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Executive Summary	1
1. Introduction: The Lisbon Agenda and science policy for the knowledge society	3
2. The contributions and debates	4
2.1 Keynote speeches and discussion (morning session)	4
2.2 Panel speeches and debate (afternoon session)	10
3. Concepts and recommendations	16
4. A 'take-home message'	18
5. Final remarks	19

Executive Summary

1) *The challenge of the Lisbon Agenda*: The Lisbon Agenda paves the way for the transition to a knowledge based society in Europe. And it does so in combining different objectives, such as social standards, cultural values, respect for the environment, and high competitiveness and economic strength. In this process, the role and the particular shape of science become an issue for discussion. How, under which conditions, does science enter the scene of the Lisbon strategy? In particular, the relation between science and the other societal fields will not remain untouched when looking at this process.

2) *'Ecology of innovation'—A general model for science and the knowledge society*: A general message from the session says that in knowledge society a broad concept of innovation—including social and institutional innovation—and an enlarged vision of the role and place of the citizens is necessary. The simple, 'linear' model of 'explaining science to the public' is replaced by a more complex, systemic, multi-directional, and multi-level concept. This concept is more interactive in the way of a 'citizen push' approach promoting innovation 'with and for everyone'. The term 'ecology of innovation' was coined for such an approach. The situation also entails processes of fragmentation, which can be seen as challenge and chance.

3) *Tasks for science*: With respect to science it was clearly marked that major changes are inevitable. The main points are: Communication beyond single channel, one-way-information; scientists have to learn the new role of a skilled communicator; the curricula have to be adjusted and fundamentally be changed in order to achieve this goal, the general task for science is: not just teach, but also learn, get involved, develop broader skills, 'build bridges' to the public and also to the media, become 'steward of the discipline'. Citizens can be viewed as actors promoting and strengthening research, not only as sceptical and uneducated. The relevance of the mass media is important, and the necessity to develop certain competences in this respect, too.

4) *Tasks for policy-making*: Political support is needed for safeguarding the freedom of research and the guarantees for this right, for accelerated recruitment of human resources for research. Significant improvements in governance have to be achieved, in order to develop 'partnership for innovators'. Young people have to be encouraged to engage in science. Furthermore, policy and research funding need collaborative approaches from the EU level all the line down to researchers and laboratories and the way back to strengthen scientific

excellence and co-operation, but also to improve dialogue and exchange with other societal fields. It might be advisable to conceive future research policy not so much according to the 'Airbus'-model of huge networks, but rather according to the 'Galileo' project, as open networks of partners. Three interwoven dimensions were highlighted: knowledge policy, economic policies for growth and innovation, and governance and regulation. Especially the Open Method of Coordination plays an important role in overcoming fragmentation of European research and in developing tools to promote innovation and science.

5) *The international dimension*: Of utmost importance is the international dimension. Not only with respect to mere competition, but also to the convergence of standards—social, ecological standards, human rights etc., the efforts must be raised. Here, a large amount international co-operation will be necessary and the EU has to prepare for this goal. The role of the patent system in this context is controversial. It remained open whether patents are—in their current form—indispensable for innovation or whether certain improvements in the system should be made.

6) *'Take-home' message*: Science must be 'open' for societal demands and perspectives. It has to develop skills and to adjust curricula in order to be prepared for a constructive dialogue on all levels. On the other hand, the prerequisites for, and the links between basic research, applied research, and product development must be strengthened. Policy must offer instruments to co-ordinate the multi-actor, multi-directional, and multi-level relations between science and all other societal fields. Instruments such as the Open Method of Coordination should foster exchange and co-operation on all levels, while safeguarding the freedom and autonomy of research, at the same time.

7) *Overall impression*: Sometimes, concerns creep around the relations between innovation policy and science policy. Session 1 manifested an overall balance in the views upon science, society and the Lisbon Agenda, neither an over-stressed technocratic ambition, nor an over-stressed participatory euphoria. It was consensus that there is a strong need for joint endeavours in science and politics in order to further proceed on the way to knowledge based Europe.

