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*The Role of National Academies of Sciences  
in Modern Societies\**

**Abstract**

In my lecture I am reflecting the roles and responsibilities of Academies of Sciences on the national and international level, in particular in the frame of the European Academies Advisory Council (EASAC). The roles of Academies will be discussed with respect to the development and promotion of science, communication of science to the public and strategies how to provide expert advice to policy-makers in national governments and the EU-bodies – the European Commission, the European Parliament and the Council of Ministers.

Mr. Chairman,  
Dear colleagues,  
Ladies and gentlemen

First, I like to thank the organizers for inviting me to this beautifully sunny capital of Montenegro and for giving me the opportunity to discuss the role of National Academies of Sciences in Modern Societies. On behalf of the president of the German Academy of Sciences Leopoldina, Professor Volker ter Meulen, who was unable to participate in this conference, it is my pleasure to convey to all members of this conference and particularly to our host, the Montenegrin Academy of Sciences and Arts, the best wishes for a successful meeting. The Academy of Sciences Leopoldina is the oldest, continuously existing Academy of Sciences in Europe which was founded in 1652 in the Free

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\* The paper is printed as submitted.

Imperial City of Schweinfurt. It is the first German-speaking scholars' society that can look back on a long lasting history. Since 1878 the Leopoldina has its permanent location in Halle, a University City at the river Saale, formerly and German Democratic Republic. The Leopoldina has survived difficult periods in German history and successfully maintained its independent international status. Together with the Berlin-Brandenburg Academy of Sciences the Leopoldina founded the Young Academy in the year 2000. The Young Academy is independent of its parent academies and comprises 50 members who are elected after application at an age of 30 to 40 for five years. The election is conducted alternately by both the Young Academy ([www.diejungeakademie.de](http://www.diejungeakademie.de)) and the parent academies.

Very recently, on July 14<sup>th</sup>, the Leopoldina was appointed as National Academy of Sciences. The official designation of the Leopoldina is now „Academy of Sciences Leopoldina, National Academy of Sciences”. For the members of the Leopoldina this nomination was perceived as a great honour but concomitantly we are aware of the big challenges that are waiting for us in the near future. The Leopoldina is now in the process of rearranging its structure and functions. This requires self-reflection on the roles and responsibilities of a National Academy, an issue that leads me directly into the topic of my presentation.

Ladies and gentlemen:

Most of the European academies were founded in the 17<sup>th</sup> century. They dedicated their efforts towards promoting the development of science and towards providing advice in science and technology to their states and societies. This task essentially still accounts for academies in the 21<sup>st</sup> century. However, we are not living anymore in a cosy environment of the period of the baroque or the time of enlightenment but in a rapidly changing, highly demanding global world. A central feature of National Academies of Sciences which is crucial for fulfilling their roles adequately in modern societies is their independent status. Their members, exclusively elected by their peers on the ground of scientific excellence and merit should be completely free of any political, economic or ideological pressure and constraints. With these prerequisites in mind, I like to address the question of the roles and responsibilities of a National Academy of Sciences in modern 21<sup>st</sup> century societies.

The president of the French Académie des Sciences, Jules Hoffmann, emphasized in a recent address at the occasion of the Leopoldina inauguration cer-

emony, that „the major responsibility of an Academy remains in the development and promotion of science”. I believe that this statement is acceptable to many members of scientific academies. Academies can foster in-depth scientific debates and conferences at the highest level possible, thereby contributing to the advancements of science. Conventions should be organized that are also open to non-academy members as well as to the general public, but the Academy bears the paramount responsibility in guaranteeing the scientific quality of these exchanges. Moreover it is a major responsibility of Academies to open avenues for emerging fields of science so that new achievements can get easier access to the scientific community. Furthermore an important task consists in deciphering and defining novel disciplines, trends and perspectives for future decades.

Ladies and gentlemen:

A lively body of independent engaged scientists, representing the intellectual elite of the country sets the basis for reflecting the second central role which a country expects from its National Academy, that is giving the best scientific advice possible. There are basically two forms of scientific advice. The first and most direct is the response of the Academy to a precise question asked by authorities of the country. The second form of advice is the presentation of a report or statement on a topic selected by the Academy itself, and considered being of major relevance to society. Decision-makers and law-makers should of course receive the best possible scientific information in an understandable form, before making their decisions.

Many National Academies have been asked for advice in recent years on complex topics ranging from stem cell research and its opportunities to genetically engineered crops, energy and climate related questions or problems concerned with infectious diseases. These difficult questions sometimes provoke conflicting debates inside the academies themselves but scientific competence and political and economic independence should pave the way to propose independent adequate advices.

How can the Academy help in making Science accessible to the public? There are two sides of the coin: One is scientific education in schools and universities, the other is guiding the public to Science. At the national level, we as Academies should be strongly involved in the preparation and revisions of school programs, in monitoring the quality of science education at all levels and namely in teaching the teachers. Education goes hand in hand with communication and one of the most challenging problems for a National Acade-

my is to communicate science to the general public. National Academies have a great responsibility here to reverse an increasing tendency of distrust and disinterest in scientific achievements. Educating a receptive public to Science is a major task for all National Academies. The National Academy of Sciences of the United States and the Royal Society in the United Kingdom have undertaken remarkable efforts to both educate in Science and attract to Science. We can benefit enormously from their programmes and experiences.

