opinions on science in the abstract. The encounter with science has a decisively social character. Outside the traditional context of school education, emphasising the transmission of information, encounters with, as well as experience of, scientific issues and activities take place within a contextualised communication process. Thus, scientific understanding can never be reduced to a purely cognitive operation, since during the process of understanding the audience continuously adapts a wide variety of potentially relevant pieces of knowledge to a concrete situation. This observation has far-reaching consequences on research in this area, since measurements of scientific literacy usually imply the retrieval of abstract, de-contextualised knowledge that, as such, may be irrelevant or difficult to interpret by the audience. In order to avoid falling into such traps, we chose to focus in our survey and focus group interviews on the attitudes of the audience, and the way they relate to science in general.

When designing the survey an evident starting point was that our audience may be defined as an "interested, engaged audience," and that it mostly consists of young people, who are before major career choice-decisions. These presumptions were based partly on experiences gained in previous years, and partly on the fact that the organisers of the event treated this category as their main target group.

Studies of public perception of science in Hungary

Based on the few studies carried out within the PUS framework, and focusing on the perception of and attitudes towards the sciences, one can safely state that relations between science and its public in Hungary are being negotiated on most friendly terms. Mosoniné, Pálinkó and Stefán (2005:122) summarise the situation as follows: when compared internationally, there is an exceptionally high standing of scientists and the sciences among Hungarians, there are no significant anti-scientific sentiments, mistrust of scientific results and applications is moderate, no large scale movements against GMO foods, nuclear energy or embryonic stem-cell research are to be found.

Several studies have offered broad empirical confirmation that such statements are accurate representations of what the Hungarian public thinks about science (Tamás 2000, Eurobarometer 2002, Fábri 2006a). Focusing on younger generations, a 2008 Flash Eurobarometer revealed, for example, above average interest in scientific news, new inventions and technologies among Hungarian youth and a widely shared agreement with the idea that scientific research should above all serve the development of knowledge. Furthermore, it showed strong perception of scientists as humanity's benefactors, and a general support of the idea that more money should be spent on research both by the EU and their national government (see Eurobaromater 2008). How such positive perceptions translate into actual practices and influence substantive life decisions is a topic that waits to be explored.

When it comes to the issue of choosing a profession, Hungarian responses are much closer to the European average. Engineering preferences are slightly higher, mathematics are lower, while biology and medicine are exactly equal to the European average. It is true, however, that the natural sciences do better with 31% of Hungarians definitely or probably considering them, compared to the 25% of EU average (Eurobarometer 2008).

How can above average levels of interest and trust in the sciences as well as their high prestige among Hungarians be explained? Based on focus group discussions, and on studies on the history of science, Mosoniné, Pálinkó and Stefán (2005:123) emphasise the role of historical past, and the exceptional achievements and personalities of Hungarian science in this respect. Within Hungarian civic epistemology science is perceived as a national symbol, and as such, an important component of national identity. For Hungarians science embodies highly placed values, such as talent, merit and excellence. It also represents an area of social activity in which these values can lead to internationally competitive, spectacular results and achievements, despite the small size and limited influence of their country. In a way the scientific record of Hungary (measured for example in the number of Nobel laureates of Hungarian origin) is comparable to the nation's Olympic record. Indeed, Gábor Palló identifies a distinct "Hungarian phenomenon" in the history of science: compared to population numbers, a high number of Hungarian scientists achieved excellent results in the most progressive areas of research (mostly in the natural sciences) during the 20th century, and while these results usually materialised abroad, they were grounded in the intellectual capital and initial impulses gained in the country. Palló lists several common characteristics of the members of this highly successful Hungarian research community, such as their strong theoretical and philosophical inclinations, practical, pragmatic common sense, affinity towards new, emergent scientific areas, versatility, and political consciousness and engagement. These characteristics describe well the public image of the Hungarian scientist, as an exceptional individual. With respect to the public image of science, such great individual achievements are related to and contextualised within a particular ensemble of social conditions, such as the strength of Hungarian secondary education, the expansion and upward mobility of middle classes, as well as the element of

migration, as these prominent scientists mostly realised their great potential abroad. The particular civic epistemology that grounds the public perception of science in Hungary places an emphasis on individual excellence, on a view of science as an autonomous, truth-oriented activity, on the importance of science education, as well as on the potential of migration or brain-drain of scientific talent (Palló 2002).

According to György Fábri (2005), the pervasiveness and lasting influence of such views may also be partly explained by the fact that there has been virtually no significant public discussion and debate in the last 20 years in Hungary on the changing role of sciences in the society. As a consequence, traditional tropes in the perception and valuation of science in Hungary (although in a slightly devaluated form) have maintained their strong influence, and the radical shifts taking place within sciences and the social roles of scientific knowledge have not become an integral part of the public image of science (Fábri 2005:8).

Fábri's important studies on the arguably most significant and influential science communication phenomenon of the last decades in Hungary, the ENCOMPASS project (ENyclopedic knowledge Made a Popular ASSett, or *Mindentudás Egyeteme* in Hungarian), offer further empirical evidence in this respect. Initiated by the Hungarian Academy of Sciences and the major private telecommunication enterprises Magyar Telekom and T-Online in 2002, this project consists of a series of highly mediatised lectures addressed to the lay public, presenting the current state of various scientific research areas and covering a wide range of scientific topics. The popularity of these lectures is, by all measures, overwhelming. Awareness of it among Hungarian university graduates is virtually complete, and exceeds 80% among college graduates, while political and economic elites express unanimous positive attitude and support of it (see Fábri 2005:10). According to a 2006 result, "86% of the population saw at least one episode [...] and more than 80% were satisfied."

As Fábri (2009) points out, the ENCOMPASS project combines a traditional, conservative view of science with modern project management. Its content represents the view and perspective of the Hungarian Academy of Sciences, and it is based on "conservative, meritocratic principles" of "classical, autonomous, truth-oriented science." This content, however, comes to be delivered through state of the art professional media tools and professional marketing, which makes it a successful and entertaining media product. Fábri (2009:10) lists three major factors that made this strategy work. The first component is "the personality of the main actor, the scientist", which is built around his/her charisma and media skills on the one hand, and on his/her credibility and authority on the other. This factor is based on the scientific work, achievement and institutional acknowledgment, which is immediately "signified to the lay audience by age, position and titles." The second factor of success mentioned by Fábri (2009:10) was the choice of topics of interest for Hungarians, such as "medicine, pharmacology, molecular biology, astronomy, nanotechnology, engineering, and the environment." Fábri (2009:10) identifies programming as the third major factor behind the success of ENCOMPASS, defining programming broadly, as attempts to present science through "the most convenient, most handy channels of media-use" (such as through advanced visualisation techniques, fast, interactive and user friendly data-transfer, etc.).

According to Fábri (2009:10), this points to "the rise of *sciencetainment*," as a new type of infotainment. However, there are some marked differences between this sort of *sciencetainment*, and what Sava (2011) describes as public relations actions grounded in popular cultural mechanisms, orchestrated with the aim to achieve specific image objectives that lead to the media-constructed image of the scientist as a star-celebrity. The success of ENCOMPASS lies not merely in its good PR-strategy, but in combining such strategy with the cultural authority and credibility of "classical, autonomous, truth-oriented science." Moreover, this cultural authority of science in the case of Hungarian society comes to be based not simply on some universal idea of science, but on a particular civic epistemology that connects this universal ideal with Hungarian national identity and history.

IV. Data collections carried out for the Researchers' Night events 2010–2012

The authors of this book have been carrying out social impact analyses of the Researchers' Night programmes for three years; thus, each impact analysis of the three years differs from one other to a certain extent. The goal of the social impact analysis was twofold: on the one hand it aimed at revealing the popular representations of science and that of the researcher; and on the other, it sought to collect both the expectations towards the Researchers' Night as well as the feedback and opinions concerning the event. It consisted every year of a quantitative and a qualitative part. According to the methodological standards of social sciences, the main aim of qualitative methods, in our case the focus groups and desk research, was to explore basic ideas concerning our research questions. At the same time, the quantitative analysis focused on the socio-demographic background of visitors, factors influencing carrier pathways, the changes of perception and attitudes towards scientists. The sample of the online survey consists of two major parts: (1) respondents reached through contact sheets and (2) pupils and students (between10-24) from participating schools.