1. Introduction: The Lisbon Agenda and science policy for the knowledge society

The Lisbon Agenda has made knowledge based society and the political, legal, economic, and scientific path towards this knowledge society *the* central issue of policy-making for the years to come. In March 2000 in Lisbon, EU heads of state and government set the strategic goal to become 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. These goals were confirmed at the Barcelona European Council, which added that investment in European R&D should be increased to 3% of GDP by 2010. The strategic goal and an overall strategy defined by Lisbon European Council were formulated as follows: ‘The Union has today set itself a new strategic goal for the next decade: to become 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’. This quotation is important to clarify that the strategic goal defined in Lisbon is not just ‘to become the most competitive’—even if this remains a crucial objective—but to achieve this particular combination of strong competitiveness with the other features. Such a complex goal required a particular strategy, which was defined in the following terms: ‘Achieving this goal requires an overall strategy aimed at: 1. preparing the transition to a knowledge-based economy and society by better policies for the information society and R&D, as well as by stepping up the process of structural reform for competitiveness and innovation and by completing the internal market; 2. modernising the European social model, investing in people and combating social exclusion; 3. sustaining the healthy economic outlook and favourable growth prospects by applying an appropriate macro-economic policy mix.’ In 2001 the importance of sustainable development was put forward in addition to the goals mentioned before.

On this background, the Lisbon strategy set political orientations, aiming—among other aspects—mainly at the following points: a policy for the information society supporting the improvement of the citizens’ standards of living; an R&D policy with a strong priority for innovation policies; better conditions for entrepreneurship; liberalisation of the basic sectors while respecting the public service inherent to the European model; a renewed European social model, making more investment in people, activating social policies and strengthening action against old and new forms of social exclusion; new education policies, turning schools into open learning centres, providing support to each and every population group, using the Internet and multimedia; raising Europe’s employment rate as a key target; cooperation

between the Member States to modernise social protection; national plans to take action against social exclusion (including education, health, housing); improved social dialogue in managing change and setting up of various forms of partnership with civil society.

In this process, the role and the particular shape of science become an issue for discussion. How, under which conditions, does science enter the scene of the Lisbon strategy? In particular, the relation between science and the other societal fields will not remain untouched when looking at the Lisbon Agenda and its implementation on EU level and in the Member Countries.

2. The contributions and debates

The contributions to session 1 and the discussions on the panel and in the plenum were dedicated to look into the relevance of the science and society dialogue to the path towards knowledge-based society. It was asked whether society—or, more precisely, all societal fields other than science—can be actors in, and not mere consumers of the innovation in Europe. Therefore, the relation between science and its societal environment—politics, economy, law, education—became a central point for the discussion about knowledge-based Europe and the Lisbon Agenda. The session consisted of four keynote speeches (morning programme) and a panel debate in the afternoon with six invited speakers and a number of supplementary remarks from different actors. The contributions were embedded in an open debate between panel and audience. The session was chaired by *Karen Siune* (Director, Danish Centre for Studies in Research and Research Policy).

2.1 Keynote speeches and discussion (morning session)

Professor Maria João Rodrigues (Instituto Superior de Ciências do Trabalho e da Impresa) opened the morning session with her talk about *'The Lisbon strategy; objectives and assumptions.'* The contribution gave a comprehensive overview over the conditions, the main lines and the current development of the Lisbon Agenda. The Lisbon Strategy is currently going to be turned into national agendas. We are stepping into phase two of the whole process. The objectives of the Lisbon strategy—which is a long term strategy for transition to a knowledge-based society in Europe—are multi-dimensional, namely heading for high competitiveness, economic growth and innovation, while keeping social cohesion, respecting cultural values and paying attention to the environmental conditions of the process. The

challenge consists of the integration of these before-mentioned goals, namely in creating a knowledge society that is able to save or even to improve social cohesion. Therefore, the priorities for policy-making consist of policies for a knowledge society, of creating proper conditions for successful entrepreneurship, and of a European social model that guarantees a high level of social protection. In this complex pattern, science has to play a pivotal role. Where are we now? The Lisbon strategy has made a certain progress, but has to be further improved and implemented on national level. This second step of national implementation raises new questions and problems of governance. Often, the citizens do not yet see the implications of the European debate for their every-day life. While in phase one a number of tools was developed on European level in order to reach a conversion of standards, the second step addresses the national strategies for implementing the Lisbon Agenda. The challenge for research policies here is how to get close links between knowledge production (research), knowledge distribution (education), and knowledge use (innovation). It is crucial from this point of view to apply effective policies for innovation on all levels, namely on scientific and technological level, but also with respect to institutions and social practices. This means also a significant improvement in governance. Here, the Open Method of Coordination plays an important role. Therefore, as *Mrs. Rodrigues* said, a ‘toolkit’ for innovators has to be developed, also certain clusters/areas for co-operation, strong interfaces between innovators and science on the one side, and other societal fields on the other, something that could be called ‘partnerships for innovators’. The seventh framework programme should, therefore, promote systematic research on national strategies for knowledge society.

