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ESTONIA

Science communication in a post-Soviet country

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Estonia, with just 1.3 million people, is one of the smallest countries in the world to use its own language as the primary language in all areas of social life, including media and all levels of education. Today, the country also has a modern science communication landscape with science centres, science festivals and other regular events, established science journalism, and a national program to foster science communication. This modern setting is mostly a product of rapid developments during the last 15 years, when Estonia's accession to the European Union functioned as a major catalyst.

Estonia belongs to a group of Central and Eastern European countries that underwent at least three significant transitions during the 20th century: first, gaining independence following World War I, then being incorporated into the Soviet Union or its sphere of influence during World War II, and finally, returning to democracy within a capitalist market structure in the late 1980s and early 1990s. Each transition brought with it a disruption that has made a steady development impossible: each time, old societal structures were dismantled or radically reshaped.

Various statistical indicators place Estonia as one of the most successful of the post-Soviet group of countries making the transition to the Western world. This also concerns science and science communication where the comparison with similar post-Soviet countries demonstrates that the development towards modern science communication is by no means a given. Therefore, the Estonian example helps describe and explain both the characteristics of science communication under the Soviet regime and what forces and factors lead to the establishment of a modern science communication system.

1. Historical background

The first Estonian-language periodical publication, the magazine *Lühhike öppetus* [Brief instruction] aimed to provide Estonian peasants with practical medical advice, both for themselves and for their cattle. The magazine was published in 1766–67 by the Baltic-German Estophile Peter Ernst Wilde and was part of the Enlightenment-inspired efforts of the German nobility who were convinced that 'if peasants' virtues were developed and proper education provided, their social circumstances would improve' (Lauk et al., 1993).

A similar focus on education and cultural development was promoted in the mid-19th century by the emerging Estonian elite leading the national awakening movement. For example, Friedrich Reinhold Kreutzwald, the doctor who penned the Estonian national epic *Kalevipoeg*, also published the widely read popular science magazine *Ma-ilm ja mõnda* [The world and other things] (1848), the first illustrated Estonian magazine (Peegel, 1994).

The contribution of Tartu University (founded in 1632 by Sweden and re-opened in 1802 under Russian Czarist rule) became more important towards the end of the 19th century when students' organisations established themselves as venues to bring science to the public. This complemented the opening to the public of the university's natural history museum and Botanical Gardens in 1802 and 1803 respectively.

During the first period of independence (1918–40), fundamental sciences were considered impractical for a small nation like Estonia and the emphasis was on 'national' sciences (i.e. those dealing with Estonian history, culture, nature, etc.) or applied sciences such as agriculture (Kalling and Tammiksaar, 2008). Scientific societies became leading communicators by publishing books and magazines, including *Eesti Loodus* [Estonian Nature], which is still published today, and *Loodusevaatleja* [Nature's Observer]. The initiator of the latter, botanist Gustav Vilbaste, considered it crucial that the publications avoided academic language and were written in a way easily understood by the readers (Tammiksaar, 2017).

In 1940, Estonia was occupied by the Soviet Union and lost much of its elite during World War II: they were either killed, arrested and deported, or fled to the Western world. Science was rebuilt to Soviet standards that had a much stronger focus on fundamental sciences and saw science and technology as an instrument to demonstrate the superiority of the Soviet model of socioeconomic organisation. The scientists had to adapt their work to the

official philosophy of dialectical materialism[1] and operate within a system of strong political control that also included censorship and difficulty of access to scientific information published in the West (Medvedev, 1979).

These pressures somewhat eased during the Khrushchev era at the end of the 1950s and beginning of 1960s. This allowed the scientific societies to become more active again, to use more Estonian language in science, and to restore some magazines closed at the beginning of the Soviet occupation (Tammiksaar, 2018). Good-quality Russian-language books and magazines were available, but soon an Estonian magazine was founded that was to become the most influential of its kind: the popular science magazine *Horisont* [Horizon], first published in 1967.