Representativeness and validity are the most important expectations towards a sample of sociological research (Babbie, 2008), but as Randall and Gibson (1990) emphasises, several scientific papers fail to present sampling methods. Thus, representativeness and validity cannot be controlled. As the number and popularity of different festivals increases, there are several studies examining their effects (Deery-Jago 2010, Maughan-Bianchini 2004, Kiss *et al.* 2006; Gábor-Szemerszky, 2006; Anderson *et al.* 1998). Nevertheless, scientific literature has little information concerning the size of the necessary sample. Authors emphasise the problem of the sample size because in most cases these surveys are based on convenience sampling. This is a non-probability sampling method; thus, it cannot result in a representative sample (for more information see: Gravetter-Forzano 2009:141, or Weathington et al. 2010:205).

Gábor (2004) developed a special sampling method, called contacting for quickly changing populations, like the visitors of a festival. The method is best described in Ercsei *et al.* (2010). Contacting" the participants of an event is the most widely used method to identify the basic characteristics of a population that can be defined with difficulty (Kabai-Krisztián, 2011; Kiss *et al.* 2006). In our research we adopted their methodology: throughout the Researchers' Night events, at each venue several interviewers (two at every site) asked visitors selected randomly to fill in a short, 5-question questionnaire. "The interviewers were instructed to select the interviewees in a random manner, but at the same time they had to fill both spatial and temporal quotas. Through *contacting* we managed to form a database of 1,519 respondents. They may also be considered a quasi-representative sample of the participants. Besides their basic socio-demographic characteristics we also asked them to provide their phone numbers and e-mails. After the event we sent out an online questionnaire using the data of the contact sheets. According to our experience, participants of the programmes were open to answer the online questionnaire; thus, the response rate was higher than 25%.

The link of the online questionnaire was also distributed to the pupils of partner schools. In this latter case we used exhaustive sampling method, and reached the usual 30% response rate of the online surveys. In 2012 we collected 1,519 contact sheets and 1,346 questionnaires: 856 before the event (pre-test), and 492 after the event (post-test).

As in every year, also in 2012 conducting focus group interviews was an important part of our research endeavour, aiming to complement and deepen information gathered through the survey. In 2012 we conducted four focus groups to explore the opinion of the visitors about the event and their attitudes towards scholars.

Focus groups were carried out in each of the three years of the Researchers' Night's social impact studies, but each time with a slightly different focus and emphasis. However, every year their role was that of the *qualitative sociological research methods* in general; that is, to approach and grasp social reality from a different point of view, and concentrate upon the *meanings social actors attach to the phenomena they are surrounded by* instead of counting social facts and opinions. Broadly speaking, the focus group studies aimed at understanding what the young conceive of *science in general*, as well as the terms they approach scientific research in. Each year, focus group discussions were concentrating upon different issues.

In 2010, in the first year that BZAKA Consortium organised the Researchers' Night in Hungary, focus group studies sought literally to assist us in formulating both the questions of our survey and in planning the activities of the event. In this respect, two such discussions were organised with high school students three months before the event, with the aim of addressing three research questions: (1) the representations of scientific research, (2) the processes of imagining one's future career as well as the main criteria behind choosing one path or another, and (3) expectations towards such an event like the Researchers' Night. The conclusions drawn from the two focus groups serve as a basis both for the programmes and the online questionnaires.

Next year there were two focus groups, but this time they were carried out after the *Researchers' Night*. The participants were recruited from among high school students. Taken into consideration that it was very unlikely that both the selected focus group participants visited previous year's Researcher's Night (which was indeed true) and that in a year's time public perceptions regarding scientific research have undergone significant transformations, we did not find it useful to address the same issue again, i.e. the meanings of science and the representations of scientists among the young. Instead, we focused on two other problems: first, understanding the decision-making process high school students face when choosing one or another department of higher education (or none, for that matter), the role of several actors – teachers, family, friends – in that process, and second, we aimed at gathering opinions and feedback regarding the Researchers' Night programmes. The schools in which we conducted focus groups were also participants of the project and themselves organisers of several programmes within their own schools. Thus, methodologically speaking, the second round of focus groups put a greater emphasis on *impact assessment* by attempting to reveal the *effects* the event had upon young visitors.

After two years of using this method, in 2012 we decided to dedicate focus groups only to improving the *satisfaction study* component of our research endeavour. Therefore, in the design of the four focus groups, in the selection of the respondents and in the formulation of the questions we followed the same goal: to understand the motivations and the expectations as well as to reveal the experiences of visitors. We find it especially useful to be able to channel all the information gathered during the discussions to the organisers of the event. The participants were selected from those having participated at the event and whose phone numbers and e-mail addresses had been selected during the contacting phase. From among them we randomly selected again a number of 80 persons, whom we approached 3 days after the event with the request to participate in a focus group. However, the randomness was only respected within two sub-groups: participants were selected randomly within the "very young" and the "adult" sub-groups. The former was formed by pupils, students and young adults below the age of 30, whereas the latter was that of the participants above 30. Two "young" and two "adult" focus groups were conducted. However, from all other points of view, these groups were heterogeneous: they were mixed in all other – gender, professional status – respects. Also, each group was formed by participants who had visited different sites of the event. In addition to our now "standard" questions regarding the views on the scientist, an entire section was dedicated to evaluating the programmes of the Researchers' Night.

To sum up, in the course of the three years, a total number of eight focus groups were conducted (2+2+4), with the participation of 64 respondents (see Table 4).

Table 4: The number of participants at each focus group interview during the three years

Focus group	Number of participants
2010: 1	9 high school students
2010: 2	10 high school students
2011: 1	10 high school students
2011: 2	11 high school students
2012: 1	4 participants
2012: 2	8 participants
2012: 3	5 participants
2012: 4	8 participants

Whereas in the first two years only high school students were involved in the research, in the last year the respondents formed a much more heterogeneous group as far as their professional structure is concerned: approximately one tenth of the participants in the focus groups were high school students, around one third university students, and the rest young or adult white-collar workers. The share of men and women was rather equilibrated in all groups.

The following sections are for the most part based on the results of the 2012 social impact analysis. We use the data from previous years if there are differences between the years so that we can describe a trend.

V. The respondents: main social and demographical characteristics

The next section of our report presents the most important social and demographic characteristics of the visitors (based on the results of the contact sheets) and the respondents of both phases of the survey. However, as we indicated in the methodological part, in order to identify the major social and professional groups with particular interest in the Researchers' Night, not only quantitative, but also qualitative data may be used, highlighting both the "typical" groups of visitors and their sets of motivations and expectations toward the event. In the following chapter we explore the gender and age composition of our population, then focus upon the residential situation and educational background of the respondents. The quantitative approach to the description of the visitors ends with the presentation of data regarding their economic background.

As with all social impact analyses in general, one of the most important aims of our study is to assess the influence of the Researchers' Night programmes upon its visitors' ideas of science. However, in order to be able to contextualise our results and also to provide useful information for planning to the organisers, it is equally crucial that we place the groups of visitors within the larger Hungarian social landscape in terms of social and demographic characteristics and economic background.

Demographic and social characteristics of the Researchers' Night visitors

As the tables below on the gender distribution of the visitors show, the proportion of female visitors is a bit higher. The residence of the visitors is clearly dominantly the capital. As all but one of our events were located in the capital , it is not a surprise. It is also worth noting that about one sixth of the visitors came from neighbouring suburban settlements.

The highest educational level of the visitors has some remarkable characteristics: the proportion of visitors having graduated from vocational school is low, while the proportion of visitors with elementary school education or university degree is fairly high.

These phenomena have two different reasons. First, the profile of the event and the message of the programmes cannot be attractive for vocational school graduates, as the career of the researcher is not open for them. The high proportion of visitors with university degree (and higher educational level) can be explained similarly: the events are directly targeted at these groups. Second, the high proportion of visitors with elementary school level education can be explained by comparing the age of the visitors with their educational level. Table 5 shows that the distribution of educational level is dependent on the age of the visitors: the average visitor is only 25.7 years old, most of them are 16 years old, and only half of them are older than 21 years.