The *discussion* that followed this contribution raised a number of questions: With respect to the political dimension of the Lisbon Agenda the concern was expressed that issues of democracy and scientific citizenship could become a mere ‘annex’ to questions of technology, innovation, and competitiveness. As an answer, the importance of very new approaches to science and technology governance in the Lisbon process was emphasised, but also the fact that the strategy entails instruments to implement such institutional innovation. Secondly, it was asked, how competition between different innovation systems could be conceived. Here an important point could be cleared, namely the fact that besides competition also co-operation—for instance in pre-competitive forms of research—is an important aspect of the Lisbon strategy. Therefore, thirdly, the aspect of competitiveness was reflected in a more differentiated way. *Mrs. Rodrigues* once again stressed the fact, that competitiveness is not relevant in every field of research, that one should avoid ‘utilitarian approaches’ to

knowledge, but should rather see knowledge as a ‘value in itself’. On the other hand, competitiveness makes sense, wherever a selection has to be done in order to support excellence.

The second keynote speaker, *Bernard Chevassus-au-Louis* (President, Muséum National d’Histoire Naturelle, Paris), talked about ‘*Citizens and the innovation process*’. The contribution challenged the classical, linear scheme of innovation that has prevailed up to now in Europe. In this scheme, science is considered as the main driving force of innovation and, at the opposite, society as a receiving, consuming body. Consequently, the public authorities should stimulate research, facilitate the transfer of his results to industry, and contribute to the ‘acceptance’ of innovations by the society. *Mr. Chevassus-au-Louis* argued in favour of a broad definition of innovation that includes products, services, methods and processes, but also organisational and institutional aspects. He also plead for an enlarged vision of the role and place of citizens in science policy by suggesting that the classical linear or ‘vertical’ model could be replaced by a more ‘horizontal’ concept of a network in which science, economy, and polity are involved, a concept that could be described as the ‘ecology of innovation’. He presented four scenarios for the potential evolution of this scheme that were elaborated by ‘FUTURIS’, a French foresight project bringing together leading players of the public and private sectors. They can be characterised as 1. the scenario of ‘institutional science’ with a more passive concept of consumers; 2. the scenario of the ‘referee state’, with a more innovation-sceptical public; 3. the scenario of ‘negotiated innovations’, with a more active and innovation-friendly public; and 4. the scenario of ‘citizen push’. The latter is based on (i) an enlarged vision of what is innovation (ii) an active participation of citizens to each step of the innovative process and (iii) a new presentation of the role and social status of science. On this background, innovation has to be ‘socialised’, in order to adopt new visions of society and innovation. The scenarios shall help understanding future society in this process. They give reason to promote innovation ‘with and for everyone’ and to rethink our understanding of scientific and technological culture.

The *discussion* following this presentation mainly concentrated on the model of innovation and on the role of social sciences: It was asked, how society relates to innovation and whether it is willing to go innovative ways. Furthermore, the relevance of social sciences and humanities in cross-national and European research policies was stressed. The debate made clear that the idea of an ‘ecology of innovation’ opens different paths for different groups and attitudes in society and that it is first of all necessary to understand the social mechanisms

which lay behind innovation. Ecology, as *Mr. Chevassus-au-Louis* argued, is something beyond competition and co-operation and stands for a more systemic or network-oriented approach. In order to understand this complex relation, social sciences have to study and to accompany the process.

Wilhelm Krull (Secretary General, Volkswagen Foundation) gave his presentation on '*Science in Society. New Roles for Researchers*'. He started with emphasising the fact that there is a big difference between providing science information and communicating science. This point is so important, because the science-society-interchange undergoes a fundamental change. The main challenges emerging at this interface are threefold: 1. To regain the power of defining the public perception of science: from specialist communication to broader audiences, from short-term results to communication about processes and structures, towards a 'co-evolution of science and society'. Progress in research has always been based on intense communication. First and foremost it is the exchange of news and views among experts that helps to bring about new insights and ideas. In a knowledge-based economy this fairly restricted mode of communication among specialists can no longer suffice. Researchers must not only think, but also learn to act in more widely defined societal arenas. They should become a 'steward of the discipline'. The new opportunities to more or less simultaneously produce, distribute, and apply new knowledge make it imperative for any researcher to be able to explain to a wider audience what he or she is doing, and what he or she wants to achieve. 2. To deal with asymmetries and bridging the gap of uncertainty: break the silence between disciplines, develop interest and knowledge, and thereby increase trust. 3. To attract young people to science and technology: from information via interaction to involvement. On this background, researchers have to develop new roles, as *Mr. Krull* said. Meeting the challenges involved in communicating with the often quite multi-faceted public is not at all straightforward. It not only requires a lot of personal and rhetorical skills, but also a fairly broad spectrum of different approaches and alliances, if one wants to overcome the usual impediments and asymmetries at the science-public-interface. For this purpose, a more structured postgraduate education is necessary. New curricula have to comprise non-disciplinary topics, such as intellectual property, science ethics, history of the discipline, interpersonal communication, and media skills. The aim should be to enable researchers to communicate, what their research is about, how they are conducting it, and why they are doing it. Research funding institutions and research policy have the task to support this process. Amongst other instruments they could foster cross-, and trans-disciplinary