The monthly magazine *Horisont* has often been cited by current Estonian scientists as one of the reasons they chose a scientific career. The magazine offered articles written by Estonian scientists in an accessible language and sometimes provided adaptions from Western popular science magazines. During the first years, the topics mostly covered global science and the latest scientific advances, while later coverage became more timeless and focused on local and Soviet topics (Olesk, 2017). The magazine enjoyed its greatest popularity in the 1970s with a top circulation of 54,000 in 1971.

The magazine was the official publication of the Teadus [Science] society. Founded in 1947 as a branch of the similar all-union society (Znaniye), its aim was to spread political and scientific knowledge among the population. Its main activities—lectures and brochures—did provide a venue for science communication but were foremost of ideological nature (officially, communism was considered a scientific discipline in the Soviet Union). As a result, we can distinguish two types of public science communication: one whose aim was not to introduce or explain science but to use science examples or scientists to reinforce ideological discourses such as legitimisation of the Soviet system; and the other that sought to popularise and explain science. A study on the science coverage in Soviet Estonian media (Olesk, 2017) showed that although the first type was predominant, the second type was also present, especially in *Horisont*, but also in daily newspapers, probably more due to the personal initiative of some scientists and journalists than to editorial policy.

The educational science communication paradigm that was to become the dominant one in 21st-century Estonia traces its beginnings to 1980, to the founding of the National Student Research Society. The society facilitated the mentoring of gifted school children by senior researchers and organised student research conferences.

1 Dialectical materialism is a philosophy of science that serves as the philosophical basis of orthodox communism.

Several scientists played prominent public roles in the popular movement in the late 1980s that finally led to the restoration of independence in 1991. The movement was sparked by scientists highlighting environmental concerns related to Moscow's plan to start mining phosphorite in the ecologically delicate Virumaa county.

The harsh reforms Estonia undertook after the restoration of independence and the abrupt transition to a market economy hit society hard. Scientists had to re-orientate themselves to the Western model, including publishing in international peer-reviewed journals and competing for funding. Under these circumstances, science communication was not a priority—neither for the scientists, nor for the media or the universities. The circulations of *Horisont* and *Eesti Loodus* declined dramatically. The field suffered from lack of resources and support and was only sustained by devoted enthusiasts.

2. Emergence of modern science communication in Estonia

When preparing this chapter and talking to people with a long history in the Estonian science communication landscape, the developments witnessed during the last 20 years were often explained by one key factor: the crucial role of individuals. In a small country, the right person in the right place or with enough determination could trigger long-term processes and have a remarkable impact. Several initiatives that laid the foundation to the period of rapid development and institutionalisation of science communication were attributed to such individuals or small groups.

To give two prominent examples: in the national media, science was kept visible by Tiit Kändler, a former physicist who started editing a weekly science page in 1995 and became eponymous with science journalism in the following decade. The interactive science centre AHHAA that became a crowd magnet in 2011 was established in 1997 and built from scratch by the former chemist Tiiu Sild.

The leap from those endeavours to a modern science communication system in Estonia required several supportive factors to come together in the beginning of the 2000s. First, society was recovering from the ruptures caused by the transition, and now had more resources to focus on issues beyond mere survival. The scientific community started to discuss the same set of perceived problems that helped to launch the science communication movement in Western European countries in the 1980s and 1990s: lack of

students in STEM-fields (science, technology, engineering and mathematics), little or inaccurate media coverage of science, and the diminishing role of science and scientists in society.

Second, new resources became available to support science communication activities—most importantly, funds from the European Union (EU). Outside support had been there before as well—in the 1990s the Scandinavian countries provided financial support and know-how for the establishment and growth of several science communication initiatives. For example, the Estonian Association of Science Journalists was founded in 1990 (then also including environmental journalists) with the support of the Finnish association; and science centre AHHAA was directly inspired by the Heureka centre in Helsinki with whom they have had a close collaboration over the years. However, the financial means that became available with Estonia's accession to EU in 2004 moved activities to a whole new scale. By around 2005, the stage was ready for a quick expansion of science communication activities in Estonia. There were dedicated individuals who worked on limited resources and with little or no institutional support, meaning that they were usually not capable of reaching beyond a niche audience. At the same time, there was a growing understanding among the scientific community that science communication can be a tool to solve problems that science is facing in society. Finally, access to EU funds made decision-makers look for fields that needed a development boost.