Table 5: Education of visitors by age groups (%) (N=1,519)

Source: Researchers' Night Impact Analysis, Contact Sheets, 2012

Age (years)	Highest educational qualification						
	elementary school	vocational school	secondary school	B.A.	M.A.	other	Total
14 and younger	61.4	0	0	0	0	38.6	100.0
15–18	94.4	0	5.3	0.3	0	0	100.0
19–24	3.5	0.3	76.0	9.0	7.4	3.8	100.0
25–29	0	0	36.3	18.6	42.2	2.9	100.0
30–39	0.5	4.6	16.8	24.4	49.2	4.6	100.0
40 and older	1.3	5.1	16.8	23.6	51.2	2.0	100.0
Total	33.5	1.6	24.8	10.9	20.8	8.4	100.0

Table 6: Gender of visitors (%) (N=1,519)

Source: Researchers' Night Impact Analysis, Contact Sheets 2012

Gender	
Male	48.8
Female	51.2
Total	**100.0**

Table 7: Residence types of visitors (%) (N=1,519)

Source: Researchers' Night Impact Analysis, Contact Sheets 2012

Residence	
Budapest	66.4
Budapest suburb	16.8
Other	16.7
Total	**100.0**

Table 8: Educational level of the visitors (%) (N=1,519)

Source: Researchers' Night Impact Analysis, Contact Sheets, 2012

Education	
Elementary school or less	37.3
Vocational school	1.7
Secondary school	24.1
Higher education – B. A.	11.2
Higher education – M. A.	18.5
Other	7.2
Total	**100.0**

Table 9: The age of the visitors (N=1,519)

Source: Researchers' Night Impact Analysis, Contact Sheets 2012

Age	Years
Mean	25.7
Median	21.0
Mode	16.0
Std. deviation	13.7
Minimum:	4.0
Maximum:	80.0

According to the data obtained from contact sheets, the "average" or "typical" visitor is a female secondary school student from Budapest. However, when looking at the tables above, we can see that there are other types of visitors, as well. In the next section we paint a more detailed picture of the visitors.

The two surveys allow us to have a detailed understanding of the social and demographic background of our respondents. Besides the gender distribution of the interviewees, we present the residence, educational level and average age of the responding visitors. Using the data we can also describe their economic background. As at this point we would like to present the visitors of the event, we focus on the post-event survey, i.e. information collected via the online survey.

Table 10: The age of the respondents (N=414)

Source: Researchers' Night Impact Analysis, 2012, Post-event survey

Age	Years
Mean	28.6
Median	23
Mode	17
Std. deviation	13.9
Minimum	7.0
Maximum	100.0

Table 11: The gender of the visitors (%) (N=425)

Source: Researchers' Night Impact Analysis, 2012, Post-event survey

Gender	
Male	45.4
Female	54.6
Total	100.0
N Total Valid	**425**

Table 12: Educational level of the respondents (%) (N=434)

Source: Researchers' Night Impact Analysis, 2012

Education	
Elementary school level education	32.9
Vocational school	1.2
Secondary school	32.0
High school graduate	33.9
Total	**100.0**

As the tables above show, the mean age of the respondents was around 28.6 years, although the respondents of the contact sheets were somewhat younger in average, but the range of their age was more heterogeneous. This may point to the fact that the willingness to respond online surveys is more powerful among older people. Also, the questionnaire was filled out by somewhat more young women, than men. In 2010 as well as in 2012 the online post-event questionnaire[8] was answered by a much older population (mean age: 25, in 2010), but the slight overrepresentation of women among the respondents was characteristic in previous years, too[9]. As Table 12 indicates, most respondents have secondary school or higher degree, and most of them are still studying at universities or secondary schools.

8 See Researchers' Night Impact Analysis 2010.

9 See Researchers' Night Impact Analysis 2010, 2011.

Table 13 displays the residential characteristics of the interviewees. The majority lives in Budapest (56.4%), and only less than 10 per cent are originally from another bigger city (a county capital). Around 3 in 10 respondents are of rural origin. The second largest residential group is those living in "a rural town", which in most cases refers to the smaller towns in the immediate neighbourhood of Budapest, i.e. the suburban zone. Typically, families living in the suburban area and working and studying in Budapest are of higher economic and social status.

Table 13: The residence of the respondents (%) (N=424)

Source: Researchers' Night Impact Analysis, 2012, post-survey

Residence types	
Budapest	56.4
A county capital	9.4
Rural town	20.8
Village	12.0
Other	1.7
Total	100.0

Social background

The social and economic status of secondary school students surveyed is much higher than that of the average young Hungarians. Among the most widely used indicators in our questionnaire we included questions regarding the highest educational level of parents as well as their employment status. In 2011 more than half of the fathers and around 60 per cent of the mothers graduated from college or university – exceeding the Hungarian average to a great extent. However, there is a sharp difference between the data in 2012 and 2011 of the survey regarding the share of parents having either college or university degree. In 2012 around 44-45 per cent of the visitors` parents had higher education, while the secondary level degree almost reached one third (29% in the case of the fathers, 36% in the case of the mothers). Whereas among the students included in the 2012 research the share of those having parents with vocational school level degree is 14-21 per cent (see Table 14), in 2011 it was 20.2-24.5 per cent[10].

Table 14: The highest educational level of the respondents' parents (%) (N=421)

Source: Researchers' Night Impact Analysis, 2012, Post-survey

	Respondent's father	Respondent's mother
Elementary school or less	3.6	5.7
Vocational school	21.6	14.2
Secondary school	29.7	36.0
Higher education	45.1	44.1
Total	100.0	100.0

10 Researchers`Night 2011, page 16.

Table 15 presents subjective data regarding the financial situation of the interviewees' families. When interpreting the data, one should always bear in mind the *subjective* nature of the responses. They do not record the *objective* growth of the households' income, but ask the respondents to assess their own financial possibilities by choosing an option. We decided not to ask for exact sums of money, since it seemed unlikely for all the children to be familiar with their parents' income. They were expected to give an estimation of how that income would suffice their needs. Whenever people are asked to estimate their situation of whatever nature, there is a sociologically well-known tendency to choose middle or average categories. This *tendency towards centrality* may also be observed in the table below, as most visitors place themselves and their families in the third categories. However, a clear decline can be seen in the fourth category ("we can buy almost everything..."), and an increase in the first ("we usually run out of money") and second ("money is enough for only the most necessary things") categories. Nevertheless, visitors can be characterised by relative well-being as indicated by the high share of respondents, who believed that their financial means allows them to buy almost everything they need.

Table 15: Self-assessment of the family's financial situation (%) (N=313, 421)

Source: Researchers' Night Impact Analysis, 2011, 2012

	2011	2012
By the end of the month we usually run out of money.	4.5	10.5
Money is enough for only the most necessary things.	10.5	17.8
If spent carefully our income is sufficient.	63.6	59.4
We can buy almost everything, we have no major problems.	18.2	8.6
Other	-	3.8
Total	100.0	100.0

According to the analysis above, we can see that there are three characteristic groups of visitors: young secondary school students (16-year-olds), university students (22-year-olds) and young employed adults (39-year-olds). Most of them live in the capital or its suburbs, in relative well-being. Beyond numbers and averages, clusters and groups of visitors can be identified through focus group studies. Qualitative methods, while not allowing for the quantification of the results, offer a deeper and more nuanced insight into social phenomena. Therefore, in our research we attempted to identify the major groups of visitors through their attitudes and motivations. The following paragraphs describe these groups of visitors, as they appeared in the focus group interviews.

Typical groups of visitors

High school students

Even if not necessarily the most important group in numerical terms, they are most certainly a significant target group of the Researchers' Night. Several elements of the awareness-raising campaign are addressed to school pupils, whom are considered to be an important future resource for the revitalization of science education at the tertiary level. Besides advertisements and PR-actions, children and young people studying in Budapest high schools are approached through games. Their involvement in the event is an important goal to be reached through the inclusion of schools in organising the programmes. The young generations are often and stereotypically regarded by the public discourse as ignorant (see for example the results of the Eurobarometer 2002), displaying indifference and a lack of interest in the nations' past scientific results and famous figures, and also showing low level of curiosity towards scientific career. Nevertheless, due to their young age and "mouldability", it is commonly and tacitly assumed that they are still keen to change perspectives, switch preferences and thus "worthwhile being changed". Additionally, according to another hypothesis, science's lack of popularity among school students is at least partially attributable to the way it is typically presented and taught in the framework of education. Most of the expectations of "sciencetainment" stem from these assumptions: the Researchers' Night programmes are designed in such ways that they place young people's encounter with scientific results in a two-way communication and construction context, where all participants are involved and invited to participate in the building of the event. Scientific results are not merely "presented" to the "not-learned" (or better, "not-yet-learned"), but everybody is invited to contribute to the event, and to imagine the place science occupies within society. Embedding these science popularising programmes into fun events aims at attracting young people, who formerly were not necessarily interested in scientific matters.