communication and training, create public debates on science and democracy, create independent networks for the audit of science and technology, promote the idea of transparency and accountability, and promote science journalism.

The following *discussion* focussed on mainly three thematic clusters: 1. The autonomy of science: how do we integrate communication in ‘normal’ projects? Is it advisable to ask for mandatory ‘communication’ parts in all funded projects, for instance on EU level? The issue remained open at the end. Some funding organisations apply a more open model, without mandatory duties in this respect, but with strong incentives for communication, others have more strict rules. In any case, such a model needs training before and some funders offer such training opportunities. 2. Young scientists: it was argued that one should not over-stress the demands for young researchers, because they have to meet the professional expectations in their discipline, first of all. On the other hand, it was argued that PhD-students as addressees are much too late, that we have to cope with a failure of the education system in school and in the early phase of university studies. *Mr. Krull* said that we are far from being perfect in this respect, but on the other hand we are much better than for instance in the eighties. Scepticism in the young generation is mostly against institutions, not so much against science and technology. The more we move towards civil society, he said, the more training in ethics and trans-disciplinary skills are absolutely necessary. 3. Public attitudes towards science and technology: in order to receive public support, science must communicate its goals, contents, and results to the general public. This is a substantial difference to former times. Therefore, public communication is absolutely necessary, although it will in many cases come into conflict with research reputation.

The last speaker of the morning session, *Professor Gilberto Antonelli* (University of Bologna) talked about ‘*Science and knowledge in the global economy: an outward strategy*’. The current economic situation can be characterised as ‘globalisation and fragmentation’. The term fragmentation means the persistence of economic systems in a pattern of ‘creative destruction’. The pattern reduces the relevance of national boundaries, but also of the supra-national ones, if they are not fine-tuned with actual trends of growth. The ‘Lisbon strategy’ reacting on this situation, is highly ambitious in its goals. It states quantum shift resulting from globalisation and the challenges of a new knowledge-driven economy. These challenges are affecting every aspect of people’s lives and require a radical transformation of the European economy. The Union sets itself the goal of shaping these changes in a manner consistent with its values and concepts of society and also with a view of the forthcoming

enlargement. It therefore needs to develop a programme for building knowledge infrastructures, enhancing innovation and economic reform, and modernising social welfare and education systems. On this background, *Mr. Antonelli* argued that the development of a knowledge-based economy is certainly a necessary but not a sufficient condition. An outward strategy, as he said, can be an effective solution from the economic point of view. This means that, after a progressive concentration on internal economic integration issues, the EU should focus on the role it can play also for the development of the regions that will never be able to join the Union (e.g., LDCs as well as Asian developing economies). This strategy, which is complex and implies also many risks, has the advantage of: (i) revitalizing the internationalisation spirit of the early stages of integration in Europe; (ii) fixing at the appropriate level the scale of knowledge (material and immaterial) infrastructures; (iii) expanding scope and adjustment requirements of macroeconomic policies (including monetary policy). In synthesis, it could have the effect of increasing the number of existing policy instruments, while leaving unchanged the number of policy objectives. Given the fact that the transferability of knowledge to developing and transition countries is one of the challenges, the OMC can be a helpful instrument for EU policies. Particular fields for activity could be immigrations policies, co-operations with Asia and South America, and the transformation of South Mediterranean Countries, which follow a different model of modernisation. One of the most interesting insights in this process is the fact that fragmentation—although being a major challenge on the one hand—proves to be a chance and can be productive, if only policies reflect on the ‘sustainability of the overall research system’. Then, an outward strategy can be effective from an economic point of view.