One case that illustrates how these factors co-contributed to a quick shift in the nature of science communication activities in Estonia was the celebration of the International Year of Physics in 2005. The Estonian Physical Society had been concerned for some time about the sustainability of the field in Estonia, considering low student interest and little public visibility of physics. While they had been doing small events before, the international year prompted them to design a comprehensive program to increase the visibility of physics in the public and among potential students. The activities included a new web portal for physics news, a weekly science experiment presentation on the national broadcaster's morning show, a public event for families and the Science Bus—a science theatre that toured schools (Eesti Füüsika Selts, 2005). Most of the funding for the program came from an EU framework project related to the Year of Physics, but the extent of the activities was also supported by a substantial amount of work done on a voluntary basis by students and university staff.

The impact of the Year of Physics activities extended well beyond the one-year project. The Estonian Physical Society continued and extended many of the activities in the following years. Several people who got their first science communication experience during the Year of Physics are now prominent

communicators. The idea of the TV show *Rakett 69* [Rocket 69], one of the biggest science communication success stories in Estonia, was born in preparation for the Year of Physics, although it finally aired only in 2011.

Perhaps the most influential activity was the creation of the Science Bus. It has visited hundreds of schools over the years with its science theatre performances and served as an inspiration for other fields to launch similar initiatives. Today, organised school visits with interactive workshops and mobile laboratories have become a widely used science communication format in Estonia.

In a way, the Science Bus accelerated the formation of the current state-managed science communication system. The wish to officially recognise the Science Bus prompted the creation of annual National Science Communication Awards in 2006, which allowed Estonia to submit the winners to a similar (but now defunct) European Union science communication competition. Further, the awards led to the establishment of the annual science communication conference. Terje Tuisk, the head of the Department of Science Communication in the Estonian Research Council, recollects that in the first years the award ceremony was rather unattractive to anyone but the people immediately involved.[2] Hence, in a discussion about how to increase the visibility of the awards the idea of a science communication conference was born. First held in 2008, it has since then annually brought together science communication practitioners, researchers, journalists, administrators, decision-makers and others. The conference has allowed the sharing of best practices and can be credited as a key component in the creation of a sense of community among science communicators in Estonia.

These stories already highlight the important role of various EU influences. Furthermore, a nudge from the EU can even be considered the beginning of the national science communication program. In 2002, the European Commission approached Estonia, then still a non-member, to submit entries to the pan-European contest of young scientists. For this, a similar competition in Estonia had to be organised. The task was given to Tuisk, a biologist by training who had some previous experience with student research. 'Essentially the Ministry [of Science and Education] was saying that you can do [the contest] if you wish but we have no money. So we did it with no funds,' she recalls.[3]

Later, the ministry handed over the coordination of university-level student research contests to Tuisk, and she began to hire people to manage all the tasks. In 2006, this group was officially named the Department of Science

2 Personal communication, 29 August 2018.
3 Personal communication, 29 August 2018.

Communication (then located at Archimedes Foundation that coordinated the use of EU funds; today it is in the Estonian Research Council, the main funding institution of science in Estonia) and started to gain more functions such as managing the science communication awards and organising the annual conference. In 2008, the Ministry of Science and Education began funding various science communication projects in an annual open call, again coordinated by the Department of Science Communication. In 2018, the budget for the call was €150,000 and a total of 30 projects were financed (Eesti Teadusagentuur, n.d.-c). In 2010 and 2016 there were two additional open calls with a budget of more than €1 million each for systematic long-term science communication projects (including extracurricular activities) aimed at young people.