It is difficult to judge to what extent this goal has been accomplished, how many students previously indifferent to science have become somewhat more interested in it. According to our research, the best and most efficient attempts in this respect have been those that took the Researchers' Night events directly into schools. The programmes organised in schools in most cases underlined the idea that science through its most often used results is present in our everyday life. The very work of organising was usually carried out by students with the assistance of their teachers. Both these features played an important role in bringing science closer to young people. Again, it is problematic to judge to what extent the previously not-so-interested were brought into these events, at least it is hard to say based on the focus group. As it is a partly participatory and somewhat more time-consuming method, it is widely known that especially those individuals are willing to participate in focus group discussions, who are generally more open and motivated. Perhaps this explains why not only Researchers' Night visitors in general, but also focus group participants in particular were more interested in science than the average Hungarian young person. According to our results, one of the most important *drive to participate* at the Researchers' Night among high school pupils is connected to their future career plans. Some of the high school students, the most motivated ones are searching for information not available within the school education system regarding admissions, requirements to universities, as well as future prospects of graduates. In other cases students, who have chosen science subjects for the matriculation exam, but consider that they are not yet proficient enough, search for opportunities to deepen their knowledge, see a real experiment or talk to a professional about the subject.

Students and young professionals

The second group is that of the young adults – tertiary-level students or graduates who already started to work. Although we did not collect quantitative data regarding the field of study of participants that are currently students, according to the focus group interviews, it is not specific to science students to be interested in the Researchers' Night events. On the contrary, young people with all kinds of professional background visited the event. As for their motivation, it must be emphasised that typically it is the exact opposite to what brought high school students to take part in the Researchers' Night. Whereas the latter aimed at deepening and specifying their interest in one or two particular subjects, improving at the same time their university application prospects, young adults either already involved in tertiary-level education or already working had different kinds of expectations. They search for presentations and events that are not related to their profession, but on the contrary, broaden their horizons. Whereas high school students are more eager to "learn" and acquire more pieces of information, young adults – university students or graduates – see the Researchers' Night as an encounter with a different world.

Young parents with children

The last well-definable group of visitors is not formed by individuals, but by families. It is young parents, uncles and aunts or grandparents, who take their children or young family members to the Researchers' Night with the aim of both offering them quality leisure programme and at the same time, channelling their interest towards science. The adults who accompany the children are mostly university graduates, but only rarely researchers themselves. Many of the people emphasised that besides having fun with the younger ones, events are also educative and relaxing for them at the same time.

VI. Attitudes toward scientific research

Personal contact with scientific research

It must be emphasised that most secondary school students included in the two samples belong to the middle and upper middle class, both in terms of material and cultural capital. This means that in most cases they have the financial means to access quality secondary and higher education. As a consequence of their social network composition, there is a higher probability for these young high school pupils to become familiar with the world of scientific research. As data included in Tables 16 and 17 suggest, one in 5 and 6 students, respectively, in the two samples have among their family members people working in research fields. These shares are even higher if not only families, but larger circles of friends and acquaintances are taken into consideration. The relatively high share of *embeddedness* into the scientific field is an important precondition of a young student's high interest in science.

Table 16: Researchers in the respondents' network (%) (N=810)

Source: Researchers' Night Impact Analysis, 2012, Pre-event survey

	Has	Doesn't have	Total
A family member working as a researcher.	22.0	78.0	100.0
A family friend working as a researcher.	29.3	70.7	100.0
A friend or acquaintance working as a researcher.	50.1	49.9	100.0

Table 17: Researchers in the respondents' network (%) (N=465)

Source: Researchers' Night Impact Analysis, 2012, Post-event survey

	Has	Doesn't have	Total
A family member working as a researcher.	21.1	78.9	100.0
A family friend working as a researcher.	27.7	72.3	100.0
A friend or acquaintance working as a researcher.	54.7	45.3	100.0

As expected, young people who are already in contact with scientific life through their family members, friends and acquaintances showed a somewhat stronger interest in the events of the Researcher's Night programme. Table 18 refers only to those interviewees who participated at one or the other programme. From the data included in the table one can formulate the hypothesis that personal contact and experience with the world of scientific research is a good foundation for the openness to further encounter with science.

Table 18: Researchers in the respondents' network (%) – post-event survey: respondents who participated at the "Researcher's Night" programmes

Source: Researchers' Night Impact Analysis, 2012, post-event survey

	Has	Doesn't have	Total
A family member working as a researcher.	26.0	74.0	100.0
A family friend working as a researcher.	42.0	58.0	100.0
A friend or acquaintance working as a researcher.	36.0	64.0	100.0

If analysed in separate cross tabulations, the values of the Chi squares, together with the levels of significance indicate a strong connection between the students' previous experience with scientific research and their decision to participate at the Researchers' Night (see Tables 19–21).

Table 19: Presence of family members working as researchers among young students who did and did not participate at Researchers' Night 2012 (%) (N=300)

Source: Researchers' Night Impact Analysis, 2012
Pearson Chi-Square: 4.85, Sign. 0.03

	Participation at Researchers' Night 2012	
	No	Yes
No family member working as a researcher	86.4	74.0
There is a family member working as a researcher	13.6	26.0
Total	**100.0**	**100.0**

Table 20: Presence of family friends working as researchers among young students who did and did not participate at Researchers' Night 2012 (%) (N=301)

Source: Researchers' Night Impact Analysis, 2012
Pearson Chi-Square: 3.46, Sign. 0.067

	Participation at Researchers' Night 2012	
	No	Yes
No family friend working as a researcher	71.3	58.0
There is a family friend working as a researcher	28.7	42.0
Total	**100.0**	**100.0**

Table 21: Presence of friends or acquaintances working as researchers among young students who did and did not participate at Researchers' Night 2012 (%) (N=303)

Source: Researchers' Night Impact Analysis, 2012

	Participation at Researchers' Night 2012	
	No	Yes
No friend or acquaintance working as a researcher	66.8	64.0
There is a friend or acquaintance working as a researcher	33.2	36.0
Total	**100.0**	**100.0**

The social representation of the researcher

In order to explore the social image of the "researcher" we asked the respondents in both studies to decide of each of the listed characteristics whether they are typical of a scientific researcher or not. We can group these characteristics in the following way: cleverness, literate are "obvious" characteristics of a scholar, perseverant, hard-working are also highly ranked. This shows that according to our respondents' views scholars usually have to work much, but are not very highly esteemed by society, as they do not earn much. At the same time, the researchers are considered neither popular nor well-known. Comparing the data from 2010, when the first impact analysis was carried out, with the results from 2011 and 2012 we can see only very slight differences in the list of characteristics of researchers.

Table 22: Characteristic traits of the researcher (%) (N=840)

Source: Researchers' Night Impact Analysis, 2012, Pre-event survey

	Characteristic	Not characteristic	Total
Perseverant	98.7	1.3	100
Clever	97.7	2.3	100
Hard working	97.1	2.9	100
Literate (cultivated)	92	8.0	100
Busy	91.2	8.8	100
Interesting	85.1	14.9	100
Pragmatic	79.3	20.7	100
Modest	60.1	39.9	100
Abstract	57.2	42.8	100
Funny	46.4	53.6	100
Lonely	38.3	61.7	100
Earning much	32.1	67.9	100
Masculine	28.8	71.2	100
Famous	25.3	74.7	100
Unapproachable	20.7	79.3	100
Old	20.3	79.7	100
Popular	19.7	80.3	100
Boring	12.5	87.5	100
Feminine	10.4	89.6	100
Self-conceited	6.8	93.0	100

Table 22 presents the data of the first, table 23 the second wave of the survey. The first and most important observation is that the two lists are almost identical. According to our hypothesis, the young, and in fact the entire society, regard scientific research as a deeply masculine profession. However, our data did not confirm this theory. Additionally it must be highlighted that in the respondents' view researchers are not popular.

Table 23: Characteristic traits of the researcher (%) (N=472)

Source: Researchers' Night Impact Analysis, 2012, Post-event survey

	Characteristic	Not characteristic	Total
Clever	98.5	1.5	100
Perseverant	98.3	1.7	100
Hard working	96.8	3.2	100
Literate (cultivated)	92.9	7.1	100
Busy	89.5	10.5	100
Interesting	87.4	12.6	100
Pragmatic	74.8	25.2	100
Modest	61.1	38.9	100
Abstract	55.0	45.0	100
Funny	53.2	46.8	100
Lonely	31.6	68.4	100
Earning much	30.5	69.5	100
Popular	29.6	70.4	100
Masculine	27.9	72.1	100
Famous	25.0	75.0	100
Unapproachable	18.4	81.6	100
Old	13.6	83.4	100
Feminine	9.6	90.4	100
Boring	7.8	92.2	100
Self-conceited	6.1	93.9	100

We addressed the issue of researchers' social representations in focus group interviews, as well. The results of the qualitative study proved to be rather congruent with the ones we reached in the online surveys. In short, both the young and the Hungarian public in general have a *stereotypical and simplistic view of scientific research.* These representations are taken for granted, are only rarely based on personal experiences and in most cases they lack all the elements that would make a choice to become a researcher attractive.