In the following *discussion* it was asked, how institution building can be possible under the condition of high labour mobility and facing competitive disadvantages resulting from this mobility. The argument was supported by a view to the US. On the other hand, as *Mr. Antonelli* pointed out, a serious comparison with the US is very difficult, if not impossible. Flexibility is indeed a problem, but one should be careful about qualitative differences, differences in the excellence and performance of the work offered, for example. Not all mobility proves to be useful in this respect. It was furthermore highlighted that mobility may be limited by the structures of national research systems. In many cases, researches will not be able to go back to their country after a longer stay abroad. This is a question of governance that will have to be addressed on European level.

After this presentation, the chairperson *Karen Siune* opened a *general discussion*. The contributions mostly attached to the points, which had been raised after the keynote speeches. The debate was not really controversial, but rather took the opportunity to consensually re-open a few issues that had been touched before, but had not gained enough relevance. One main issue was the relation between the Lisbon strategy and the concept of social innovation. The science-society-interface for some participants is too much centred on the topic of ‘science communication’ in the classical, ‘linear’, one-way communication sense of the word. A number of speakers highlighted that in knowledge society a complementary perspective is adequate, conceptualising ‘the voice of society in Science and Society and the Lisbon Strategy.’ Again, the question of young researches came up. Participants stressed the view that young researchers should communicate with young people, in order to better communicate within a common generational horizon. Also the danger of further brain drain was discussed in this context. Young researches should find attractive possibilities in Europe. Finally the more practical aspect of implementing the Lisbon strategy was touched. The information was given that an action plan is currently being discussed on EU level.

2.2 Panel speeches and debate (afternoon session)

The afternoon session was opened by *Paul Caro* (Directeur de Recherche honoraire, CNRS, France), who spoke about ‘*Human Resources for Research*’. Europe is behind Japan and the US in terms of the number of researchers per 1000 of the workforce. On the other hand, the number of young graduates in science and technology is higher in Europe than in the US and Japan. The wide disinterest in Europe for basic scientific courses (physics chemistry maths) is counterbalanced by the attraction of more interdisciplinary fields (for instance computer science). Young people are very aware of the trends on the labour market. It is essential to offer more opportunities for research and technology jobs in the private and the public sector. Research careers in industry are attractive both from the point of view of remuneration and sustainability of employment. Universities are often dedicated to the “reproduction” of academics, an effort has to be made to open training to the needs of a knowledge society. For efficient recruitment into science careers the presentation of science and technology at primary and secondary schools is important. There is a trend towards a future lack of well qualified science and technology teachers, which may be a serious obstacle to the increase of the number of scientists and which has to be corrected immediately. Although science is well supported by society at large, it is also more and more criticized by fractions of the opinion.

Youngsters especially are sensitive to the opposition between science, associated to the artificial, and “Nature”. The media have a tendency to emphasize the spectacular outcomes or the dangers of the scientific enterprise, not its practical reality. People in Europe get essentially their scientific information from television. The effort of popularisation of science and technology undertaken by many countries in Europe under different forms has to be strongly supported. The success of a knowledge society depends essentially on its acceptability and support by a well informed public. An important effort in that direction has to be implemented in the Lisbon strategy. However, the present situation does not allow an increase in human resources sufficient to meet the requirements of the Lisbon agenda. There is an urgent need for action. Recruitment has to be accelerated together with an improvement of working conditions for scientists in Europe in the public sector. Industrial research should also be supported and developed. Europe should have the will to consider as a priority for its future the creation of more human resources in science and technology.

Professor Gertruij Van Overwalle (Katholieke Universiteit Leuven) gave a presentation entitled ‘*Public and proprietary knowledge*’. Recent events have convincingly shown that public opinion is very sensitive to the expansion of legal protection regimes for scientific knowledge and the possible blocking effect on research. Thoughtful observers warn of the emergence of intellectual property (IP) thickets and the possible chilling effect on innovation, which might lead to a tragedy of the anti-commons. The latter term relates to the danger of a broad privatisation of knowledge that might make technologies embedded in knowledge unusable. Whereas in trade secrets, know-how, and copyright knowledge is not—or only on high costs—made available, patents make knowledge available (accessible), but can also make it incomprehensible. It may be used, but cannot be used without payment. This privatisation, as the hypothesis of the ‘tragedy of anti-commons’ says, might lead to an under-use of knowledge. Against this background, strategies and tools to deal with IP thickets were discussed. Special attention was paid to “Creative Commons in Science”, patent pools and other clearing mechanisms. These instruments intend to balance competition and private interests with public interest and with the sharing of knowledge. Information clearing mechanisms as applied by AAAS and others may help to improve access to knowledge and to understand patent information. Patent clearing systems and additional mechanisms, such as research exemptions, patent pools and others, may help using knowledge, and thereby give impulse to innovation and economic growth.