'When the preparations for the new period of the [EU] structural funds started, the Ministry had already realised that this field needs more resources,' Tuisk says.[4] Hence, a national science communication program was crafted. The TeaMe program (short for *Teadus, meedia ja meie* or Science, Media and Us; also translates as 'we know') had a budget of €3.34 million over the period 2009–15, 85 per cent of which was provided by the European Social Fund. The program had three general aims:

> To increase the interest of young people in science and technology, and for careers in these fields;
>
> To expand the scope of Estonian science media and journalism; and
>
> To spread the scientific way of thinking, bring science closer to people and make it more visible in the media. (Eesti Teadusagentuur, n.d.-a)

The biggest part of the budget was used to commission two TV shows: one for general audiences, introducing Estonian scientists; and the other aimed at young people. The latter was the aforementioned *Rakett 69*, a show where youngsters aged 15–24 compete in solving science-related puzzles. The show has been running on prime-time since 2011 and was declared the best European educational format by the European Broadcasters Union in 2012.

Other activities of the TeaMe program included communication training for scientists and skills training for journalists. For schools, the program commissioned new study materials for science-related elective courses as the possibility for such elective courses was recently introduced in secondary education, and science and technology subjects in particular lacked suitable materials.

4 Personal communication, 29 August 2018.

Figure 12.1: The TV show *Rakett 69* features young people solving science-related tasks.

Source: *Rakett 69*.

The program also supported the Year of Science in Estonia. In the tradition of having theme years, 2011/12 was declared the Year of Science to make science more visible to the public. The execution of the year was designed to get more attention to existing science communication activities rather than to create new ones. For this purpose, a specialised portal was created (miks.ee) and PR support for various activities was provided.

The program did have its critics. A study commissioned towards the end of the TeaMe program concluded that the field of science communication in Estonia is characterised by a lack of strategic guidance or vision by the funding bodies, lack of focus on effectiveness and desired outcomes, and too much emphasis on attracting pupils' attention rather than long-term activities to maintain interest in science and technology (Kirss, Haaristo, Nestor, and Mikko, 2013). This input, along with the comments from stakeholder representatives on the TeaMe advisory board who strongly recommended focusing the activities on young people, was used to design the follow-up program TeaMe+ (2015–20, total budget €3.2 million).

As a result, the current program introduced new measures that support long-term activities at the primary and secondary levels of education. These include networking and training of teachers and supervisors in extra-curricular education and supplying them with methodical materials for teaching. At the same time, the program continued with the TV show *Rakett 69*, which has in the last seasons paid special attention to gender equality (and has produced

two female winners to date). The annual competition for young scientists was developed into a full-weekend science fair open to the public and an initiative was launched to involve companies in teaching STEM subjects.

The activities of the Department of Science Communication, including the two TeaMe programs, have been tone-setting in Estonian science communication, both because its focuses define the national priorities and because it is the biggest funder of science communication activities. Tuisk also sees a clear impact of the TeaMe programs and the project calls they organise: 'The fact that public money was given to the field [of science communication] has brought more actors to the field. Since then activities have gained a much wider base'.[5]

It must be noted, however, that science communication has never featured in policy documents of the Estonian government or been the focus of special government initiatives. The national programs and activities mentioned above have been mostly initiated and managed at the ministry level or below. This could be contrasted with the topic that has made Estonia most prominent internationally—the advanced information society characterised by the widespread usage of public e-services, digital society innovations and an active and successful ICT start-up scene (Heller, 2017). This digital transformation was pushed strongly by policymakers (Kattel and Mergel, 2018), with policy documents describing the benefits of ICT adoption as being the improvement of Estonia's competitiveness, democracy and educational system (Runnel, Pruulmann-Vengerfeldt and Reinsalu, 2009).

It might be surprising that science communication has been rarely discussed in the context of the digital transformation. Digital innovations have not been seen as a potential tool for science communication, and nor has science communication been focusing specifically on popularising ICT (although robotics is one of the best-established fields in informal science education). There are some connections on the rhetorical level: the focus on education and young people of Estonian science communication activities has been justified by its potential economic benefits to the country. The program document for the original TeaMe program stated that Estonia lacked enough researchers and engineers to move to a knowledge-based economy, therefore it was necessary to attract more young people to STEM fields:

> To better understand the connections between the society and science and technology we need to increase the awareness of young people and the whole population about the impact that research and development and innovation have on national competitiveness and productivity and thereby on social well-being (Haridus- ja Teadusministeerium, 2013).