As the following chapter points out, not even famous Hungarian researchers can be considered popular among the respondents: only a small part is familiar with their names, let alone their field of expertise or major results.

Researchers are not ordinary people – this is one commonly held view of scientific researchers. In most cases, respondents agree that this "unworldliness" bears generally positive connotations. Nevertheless, all the traits that are typically attached to the figure of a researcher, in terms of personal characteristics, make him or her quite distant and unreachable. Therefore, even if the researcher is a positive person, he/she is difficult to like and to identify with. Quite unsurprisingly, researchers are expected to be men – wearing a white robe. However, according to our experience the gender of the researcher, as taken for granted as it is, proved to be easy to question. Many of the younger and older participants in the focus groups who visited one or more programmes at the Researchers' Night events re-thought this stereotype. There are no specific patterns in our respondents' view regarding his or her age. However, our hypothesis that scientific research tends to be associated with older age does not hold. On the contrary, research means activity and perseverance, which is much more commonly linked to the active years or decades of one's professional life. Even if the option "not being fit for this world", that is, not being pragmatic enough proved to be far from being a widespread view, generally being committed to one's work and profession is often regarded as a lack of or smaller amount of attention dedicated to everyday life issues.

> *"A researcher definitely needs a personal manager to deal with everyday issues. That's generally his wife, or more rarely her husband."*
> *"They don't lead a normal life, they are somehow disconnected from the real world".*

Even if a great deal of reflection upon these stereotypes changes respondents' ideas of the "manliness" of scientific research, the way they are characterised as private persons emphasise their "male" character. It is mostly men who need "guidance" in matters of everyday life, who leave their "earthly" duties to their personal assistants or wives. But it comes as no surprise from people who are considered to be "so committed", even "obsessed" with their work, which they consider more of a "calling". Therefore, work gains a different meaning with scientists: it controls their whole existence. The interviewees see this as something quite distant from their own aspirations. We believe that this aspect of the image of the researcher is one that may be challenged through the Researchers' Night events, because personal encounters with scientists can bring this profession closer to the young. Within the image of the scientist, as it was painted by our respondents, personal traits are closely interconnected with professional ones; therefore, researchers' immanent high sense of discipline, curiosity, but even their enthusiasm make them basically positive, "likeable" people. Science can only be dealt with lots of humbleness and perseverance. Results do not show up immediately, which is just a natural part of research. One needs to be patient, even during somewhat more monotonous phases of the research activity. But the rewards, in case someone is really successful, are really promising: researchers always create something durable and valuable, and their work needs to be socially worthwhile, too. In every discussion, probably as a result of the most popular scientific discoveries – the hydrogen bomb, for instance – the role of science (and that of the researcher) in improving people's life and perpetuating peaceful development proved to be a crucial issue. Finally, a topic that is often considered – at least in Eastern and Central Europe – to be a major factor that prevents young people from choosing a scientific career is financial reward. Indeed, during the focus groups this theme came up, but participants' views were much more nuanced than simply stressing the difficulties of making a livelihood out of science. From the material point of view researcher career paths are imagined not flat (and low on rewards), but more like a curve that starts rising with age and seniority. This means that material capital accumulates with the years: one has to be very patient at the beginning of a scientific career, because the first period of research is sometimes an "investment" into one's future ascension. However, financial possibilities depend on science and on society's willingness to pay for research.

Negative aspects of this profession are much less emphasised. However, they do not stem from the researcher's personality, but are a result of the social reality he/she is surrounded by. Social

conditions are to blame for the battles researchers need to fight for financial support, which is for the most part contingent upon political preferences, the perceived social use of the results, and mostly industrial and economic interests. Hence, scientists work under the continuous pressure of demonstrating the social and economic worth of their research. This is part of the price researchers have to pay for the fame they gain.

Finally, an important topic that usually arises each time the social role of researchers is being discussed is the (social and moral) responsibility of the scientist. As a member of the intellectual elite he/she is expected to have a certain reflexive and "scientific" vision of and approach to social and public issues. Being a researcher is a matter of *habitus*.

The reputation of Hungarian scientists

As we could see from the previous table, respondents do not consider scholars well-known. As we have included questions regarding the reputation of certain Hungarian scholars in our questionnaire since 2010, we can provide data that verify this fact. Since then the rankings have been almost unchanged. The most famous scholar is Albert Szentgyörgyi, doctor and pharmacologist, Nobel Prize Laureate; 95.5 percent of the respondents knew his name. The second most famous is János Bolyai (81.5%), famous mathematician from the 19th century. The third one is Ottó Herman, famous polymath, who is known by almost 80 per cent of the respondents of the survey conducted before the Programmes. The fourth scholar on the list is József Öveges, his name is familiar to two third of the respondents. The first four scholars lived at least four decades ago.

The second group is composed of contemporary researchers, many with decades of activity, but whose reputation is between 17–41%. Among them, the American-Hungarian Charles Simonyi (IT specialist, businessman, and hobby astronaut) is the most well-known; he is known by 40.9 per cent of the respondents. The case of Charles Simonyi is quite interesting: nearly 25 per cent of the respondents do not consider him a scientist (similarly, the rate was 20% in 2011)[11]. The secaond one in this group is Szilveszter Vízi E.: a medical scientist, also a former president of the Hungarian Academy of Sciences and a well-known figure of the Hungarian scientific scene, who cannot be considered widely known with 31.8 per cent. Vilmos Csányi (ethologist) and Zsuzsa Ferge (sociologist) are not well-known, either, despite their mass media presence.

Table 24: The reputaion of Hungarian scientists (%) (N=830)

Source: Researchers' Night Impact Analysis, 2012, Pre-event survey

	Known	Unknown	Not a scientist	Total
Szentgyörgyi Albert	95.5	3.4	1.1	100
Bolyai János	81.5	9.9	8.6	100
Herman Ottó	79.8	16.4	3.8	100
Öveges József	66.0	28.9	5.1	100
Charles Simonyi	40.9	38.8	20.3	100
Vizi E. Szilveszter	31.8	62.0	6.3	100
Csányi Vilmos	31.1	60.5	8.4	100
Ferge Zsuzsa	17.0	76.1	6.9	100
Barabási Albert-László	15.1	83.1	1.9	100
Detrekõi Ákos	10.6	85.7	3.6	100
Mikes András	8.7	80.7	10.6	100

Table 25: The reputation of Hungarian scientists (%) (N=469)

Source: Researchers' Night Impact Analysis, 2012, Post-event survey

	Known	Unknown	Not a scientist	Total %
Szentgyörgyi Albert	96.2	2.1	1.7	100
Bolyai János	90.6	6.7	2.8	100
Herman Ottó	83.5	12.8	3.7	100
Öveges József	80.3	14.8	4.9	100
Charles Simonyi	50.1	24.4	25.5	100
Vizi E. Szilveszter	43.9	51	5.1	100
Csányi Vilmos	42.2	52.2	5.3	100
Ferge Zsuzsa	22.7	70.5	6.8	100
Barabási Albert-László	18.0	80.0	2.0	100
Detrekõi Ákos	11.4	84.3	3.8	100
Mikes András	5.2	86.2	8.6	100

11 One of the reasons could be that when he was presented in the mass media as the second space tourist of the world, and the second "Hungarian" in the space, it was this and not his scientific activity that was emphasised.

The tendencies are similar according to the data of the post-event survey: Charles Simonyi is more widely known than Szilveszter Vízi E. (although also in this group he is not considered a scientist by most respondents). Our data also show that mass media has its limits: although László Barabási-Albert published his new book accompanied by a moderate but visible media campaign, and the presence of Zsuzsa Ferge and Vilmos Csányi as experts is continuous in the mass media, they remain unknown for a greater part of the respondents.

We also studied whether people really know scholars. To this end we included in our list a non-existing scientist, András Mikes, as well: most of the respondents said that he is unknown (83% - in 2011, 80.0% - 86.2% 2012).

By counting the yes answers the mean is 4,7, while the modus is 4. After analysing the positive answers we can see that older, more educated people know more scholars. Also, visitors of the Researchers' Nights programmes know more scientists than other respondents.

Prestige ranking of professions

Respondents were asked to rank several professions based on their perceived social prestige. The question was repeated in October, after the Researchers' Night. This question, just like the other ones, intended to reveal teenagers' preferences concerning future occupations and careers in order to understand the criteria and mechanisms of choosing one professional track over theother.