Mrs. Van Overwalle's contribution was followed by a short comment from *Mr. David Sant* (European Patent Office, Brussels), who stressed the economic rationality of the current patent system. Because the Lisbon Agenda is about competitiveness, it is essential to strengthen a system of intellectual property rights that bridges the gap between science and competitiveness/innovation. Since research and development entail high investments, without giving the guarantee for economic returns, they allocate financial risks on the side of the (private or public) researcher. Patents serve the purpose to guarantee the later return in case of an economic success of the technological product and thereby first of all open an opportunity for research.

The subsequent brief *controversy* about the relevance of patents could not be brought to a consensual end. It remained an open question, whether and to which extent patent law is affected by new modes of knowledge production and how the current system fits into the challenges formulated by the Lisbon Agenda.

In his contribution, *Professor Massimiano Bucchi* (Università degli Studi di Trento) raised the question: '*Can Citizen Participation Enrich Research Policy?*' Accounts of science and society relationships often convey an impression that citizen participation and mobilization are largely perceived as a potential obstacle for research and innovation development, to be as far as possible prevented or removed by virtue of appropriate initiatives. In contrast to this view, *Mr. Bucchi* argued in the opposite direction, i.e. that citizen participation can be an important resource to promote and strengthen research—and is likely to be so even more in the future. An increasing number of cases is available—in Europe and outside Europe—of civic associations (e.g. patient associations) having developed an active role not only in research funding, but in the very shaping of the research agenda. For example, one might think of the support to cancer or AIDS research, or more recently, to the success of associations like Telethon or the Association for Muscular Dystrophy in France (AMF) in promoting research on particular pathologies that both public and private research would never have undertaken. Citizen participation may from this point of view be an important resource to promote and strengthen research. However, it is important to see that citizen participation is not an easy 'button to push'. The public cannot be instrumentalised by science policy in the way that it could be activated or deactivated according to the day-to-day needs of a research policy that is formulated elsewhere. Society does not come into play *post festum*, once all decisions have been drawn. Knowledge society, as *Mr. Bucchi* said, cannot exist

other than being a society which is truly democratic in all its processes, including the governance of knowledge.

Professor Gerd Wolf (European Economic and Social Committee) continued with a presentation on *'Research and Innovation: a scientist's view'*. He strongly argued in favour of scientific freedom, particularly as regards basic research. Citizens of the EU have achieved a level of prosperity, knowledge and legal protection that is unprecedented in history through scientific and technological innovation. Nevertheless, we are facing problems with science in society. What are the problems? They are to be found in the science-society-interface, where the conditions for competition and innovation are led. This competition is characterised by changing industrial and economics structures, labour market situation, and raw material parameters. Sources of innovation are basic research and a symbiosis between science and technology. Most of the great discoveries were the outcome of fundamental research. A single new discovery or concept snowballs into an avalanche of innovations and advances. For a targeted approach objectives must be defined and the way ahead needs to be sufficiently clear. Innovation results from the continuous interplay between basic research, applied research, and product-oriented development. Science delivers the knowledge, industry delivers the products, but citizen and society decide on the use. However, there prevail misunderstandings between society and the scientific community, concerning also the nature of scientific research. Research—particularly basic research—is a step into the unknown. Advances in science are based on ingenuity, intuition, imagination, continuity, persistence, care, chance, and hard work; they come about through hypothesis, experimental evidence, and criticism. It is therefore important, that scientists learn about the demands and concerns of society, but also that society learns about the optimal operating conditions for science, where freedom of science and research is the most important one. The crucial feature of scientific knowledge is the step from the scientific quest phase to the reproducibility of findings and demonstration of their range of validity. Duplication is, therefore, an essential element of scientific method and progress, a fact, which should play a role in science policy and funding. The best conditions for scientific work can be characterised as 'bottom up' where possible and 'top down' where necessary. Altogether, the EU should—among other needs—complete Single Market and ERA, double research budgets, stimulate the interplay between basic research, applied research, and product development, stimulate mobility, protect against over-regulation, and last not least acknowledge the basis of science and research, namely freedom, autonomy, excellence, competition, and co-operation.