Ladies and gentlemen:

Another important issue is: How can an Academy act as an ambassador for the Science of its country? This role is not exclusive there are other excellent institutions involved in this process, for instance in Germany, the Alexander von Humboldt Stiftung. But National Academies have a unique opportunity in establishing working relations with foreign Academies and in exchanging the scientific perceptions and achievements of each country. They can promote international mobility and career development of researchers by providing international exchange programmes or collaborations. Multilateral relations can be extremely rewarding both for Science and for Societies. Let me give you an example of my own field as a microbiologist. Three weeks ago a meeting on „Nosocomial Infections”, organised by the Leopoldina together with the Académie des Sciences and academies from the UK, Sweden and the Netherlands, was held in Berlin. This meeting provided a platform for exchanging the latest advancements in this area of research and concomitantly the meeting offered a unique opportunity to write a common report addressed to policy-makers in several countries which are facing similar health problems.

Ladies and gentlemen:

There is no doubt that knowledge and research are global commodities and respect neither geographical nor disciplinary boundaries – hence the importance of building scientific interactions on the international level is another important role for Academies. They need to introduce efficient tools to inform policy-making institutions world-wide as emphasized in the previous talks. I want to illustrate this pervasive quality by reflecting the work of the European Academies Science Advisory Council (EASAC), now headed by the Leopoldina president, Professor ter Meulen. EASAC was formed by 23 National Science Academies of the European Member States to enable them to collaborate with each other in providing advice to European policy-makers. In essence, EASAC represents an institution for expressing a collective voice of Europe-

an science, covering all scientific and technical disciplines. Like its national Academy subdivisions, EASAC is vigorously independent of economic, political and ideological interests. As EASAC is a very young organisation (less than 10 years old) I would like to present some detailed information on the new role of this council. There is a long list of topics where science could and should inform policy at the European level and EASAC has initiated work in a wide range of areas. For example, EASAC has run projects relating to the environment and biodiversity, energy, public health, plant sciences and the analysis of research and development of funding intensity. I do not have the time and competence to discuss all of these areas. But let me draw your attention on the EASAC experience in just one domain – infectious diseases. This is a field where the Leopoldina and its president are highly active.

Let me give you some examples, illustrating what we have learnt.

### 1. Building data bases for decision-making

We come to the conclusion that the development of strategies to attack infectious diseases depends on the generation of more robust, more coherent information. Public health surveillance must take efforts to introduce and apply standardised methods for data collection and data assessment. Public health responsiveness is based on an improved inventory of data to control and coordinate the outbreak of infectious diseases.

### 2. Strengthening and support of fundamental research

Novel discoveries leading to novel applications usually derive from high quality advanced basic research which gets neglected in several European countries due to high costs. However this attitude is narrow-minded since investments in personal and equipment pays back manifold. For instance the three Nobel price awards in medicine, appointed a few days ago, including the Leopoldina vice president Harald zur Hausen, investigated viruses on the basal level. Their discoveries led to the design of novel drugs, therapies and vaccines. Investigations on the green fluorescence protein awarded by the Nobel price in chemistry two days ago, represents another example.

### 3. Health and Wellness

To meet the demands of modern societies, progress in fundamental research has to be transmitted to innovations in applied areas such as new healthcare

products, efficient services in diagnostic and health treatment. Academies can bridge the gap between the science community, public more applied research institutions and industrial companies.

#### 4. Strategic coherence

National as well as international activities need to be coordinated more efficiently. Academies can play the role of chaperones by enhancing coordination and integration of science into economy and politics.

#### 5. Informing the general public

A survey by EASAC on the treatment of infectious diseases uncovered that the application of therapies within different EU states is rather diverse. The wide use of antibiotic treatment, for example, is the causative agent for the dangerous development of microbial multiresistance against antibiotics at high scale.

#### 6. Informing politicians

Several academies, for instance the Royal Society, have introduced a so-called „pairing system”. For a certain period of time a scientist and a member of the parliament maintain a close consulting relationship. Both partners benefit from this activity. The scientist gets insights into the work of the parliament and the parliamentarian obtains individual expert advice. EASAC is going to extend this concept to the European Parliament.

To summarize:

A concerted strategy for the generation of reports and delivery of scientific advice by a European association like EASAC or a world wide operating institution such as the Interacademy Panel will be certainly more powerful and may help the national academies to get access to politics and to put influence on their own governments. It is needless to say that reports, statements and recommendations which have been authorized by a number of countries have a stronger and sustainable impact than individual Academy declarations exert on governments, press, media and the society.

Finally, what is the take home message?

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To influence political and legal decisions, to restore confidence in science and promoting consensus and acceptance for scientific progress in the public, the following criteria should be taken into consideration:

- Scientific advisory reports should be based on evidence, on good scientific practice, a process of peer review, transparency and an explicit statement of conflicting results. It is our collective responsibility to highlight where consensus has not yet been attained and to propose modes of bridging the gaps of knowledge.
- To transfer scientifically sound and relevant knowledge into the field of politics the advisory report of the academies should be addressed to politicians who are prepared and willing to be confronted even with controversial issues. An intense discussion between the different partners is an important prerequisite to establish a confidential, trustful relationship between politics and academia. Only under these circumstances solutions can be generated by mutual consent. If this is impossible the Academies should frankly reject their commitments.
- Based on the experiences with EASAC it appears beneficial and more powerful to make joined efforts in building science into policy – on both European and international levels – in order to provide useful and efficient scientific and technological recommendations to the government and the society.

These duties are certainly big challenges for modern Academies. As an optimistic person, however, I say: Let us start!!! There are numerous problems in the world that need to be analysed, treated and solved by outstanding experts who are available in our Academies.

I thank you for your attention.