Table 26: Ranking professions 2012

Source: Researchers' Night Impact Analysis, 2012, Pre-event survey

	Rank	Most frequent ranking
Doctor / Physician	4.89	4
Economist	5.34	3
Engineer	5.6	4
TV Star	5.78	1
Lawyer	5.78	1
Actor	5.93	2
IT specialist	6.14	5
Interpreter	8.38	9
Researcher	8.96	9
Politician	8.98	15
Political Scientist	10.23	14
Baker / Confectioner	10.34	14
Physicist	10.47	12
Teacher at secondary school	11.13	13
Carpenter	12.79	15

In this list we can see minor changes between 2011 and 2012. In 2011 lawyer was the most popular profession among our respondents. The second most popular was doctor or physician, followed by actor and movie/TV star. In 2012 doctor was the most popular profession, followed by economist and engineer and TV-star. Lawyer was only the fifth. It is worth noting that the evaluation of movie stars has the highest standard deviation, which means that our respondents were highly heterogeneous on this issue. Some of them found movie stars in general very popular, others really unpopular. The profession of politicians was another one that divided respondents; however, the overall ranking of this job is much lower: it is only the tenth in the ranking. Scholars are the ninth, followed by the previously mentioned politicians and right after the interpreters. Physicists are also at end of the popularity list, among the least popular professions, along with bakers, teachers and carpenters. The results of the post-event survey are quite similar.

Table 26: Ranking professions – 2012

Source: Researchers' Night Impact Analysis, 2012, Post-event survey

	Ranking	Most frequent ranking
Economist	5.01	4
Doctor / Physician	5.06	4
IT specialist	5.31	4
Lawyer	5.78	1
TV Star	5.78	1
Engineer	5.97	3
Actor	6.18	2
Interpreter	8.37	9
Research fellow	8.88	9
Politician	8.98	15
Political scientist	10.07	10
Physicist	10.08	11
Baker / Confectioner	11.02	14
Teacher at secondary school	11.1	13
Carpenter	12.56	15

VII. Career choices

Professional plans and decision making

In the following section we analyse a sub-group of our respondents, secondary school students, to know more about their aspirations after secondary school.

After graduating from secondary school, of course, not all young people wish to continue their studies at a college or university. When selecting the samples for our study, the schools were grouped into several categories: public, state supported vs. privately financed, general secondary school vs. vocational secondary school, and schools with low and medium vs. high university admission rates. It is especially general secondary schools, whose students display higher level of willingness to continue studies at the tertiary level.

According to the data displayed in Tables 27 and 28, in 2011 as well as in 2012 nearly 4 out of 5 students expressed their wish to apply for college or university, whereas the second largest group was that of the undecided: almost one tenth of the samples both in 2011 and 2012. Although everyday experience would render it somewhat unlikely in Hungarian society for an 18-year-old to choose travelling around for a year after graduation – instead of working or studying –, according to our data, around 4-5 per cent of respondents have this option in mind, most likely as a means of gaining time before the final decision. Another sign of the weight this decision has on young people's life is the relative popularity of temporary work. Both travelling and working temporarily are strategies of gaining "life experience" and independence before embarking upon further studies. Besides the "other" category, planning to begin full-time work after high school graduation seems to be the least attractive option, mentioned by only around 3-4 per cent of the interviewees. Certainly, this is a natural consequence of the way in which schools were selected.

Table 27: Professional aspirations of high school students after graduation (%) (N=416)

Source: Researchers' Night Impact Analysis, 2012, Pre-event survey

	2012
Studying at a college or at a university	85.1
Journey	2.2
Work	1.2
Work until (s)he makes up his/her mind	2.6
Hasn't decided yet	7.0
Other	1.9
Total	100.0

Table 28: Professional aspirations of high school students after graduation (%) (N=136)

Source: Researchers' Night Impact Analysis, 2012, Post-event survey

	2012
Studying at a college or at a university	80.6
Journey	3.0
Work	3.7
Work until (s)he makes up his/her mind	3.7
Hasn't decided yet	8.2
Other	0.7
Total	100

As we have seen in the tables above showing data from 2012, around 15 per cent of secondary school students find it difficult to make firm plans for the years after graduation, many of them trying to gain more time and experience through travelling or working for a shorter or longer period. Of course, taking up work for a while might as well be a strategy for collecting money for later studies. Nevertheless, it is widely known that 17-18–year-olds spend a great time selecting the subjects to study after graduating high school.

As for the role of several people in guiding young people in their choices, the results of our survey – the question was only included once in the questionnaire, just in the first phase of data collection – come as a surprise after our previous data collected through interviews and focus groups. Qualitative sociological research carried out in student groups in the final years of secondary school have repeatedly underlined parents' and families' weakening role in choosing one university and subject over another, leaving much more space for friends and acquaintances. It is true that having several actors in the decision-making process may be multifaceted. People consider mere openness to talk through several options to be helpful, without expecting to receive any firm pieces of advice. More than 90 per cent of our respondents considered their parents to be the most important persons to rely on when thinking about future plans. In fact, this does not contradict our previous interview and focus group results, according to which parents are less and less familiar with the multitude of university options available[12]. Family members are followed at a great distance by friends: more than half of the respondents believed they could count on friends while searching for the best university and department to apply to. Finally, both our interview and survey data converge on estimating teachers' roles in guiding secondary school students: their role was appreciated by around half of the respondents. Whereas our survey does not refer to the motives and phenomena behind the data, focus group interviews have revealed a double reason for teachers' lack of involvement in their students' decision-making process. First, they seem to have lost contact with the university world, and have less knowledge about the strengths and weaknesses of subjects. Also, they seem to be quite hesitant as far as the market value of some of the professions is concerned. Second, the workload of high school teachers prevents them from being motivated enough to offer guidance to their students about their future plans.

12 Here we present the results from the previous years, to present the relevance of family members.

Table 29: Guidance and assistance in decision making for the years ahead (2010–2012)

Source: Researchers' Night Impact Analysis, 2010, 2011, 2012

	2010 %	2011 %	2012 %
Family members	82.7	92.6	85.5
Friends	51.2	56.7	52.5
Teachers	50.4	48.9	55.0

Although the programmes of the Researchers' Night are offered to a large audience, one of the most important target groups is primary and secondary school students. Their decision making concerning their career choices can be assisted by offering them information regarding researchers' life. In most of our focus groups we attempted in a way to map the *key actors and key factors* influencing the process of decision making. In the focus groups conducted with high school students we were able to grasp several phases of the decision-making process in their occurrence. At the same time, in the discussions carried out in 2012 mostly with adults, we asked respondents both to recall their own experiences and to *imagine* a situation in which they would advise their own children. In the following section we present the most important *elements* of the process through which high school students choose from tertiary-level offers, highlighting the factors' role in guiding young people. First, we argue that among other things *conceptions regarding the perfect job/profession* have a definite impact upon study options. Then we describe turn to the discussion of people/actors, whose role is important in the selection of subjects or institutions.

Important actors in the decision-making process

Generally speaking the process of choosing, or at least short listing the options available, is not an individual act: while it is embedded in the socially created and shared conceptions of the "ideal job" or "ideal profession", the choices between different "ideals" are largely influenced by people whose opinions and experiences are considered important. First we turn to the description of "the ideal job".

"Something that you enjoy doing"

No matter how the question is phrased, whether it is put into a questionnaire or raised at an interview, most respondents start describing "the ideal profession" by its content, and more precisely, emphasising the fact that it should coincide with the person's preferences.

Table 30 sums up the most important characteristics of the "ideal profession", grouped into four crucial dimensions: ways of performing the tasks, content, organisation of activities and output.

Table 30: Characteristics of the "ideal job" or "ideal profession"

Source: focus groups carried out in 2010, 2011 and 2012

Most important features	Detailed description
Performing the tasks	team work, but in smaller groups, also performing individual work interactive, based on cooperation
Content	not routine, never boring, not monotonous always need to learn, lifelong learning, always room for development creation personalised level of difficulty interesting, likeable
Organisation of activities	flexibility good life/work balance (esp. for women)
Output	concrete results worthwhile activity, social use financially rewarding

In addition to being pleased with the job, respondents also underline the ideal job's non-routine character, which generally means creative work. In order to achieve this, most young people interviewed say that they would be willing to continue their education. Enjoyable work means creation, i.e. the possibility for people to identify completely with the results, the output of their work. However, an important aspect of the content of the desired work is a level of difficulty, which does not impose too great of a challenge on people. In other words, neither the workload, nor its difficulty should overwhelm the person in charge. Concerning the way tasks are organised, teamwork is usually very much praised; however, not at the expense of individual work. Flexibility and manageable life/work balance are very important, too, because they mean independence in organising one's work. For the young people interviewed the "ideal job" should reward the worker "financially" without him/her being compelled to sacrifice leisure time or family life. Lastly, "ideal work" is meaningful work with results that are "concrete", "touchable", and useful for society at the same time.