The contribution by *Mario Telo* (Research Director at the Free University of Brussels) gave a summarising view on *'Research policy at the heart of the Lisbon strategy and of its international dimension'*. The starting point was the fact that the 'Lisbon strategy's' main aim is to build up a knowledge society in Europe according to our common values. Its background is, on the one hand, the consciousness of the fact that EU is lagging behind in international competition as ICTs and their social spreading are concerned; and, on the other hand, that the EU knowledge society can only succeed if it develops its unique distinctive features within the partially globalised world. The international dimension is, therefore, an inevitable component of the Lisbon process. It allows building deeper knowledge from a comparative point of view. Furthermore, we have to conceive the European dimension not in an isolated way, but rather as a dynamic balance between national identities and transnational convergence. Research policy is an excellent test for the success of the Lisbon strategy because research is part on the European modern identity. Moreover, research and science 'shaped the modern European identity' (Georg Gadamer). It is therefore necessary to strengthen the EU budget in this respect and to enhance significantly the co-operation between national research programmes through the Open Method of Coordination, but also to take into account new instruments, such as ERA networks, for instance. The 'Kok Report' (Dec 2004) on the mid term evaluation of the Lisbon strategy underlines the qualitative and quantitative accomplishments of Scandinavian national research policies and particularly of Sweden, the country which has the best record of social budget and public investments and least similarities with the US model. The international dimension of research policy means first of all consistency between a farseeing vision of Europe as a distinctive global research power with a new coherent policy agenda, meeting external expectations and increasing attractiveness for European and non European researchers . Vision and policies should better combine the 'Airbus model' of internal trustification, with the 'Galileo model' of openness and international co-operation. Both are essential sides of the EU international research identity. The NoEs in fp6 are a step in the right way, but can be improved. More open public debates are needed on how we establish Europe on global scientific level and as a global research actor.

The last speaker, *Mark Holderness* (Director of Agriculture, CAB International) focussed on *'Science and society – linking European and developing country innovations systems'*. The Lisbon strategy can bring Europe a strong future, but also carries implications for our relationships with developing countries. We have to ask, firstly, how societies and science can

be better linked and reconciled towards development. Secondly, what is required for Europe to achieve both the Lisbon Agenda and development objectives. These questions include further differentiations: Who drives the agenda? The gap in understanding and trust between science and wider society is even more pronounced in the developing world. We need new ways to bridge the divide between innovation from science and that from the community. How is knowledge spread? Many developing country institutions were founded on models that are now proving unsustainable, or disconnected from the societies they serve. New thinking on scientific roles and institutional relationships is required to address these needs. Who is benefiting? Private sector research investment, scientific advance, new producer-consumer relationships and the demands of the food trade all carry implications for the poor. A number of examples illustrated the challenges in reconciling a knowledge-based European society into the international frame. Based on these examples, a complex model was presented in order to give a model on how knowledge is put into work. It was made clear that accessing information and the way it is obtained is a crucial task and a serious problem for those holding 'local' knowledge but being excluded from most of the modern IT & communication technologies. When we start reflecting on how to bridge innovation domains, *Mr. Holderness* suggested community-centred, not technology-centred thinking, innovation and knowledge access and transformation systems, stakeholders learning processes, institutional innovation, and convergence of R&D policies. It was very clear that there are many constraints to this process and that the international dimension of the Lisbon Agenda is most important in order to cope with developmental problems and gaps.

Before the end of the session *Katharina Schauer* (Commission of the Bishops' Conferences of the European Community, COMECE, Brussels) briefly presented a paper '*Strengthening the European Social Model*' that expresses the bishops' concern about fundamental political and social rights, now enshrined in the European Constitution. The paper sees these values becoming fluid and suggests some renewal of the Lisbon Strategy.

Finally, *Dusan Soltes* (Comenius University, Bratislava) made a brief contribution on economic aspects, emphasising the needs for 'e-Europe' in the years to come.

After these many contributions, due to the very narrow schedule, no further general debate could take place. The talks were followed by a number of clarifying questions that helped understanding some problematic points. The chairperson *Karen Siune* closed the session expressing her gratefulness to the speakers, who had presented brilliant contributions and had offered an excellent insight in the challenges and the chances of the Lisbon Agenda to Science

and Society. She also expressed warm thanks to all participants from the audience, who had made the session a dynamic exchange of arguments and who very much contributed to the unique experience of an open dialogue on the path to European knowledge society.