5 Personal communication, 29 August 2018.

The follow-up program emphasised a similar motivation: 'Young people's willingness and motivation to acquire a higher education in STEM fields must be given a firm basis already in comprehensive school and secondary school levels' (Eesti Teadusagentuur, n.d.-b). This economic discourse aligns well with the political liberalism that has been prevalent in Estonian politics throughout the current independence period.

Thus, the core goal of Estonian science communication is getting the attention of young people with attractive presentations of science and then guiding their interest towards choosing a career in STEM fields. As well as the already mentioned activities, several other successful examples follow the same discourse—for example, science centres or the robotics contest Robotex, one of the largest in Europe.

In terms of public visibility of science, a major turning point was the opening of the AHHAA science centre in 2011. AHHAA had been founded in 1997 as a project of the University of Tartu. The story goes that the Estonian president Lennart Meri, a person with much symbolic power, visited the Heureka centre in Helsinki and was so impressed that he immediately faxed the Estonian Minister of Education to recommend establishing a similar centre in Estonia.[6] The University of Tartu took on the task and appointed the young chemist Tiiu Sild to run the centre. However, as Jaak Kikas pointed out, the establishment of the centre was not a top-down order but matched the interests of some researchers who were keen to communicate science but had had few opportunities for this.[7]

The determination of Tiiu Sild allowed the centre to develop from modest beginnings and from no permanent exhibition space into one of the most modern science centres in the Eastern and Northern part of Europe. In 2004, the centre was reorganised into a foundation by the University of Tartu, the city of Tartu and Ministry of Science and Education, and applied for EU funds to build its own permanent house. When it was opened in Tartu in 2011, the centre became an immediate public success and still attracts a steady 200,000 visitors per year. The centre also coordinates the annual Night of Researchers, which grew in 2012 into a week-long national science festival.

6 Jaak Kikas, chairman of the board of AHHAA, personal communication, 24 August 2018.
7 Personal communication, 24 August 2018.

Figure 12.2: The new building of science centre AHHAA was opened in 2011.

Source: AHHAA.

Figure 12.3: First director Tiiu Sild (1958–2012).

Source:Lauri Kulpsoo/Tarkade Klubi.

As the examples of AHHAA and the Science Bus show, the support of universities has been crucial for the start of initiatives that have later grown into something bigger. The universities are relevant actors in the field and many of their initiatives are directed towards young people, i.e. potential future students. Their efforts to communicate to the media and the wider public include hiring of communication specialists and providing communication training to scientists. However, these trainings remain on a small scale, are not systematic and have not been integrated into official curricula. Often, they take place within EU-funded doctoral schools. The same applies to the training of science communicators—these are based on ad hoc activities instead of designated programs. Academically, science communication has been researched in the communication departments at the universities of Tartu and Tallinn, but currently there is no designated research group or study program.

The universities have also made efforts to communicate with industry as the lack of knowledge transfer to business has often been cited as one of the major problems in Estonian science. The initiatives sometimes have a dual purpose, also serving to communicate science to the public—for example, TalTech University's innovation centre Mektory. The online science news site *Novaator*, which is now a part of the public broadcaster's online service, was founded by University of Tartu as a public channel to provide university-related news to entrepreneurs.

Recent years have seen the emergence of another major driver for public communication of science. While the rapid developments in the mid-2000s can be attributed to a common concern of the stakeholders about the science interest and career choices of young people, the 2010s brought a new focus on the funding of science. Because state funding to science has been dwindling, the universities, individual scientists, National Academy of Science, and Estonian Research Council started to consider public visibility as a valuable tool to influence the situation and undertook efforts to increase the profile of science. By presenting success stories and increasing the quantity of science coverage in the media, they hope to increase public support to science, which they expect will then lead decision-makers to increase funding (Scheu and Olesk, 2018). In late 2018, the pressure by the scientific community led to the signing of a political agreement to increase research funding to 1 per cent of GDP.

Generally, the Estonian media is a good partner for the scientific community. Science has become a permanent part of the menu that media houses offer and (science) journalists are generally characterised by a favourable attitude towards scientists. This development has taken place within the last 15 years, more as an evolutionary process rather than due to outside influences.