Finally, "ideal profession"-representations proved to be gendered, too, especially in girls' and young women's perception. On the one hand they emphasised the importance of care and concern in a woman's activity. On the other hand, when asked to imagine that they have the "ideal job" in 20 years' time, young women were more likely to imagine themselves as 'secondary earners' within the household economies, and defined their own roles in terms of primary caretakers of the children and other members of the family.

Significant actors involved in decision making

Our focus group results show that there is a wide consensus of what people, and especially high school students, understand by *competence in assisting them throughout the decision-making process.* In all discussions where this issue was addressed, the same ranking was formed: it is friends and peers who are seen as the most competent in providing them with information regarding university level studies, they are followed by *some parents* as well as *family friends*, but only if they have some connection with tertiary-level education. The list is closed by high school teachers.

Competence is contingent upon personal experience and it becomes obsolete with age. All interviewees acknowledge that the *high pace of industrial, economic and technological transformations* makes people's knowledge obsolete, affecting their orientation skills in labour market issues. For someone to be able to guide a teenager in his/her decision making regarding university studies, they should be endowed first of all with personal experience. A tertiary-level diploma or theoretical knowledge about the operation of the economy is far from being enough when assisting a high school student in university matters. Instead, recent knowledge both about the internal functioning of university departments and personal experience concerning the link between the studies and the labour market is much more highly valued than any other form of "capital". This is how students, older brothers and sisters, former high school schoolmates become the best advisers of teenagers concerning study options: they have all that informal set of knowledge that helps the young in the midst of entry requirements, level of difficulty of the courses, possibilities of gaining practice, as well as "transit routes" toward the desired jobs. Some high school teachers must be aware of the role older peers play in the decision making of the young, because many schools invite former students currently studying at different universities and young practitioners from different professions to describe the professional route they have followed in previous years. Organising "life course presentations" or "life histories" with successful young researchers as part of the Researchers' Night must be equally inspiring and helpful for young candidates for scientific career.

Parents and teachers have approximately the same position in guiding high school students in their choices. Parents are only considered "relevant" in these issues if they are university graduates themselves, and possibly work in an environment which is seen as closely linked to tertiary education. However, due to the pace of changes in education, "older" people are thought to have lost touch with the field.

The qualities of "the perfect job"

Plans for tertiary-level education – and for that matter, all kinds of decisions on one's later professional life – are made based on the representations people have of professions and occupations. The following two tables demonstrate the answers given to a somewhat different type of question: how would you describe "the perfect job"? What are its characteristics? What makes a job a good one? Respondents were asked to rate twelve possible characteristics of a profession/job from 1 to 12, where 1 meant the most important advantage of a good job and 12 the least important. Besides the fact that the responses reveal the list of preference young people have in mind when applying for one faculty or another, making it also possible to understand what the preferred characteristics of the ideal job are, we also wished to use the question and the answers it provided in the forthcoming Researchers' Night programmes. The most important objective of the events is to bring science and research life closer to the young. Therefore, it is highly crucial to be aware of what today's youth values in a "good job", because those characteristics may become key elements in the "marketisation" of scientific life. As with every "market strategy", the elements and key features of the target group's needs are indispensable in efficiently making the "product" attractive.

In this regard, future programmes should bear in mind the most important needs a "perfect job" is expected to meet. According to the data included in Tables 31 and 32, a good job is supposed to offer personal satisfaction and at the same time allow the person to have a private life. These first two priorities are followed by a much more pragmatic one: it should be fulfilling from a financial point of view, too. The following items on the list are the safety of the position, and another element that points toward personal fulfilment, i.e. an interesting and not monotonous work. Among the least important features of "the perfect job" two are related to professional and

personal autonomy: on the average, a good job is not supposed to improve personnel skills and knowledge, and it seems less important for it to offer opportunities of mobility. Flexibility also proved to be less valued. It is worth mentioning that the two lists formed in the two surveys are almost identical, and only minor differences can be observed between 2011 and 2012. To sum up, in next years' events a researcher's life might be presented as an attractive option by highlighting its potential to enhance personal fulfilment and also the fact that one might pursue a private life besides being a researcher.

Table 31: Characteristics of a good job[13]

Source: Researchers' Night Impact Analysis, 2012, Pre-event survey

	Ratings	N total Valid
It is important to love what I do and not to work out of constraint or routine.	2.22	717
It is important for the job to be safe.	3.46	508
It is important to earn much.	3.72	503
It is important to gain reputation through my work.	3.72	503
It is important for the work to be interesting and diversified.	3.78	503
It is important to be my own boss.	3.78	543
It is important to always have time for my private life.	3.97	551
It is important for my work to benefit people.	5.23	403
It is important to be able to keep improving my skills and knowledge while working.	5.35	381
It is important for the workplace to offer chances of mobility.	6.13	332
It is important to travel much and get to know new people and places.	6.85	313
It is important for the work schedule to be flexible.	7.28	293

13 Respondents were asked to rank the items according to their preferences. 1 was assigned to features considered the most important, whereas 12 was assigned to the item considered the least important.

Table 32: Characteristics of a good job

Source: Researchers' Night Impact Analysis, 2012, Pre-event survey

	Ratings	N total Valid
It is important to love what I do and not to work out of constraint or routine.	2.1	397
It is important for the work to be interesting and diversified.	3.6	285
It is important to gain reputation through my work.	3.6	285
It is important for the job to be safe.	3.8	273
It is important to earn much.	4.0	286
It is important to always have time for my private life.	4.1	277
It is important for my work to benefit people.	5.0	222
It is important to be able to keep improving my skills and knowledge while working.	5.1	227
It is important for the work schedule to be flexible.	6.5	163
It is important to be my own boss.	6.6	183
It is important for the workplace to offer chances of mobility.	6.6	183
It is important to travel much and get to know new people and places.	7.4	156

After presenting the aspirations of secondary school students' to tertiary education, we analyse the factors influencing their decisions. Students were asked which subject they wish to pursue in their studies. As this was an open question, the answers were re-coded and split into two categories: natural sciences and everything else. Our aim was to understand the factors influencing the choice of natural sciences. The popularity of natural sciences and engineering is low: 14.3% wish to study it (N=1,345). According to our data, students planning to choose natural sciences have parents with university degree, discuss career choices within the family and live in subjective well-being. They also have personal experience with scientists, as it is more likely that they have an acquaintance who is a scholar herself or himself. The focus groups verified these results, especially the ones conducted among secondary school students.

The following table shows the relationship (contingency) of career choice and visiting the programmes of the Researchers' Night.

Table 33: Career choices of respondents by their interest in Researchers' Night (%) N=1155,)

Chi Square=2.45, p=0.048
Source: Researchers' Night Impact Analysis, 2012, Pre-event and Post-event surveys

Career choice	Visited the Programme	Did not visit the Programme	Total
Natural sciences	42	58	**100**
Arts, humanities and social sciences	36	64	**100**
Total	37	63	**100**

According to the above table, there is a weak, but detectable difference in the career aspirations of high school students who either did or did not visit Researchers' Night in the previous year, in 2011. As a rule we can state that students who proved to be more interested in the Researchers' Night are at the same time more likely to embark upon natural science studies.

VIII. Satisfaction study

Identifying the most popular and useful sources of information concerning the Researchers' Night is extremely important to organisers, especially with regard to future events (Table 34). The awareness-raising campaign was changed in 2012, based on the results of the 2011 impact analysis. Nearly 78 per cent of the interviewees considered schools and universities an important source of information regarding Researchers' Night. As expected, they were followed – at a great distance – by the radio and the Internet. Informal networks and street advertisements are the third most efficient way to popularise the event, according to our data from 2011.

As the Internet was considered an important source of information, the awareness-raising campaign used it more intensively in 2012. It is mirrored by the data: 51% of respondents mentioned it. Schools, university information and friends also remained important. Friends and acquaintances, especially those having participated at the events in previous years, seem to be more important sources of information than street advertisements. Electronic media and printed magazines and journals are, however, less efficient in attracting new interested young people. It is worth noting that in this year only 5% of those interviewed never heard of this event, while in previous years this proportion was 25%

Table 34: Sources of information regarding Researchers' Night (%) (N=490)

Source: Researchers' Night Impact Analysis, 2012

	Yes	No	Total
Internet	51.0	49.0	100
In school/ at the university	39.0	61.0	100
From friends and acquaintances	39.4	60.6	100
Street advertisement	29.4	70.6	100
Radio/TV	15.5	84.5	100
Newspapers, journals, magazines	12.4	87.6	100
From parents	8.6	91.4	100
Other	7.3	92.7	100
Never heard of Researchers' Night	1.0	99.0	100

In 2012 we asked again the visitors to rank the programmes. The figure below shows how frequently a programme was mentioned by the respondents at the first three places. According to the ranking, the most popular programmes were again scientific presentations, followed by presentations about modern technical equipment and innovations. The next were plays and games, talks with researchers and exhibitions, but their score is much lower, only around 100 mentioning. Beer drinking, theatre plays, quizzes, professional counselling are below 50 points, while pop music concerts and classical music concerts are the least popular.

Figure 2: The popularity of several types of programmes at the Researchers' Night 2012

Source: "Researchers' Night" Impact Analysis, 2012

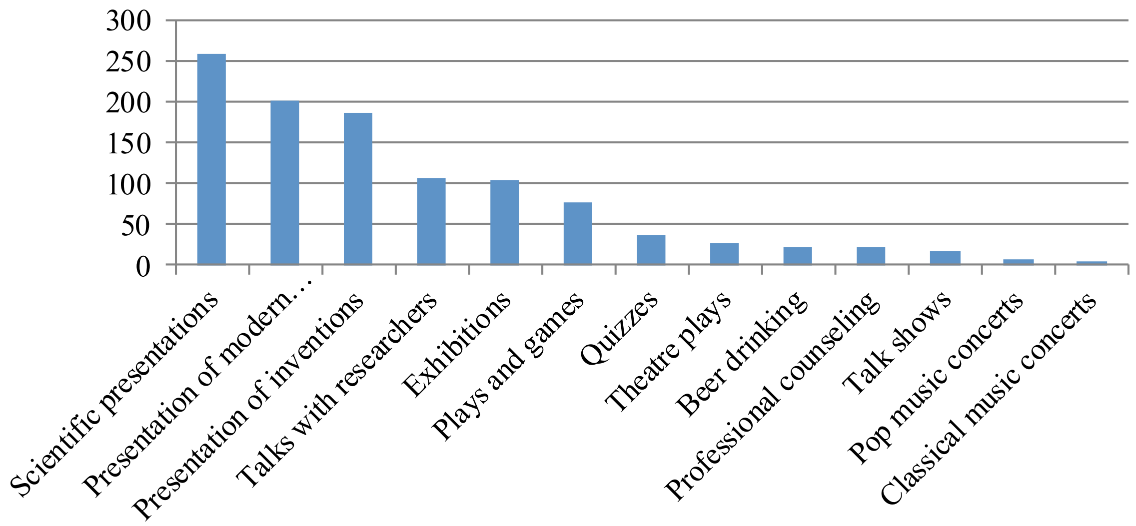


Figure 2 shows that the most popular programmes were the ones introducing innovations, technical equipment and results of pure scientific knowledge. Respondents were apparently interested in programmes presenting science as a distinct and useful knowledge form. These programmes did not depict the researcher as a practical and skilful person, but as someone with special and hardly accessible knowledge.

On the other hand, programmes, like beer drinking or talk shows through which scientists could be met as everyday people proved to be less popular. Similarly, concerts, which were difficult to link to sciences, turned out to be less interesting for the audience.

There was a great variety of programmes through which visitors could themselves became involved and acquire own experiences through participating actively in experiments and testing innovations. They could try modern info-communicational technologies, conduct chemical or physical experiments, or anatomise a fish or a rat. These programmes proved to be the most popular.

IX. Conclusions

In the last chapter we provide an overview of the main findings of our research. First, we introduce typical visitors, who they are and what they look for during the long night of the event. Then we present the connection of the idea behind the Researchers' Night to science – society relationship. Finally, we explore the main factors influencing profession and career choices of secondary school and university students.

The socio-demographic characteristics of the visitors were studied throughout the three years both from a quantitative and a qualitative perspective. Whereas the surveys allow for the statistical description of the several groups of participants, the qualitative method applied – i.e. the focus groups interviews – aimed at revealing "typical visitors" with a well-defined set of motivations and expectations. Quantitative data in the last year of study (2012) stemmed from two sources: on the one hand, more than 1,500 visitors completed so-called "contact sheets" during the event. They were meant to facilitate "quick and efficient" collection of five basic pieces of information: sex, age, residence, education and occupation. On the other hand, visitors were asked in the Researchers' Night's aftermath to complete a short, 20-question online questionnaire that intended to record more personal data as well as expectations, satisfaction with the event, attitudes towards science and other information.

While the gender composition of the visitors, according to our quantitative data, is relatively equilibrated (with a slight female majority), there is a significant variety in the age structure of the participants. The mean age of the people who visited the shows was nearly 26 years, but the most frequent age (that is the modal value) was 16 years. It is the least surprising finding that most visitors are highly educated, whether they have a BA or an MA degree. All in all, the participants of the Researchers' Night are mostly intellectuals or university students whose economic and social status is above the Hungarian average. This is also confirmed both by the subjective assessment of their financial possibilities and by their residence: more than 80 per cent of the respondents were coming either from the capital or its suburbs. From a qualitative perspective the visitors may be grouped into three large categories: high school students are primarily interested in the Researchers' Night as a means of gathering information regarding tertiary-level education. In order to be able to make well-informed decisions concerning their future career plans, they need more data about admissions, requirements to universities as well as future prospects of graduates. In other cases, students, who have chosen science subjects for the matriculation exam, but consider that they are not yet proficient enough, search for opportunities to deepen their knowledge, see a real experiment or talk to a professional about the subject. Young adults – i.e. tertiary-level students or graduates who already started to work – search for presentations and events that are not related to their profession, but on the contrary, widen their horizon. Whereas high school students are more eager to "learn" and acquire more pieces of information, young adults – university students or graduates – see the Researchers' Night as an encounter with a different world. Lastly, young parents with children look for quality leisure programmes, and at the same time they are determined to channel children's interest towards science.

The idea behind the programmes of the Researchers' Night can be traced back to the PUS (Public Understanding of Science) paradigm: during the programmes scientists meet the public, and introduce themselves as everyday people (Bodmer 1985, Sava 2011). Participating scholars speak about their scientific results, present their work, their innovations, technical equipment, but also keep talks, and participate in round-table discussions. As Figure 2 shows, visitors are interested in scientific presentations and would like to know modern equipment. Most successful programmes aim at showing scientific knowledge and its result to the wider public, but do not aim at eliminating the differences between scholarly knowledge and lay knowledge. Instead, the goal of the event is to attract visitors to become scholars and enter into their "sacred world". According to the impact analysis, visitors would like to meet the manifestations of distinct and strange scientific knowledge. This would lead the researcher to the assumption that the typical visitor of the Researchers' Night programmes is a passive consumer of science; however, further analysis of impact assessment results allows us to paint a different picture.

As Figure 2 indicates, programmes allowing visitors to use innovations, or conduct experiments were popular, which suggests that participants are ready to get their own experiences about scientific knowledge. According to our research, people are not interested in popularised knowledge, but prefer scholarly knowledge choosing a democratic access to scientific knowledge. Also, the low scores of completely non-scholarly activities (like beer drinking, theatre play, or music concerts) suggest that the visitors of the Researchers' Night are interested in scientific results, but presented in an accessible manner.

Finally, a core topic addressed throughout our studies was that of career options of the young. Secondary school students choose a profession instead of a career. According to our research, pupils and students choose a university and a science to study, and decide about career only in the last year of university or after graduation. Our research shows that after graduation young people do not want to start work or travel, or gain experiences: such ideas are almost unknown in Hungary. Most of the youngsters wish to continue to study. At the same time, according to the focus group interviews, students do not decide in the secondary school where they would like to work after finishing studies. When graduating from high school pupils do not have clear ideas about career options. Further research among university students and young researchers would help answer the question: when and how they decide between different career options and workplaces. Comparing the respondents' perception of researchers' characters and the characteristics of the ideal job, we can assume that there are minor differences among the two lists: respondents would like to have an interesting, non-routine, autonomous job, where they can have high salary and gain reputation. The respondents consider researchers clever, perseverant and hard-working, but they are thought to have low salary, be less popular and not famous. Thus, we can assume that the career of the researcher would be more attractive if it was more visible and better paid.

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