After the collapse of the early 1990s, science was hardly present in the media. The magazines *Horisont* and *Eesti Loodus* survived but became marginalised. For a long time, the only regular occurrence of science in mainstream media was the weekly science page in one of the daily newspapers that the former physicist Tiit Kändler started writing in 1995. The beginning was hard, he recalls, especially due to lack of information and researchers' mistrust towards journalists since the concept of science journalism was almost unknown at the time.[8] Over the years he established himself among scientists, editors and readers as a respected writer. Another few enthusiastic journalists emerged to cover science in addition to their main reporting tasks. Their efforts convinced media managers that it was possible to cover science in an engaging way and that there was interest from the readers, so media channels began to consciously

8 Personal communication, 20 October 2018.

look for science coverage. Today, most main national media channels employ a science journalist or have a science section. The strongest online channel is *ERR Novaator* (err.novaator.ee), co-managed by the University of Tartu and Estonian National Broadcasting. In print, franchise magazines such as the local version of Danish *Illustrerad Vetenskap* enjoy good circulation numbers.

There is no general association for science communicators, only two more specialised umbrella organisations. The Estonian Association of Science Journalists, originally founded in 1990, experienced a long hiatus soon afterwards. It was revitalised in 2007 and has since become an active stakeholder in science communication discussions. As of 2018, it has 23 individual members. The Estonian STEM Education Union, an umbrella organisation for everyone in non-formal STEM education in Estonia, was founded in 2016 and, as of 2018, has 119 members, both individuals and organisations. The main informal network, the Facebook page *Teaduse populariseerijad*, has more than 800 members.

Ten years ago, the initial discussions at the first science communication conferences mostly focused on issues related to media. The poor nature or lack of science coverage was seen as the central problem and the cause for the perceived lack of public appreciation for science. The understanding of the goals and methods of science communication were very much similar to these now described as the deficit model of science communication (Miller, 2001). Improving the quality of science media was also one of the aims of the original TeaMe program. However, actions quickly revealed that the impact of interventions is limited. This, along with the shifting focus to education and the gradual improvement of science media triggered by media houses themselves, contributed to science communication being understood as more like an ecosystem of actors with varying possibilities and roles. Additionally, an increasing number of activities claim to focus not just on presenting science attractively but also on creating a deeper understanding of the scientific process (i.e. increasing the scientific literacy of people).

A notable gap in the Estonian science communication field is the lack of public engagement activities. While many activities with young people can be considered some form of engagement (they are involved in hands-on activities or even forms of citizen science), these mostly serve educational purposes, not democratic participation. One possible explanation is the lack of a perceived need for such formats. The fields that are generally the subject of engagement formats in Western European countries, e.g. synthetic biology, are not being developed here, or there is no appropriate local political process that could be influenced via such mechanisms. Surveys show a strong public trust of scientists (European Commission, 2010) and PISA tests indicate that Estonian students are among the best in the world in natural sciences

(Haridus- ja Teadusministeerium, 2017). Therefore, other formats of science communication might be perceived as more suitable to approach the issues that have been defined as core problems (such as lack of students in STEM fields or insufficient knowledge transfer from academia to industry).

Regarding terminology, 'popularisation of science' is still the most common expression to describe the presentation of science to the public. The expression was widely used during the Soviet period and its continued use can be both attributed to a habit and to a linear one-directional understanding of science communication as transfer of knowledge from scientists to the public. One can see, however, that 'science communication' has started to gradually replace 'popularisation'. The change is not uncontested as it has been argued that in Estonian, 'communication' has a more verbal connotation than in English, and therefore is not the most appropriate term to describe educational activities such as hands-on experiments. Currently, the Estonian Research Council uses 'popularisation' to describe educational activities and 'science communication' for media-related activities. However, the discussion in the Estonian science communication community about the most appropriate term continues.

The science communication system and its development in Estonia is greatly influenced by the fact that Estonia is a small country. This enables some processes to take place quickly and one person can have a great impact on the outcome, as most of the stories in the chapter demonstrate. At the same time, there is a constant lack of resources that leads to questions of sustainability. In a small market, activities are often not able to operate on a fully commercial basis and depend on institutional support. This again depends on the priorities of the individuals currently in the system.

Tuisk attributes the rapid development of Estonian science communication in the mid-2000s to favourable attitudes among the decision-makers: 'There were people [in the Ministry and the science funding body] who saw perspective [in science communication], were supportive of new initiatives and found resources to start things'.[9] The ideas that had been devised by the early enthusiasts and received initial institutional support were then catalysed into major projects once EU funding became available. Many major projects (museums, TV programs, the national science festival) have been or are still partly funded with EU money.

This arrangement means that the science communication system in Estonia is still fragile. Major reduction of EU funding is expected in 2020 and the future funding of many current activities, including those in the TeaMe+ program,

9 Personal communication, 29 August 2018.

is uncertain.[10] A significant section of various science communication activities is dependent on project-based funding. Such an unsteady environment again amplifies the role of individuals: if there is institutional support, the system fulfils its purposes; but once the tide turns towards other priorities, enthusiasm may not be enough to sustain the achievements.

Despite the somewhat uncertain future and some gaps in the science communication landscape, Estonia can be considered as having completed the transition to a modern science communication system. The system is not yet consolidated, and in their cross-Europe analysis, Mejlgaard et al. (2012) place Estonia in the group of countries with a 'developing' science communication culture along with several other Eastern and Central European countries. A clear difference with other post-socialist countries emerges, however, when looking at the science–society relationship, according to Mejlgaard (2017). Taking into account not only the state of science communication but also the use of science in policymaking, public participation in science governance and innovation performance, this analysis places Estonia in the 'science central' cluster. In contrast, the position of science in other Eastern European countries can be considered as 'disregarded'.

Unfortunately, data about the state of science communication in the European post-socialist countries are too scarce to make generalisations. Available literature from individual countries mostly discuss various problems: for example, low level (Lehmkuhl et al., 2012) and low quality of media coverage (Šuljok and Brajdić Vuković, 2013), lack of domestic sources in media coverage (Łach, 2014), dominance of the 'deficit model' in science communication activities (Adamsone-Fiskovica et al., 2009), and fragmented academic research in the field (Valinciute, 2017).

Messages received via personal contacts or anecdotal stories indicate that although science communication activities exist in post-socialist countries, they have a low profile and often remain under the national or international radar. These countries are still struggling to build up a strong and sustainable national science communication system, the weakness of their science media being the greatest concern. While many post-socialist countries have their own associations of science journalists, Estonia and Russia are the only countries from the former Soviet Union to be members of the European Union of Science Journalists' Associations (EUSJA).

10 In 2019, the Ministry of Education and Research launched a process to devise a national strategy of science communication. The strategy aims to define the national priorities, main activities and the actors involved, and address the issues of funding.

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Timeline

Event	Name	Date	Comment
First interactive science centre established.	AHHAA Science Centre in Tartu	1997/2011	Permanent exhibition opened in 2011
First national (or large regional) science festival.	European Night of Researchers	2006	
An association of science writers or journalists or communicators established.	Estonian Association of Science Journalists	1990/2007	EASJ founded in 1990, revitalised in 2007 after a hiatus

Event	Name	Date	Comment
First university courses to train science communicators.	Various short training courses	2010	No full-length university course available
First PhD students in science communication graduate.		2020	
First national conference in science communication.		2008	
National government program to support science communication established.	EU-funded TeaMe program	2009	
First significant initiative or report on science communication.	EU-funded TeaMe program	2009	
National Science Week founded.		2006	Organised around the European Night of Researchers
First significant radio programs on science.	*Kristall* [Crystal]	1964	From 1964 to 1985
First significant TV programs on science.	*Rakett 69* [Rocket 69]	2011	A competitive science show for young people
First awards for scientists or journalists or others for science communication.		2006	
Other significant events.	National society Teadus [Science] founded	1966	Lectures and brochures and a venue for science communication
	Popular science magazine *Horisont* [Horizon] founded	1967	
	National Year of Science declared	2011–2012	September 2011–September 2012

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