3. Concepts and recommendations

It is difficult—if not impossible—to summarise such a rich and broad debate as the one reported above into a short-list of key issues. Therefore, the summary will always reflect some of the rapporteur's personal impressions and thematic preferences. Nevertheless, the detailed report above shall enable readers to check the adequateness of the summary and to draw his and her own conclusions. Moreover, it is important to note that the session did not produce explicit recommendations, since there was no process of decision-making on such recommendations. The session rather produced an open exchange of arguments with sometimes contradicting positions, but often without explicit dissent. Therefore it is only possible to identify streams of more or less consensual communications, in which a few 'islands of dissent' are embedded. Having made this 'caveats', I would suggest the following points that came up during the session, as main lines of argument:

1) *Diagnosis*: The situation of science on the way to knowledge society is characterised by rather complex relations with all other societal fields. Therefore, a complex model for understanding and describing the current situation came up in a number of contributions (*Rodriguez, Chevassus-au-Louis, Krull, Antonelli*). The model, for the purpose of abbreviation, can be called the 'ecology of innovation'. It entails an enlarged vision of the role and place of citizens in science policy by suggesting that the classical linear or 'vertical' model could be replaced by (i) a more 'horizontal' concept of a network in which science, economy, and polity are involved, (ii) a broad definition of innovation that includes products, services, methods and processes, but also organisational and institutional aspects, and (iii) finally the notion that competition and co-operation are both elements of knowledge politics in this 'fragmented' situation. 'Fragmentation' in this sense is challenge and chance (*Antonelli*).

2) *Perspectives*: The situation described above requires complex instruments and approaches. Practically all contributions addressed a perspective that is characterised by multi-actor, multi-directional, and multi-level mode of communication (*Chevassus-au-Louis, Krull, Caro,*

Telo). The need for a stronger coordination between national policies and the EU comes to the forefront under this condition (*Rodrigues*).

3) *International dimension*: World society and the international dimension gain a rapidly increasing significance, for a number of reasons and have to be addressed with respect to ‘internal’ and ‘external’ strategies (*Telo, Antonelli, Holderness*). National and EU policies have to be co-ordinated (*Rodrigues*). An outward strategy, also to LDCs and Asian developing countries, is needed (*Antonelli*). The international dimension allows for building deeper knowledge by comparison (*Telo*). On local level, community oriented, not technology-centred thinking, innovation, and knowledge access are necessary (*Holderness*).

4) *Particular challenges*: As an important aspect of the above-mentioned particular situation of science, the relations to civil society (*Bucchi, Krull*), to public opinion and the media (*Caro*) become more important. Knowledge society cannot exist other than making knowledge governance a truly democratic process (*Bucchi*). Problems with young people not so interested in science have to be solved in order to safeguard scientific excellence (*Caro, Wolf*). Significant improvements in governance have to be made, a ‘partnership for innovators’ has to be developed (*Rodrigues*) and innovation has to be ‘socialised’ (*Chevassus-au-Louis*). Researchers must learn to act in widely defined social arenas. For this purpose, also major changes in university education are necessary (*Krull*). Recruitment has to be accelerated together with an improvement of working conditions for scientists. Also, industrial research should be supported and developed (*Caro*). Society has to learn about the demands and concerns of science, while science must further develop mechanisms to listen to evolving societal demands. The interplay between basic research, applied research, and product development can be improved (*Wolf*).

5) *Particular risks*: A loss of autonomy of science by over-regulation could be a danger in this process (*Wolf*). It is an open question, whether patents bear the risk of preventing innovations (‘tragedy of anti-commons, *Van Overwalle*) or if they are indispensable for innovation. Patent clearing systems may help using knowledge and thereby give impulse to innovation and economic growth (*Van Overwalle*). Concerns were expressed about fundamental political and social rights, now enshrined in the European Constitution. These values, it was said, might become fluid without some renewal of the Lisbon Strategy.

6) *Overall emphasis on the Lisbon Agenda*: The session made three closely interwoven dimensions visible: knowledge policy, economic policies for growth and innovation, and

governance and regulation. In this mingled field, especially the role of the Open Method of Coordination was stressed in overcoming fragmentation of European research, and in building tools to promote innovation and science (*Rodrigues, Antonelli, Telo, Wolf, Caro*).

7) *A list of suggestions* derived from the contributions:

“The seventh framework programme should, ..., promote systematic research on national strategies for the knowledge society.”

“Social sciences have to study and to accompany the process (social mechanisms) which lay behind innovation.”

“Research funding institutions and research policy have the task to ... foster cross- and trans-disciplinary communication and training, create public debates on science and democracy, create independent networks for the audit of science and technology, ..., promote science journalism.”

“EU should focus on the role it can play for the development of LDCs as well as [for emerging economies]... Particular fields of activity could be immigration policies, cooperations with Asia and South-America, and the transformation of South Mediterranean countries which follow a different model of modernisation.”

“More open public debates are needed on how we establish Europe on global scientific level and as a global research actor.”

“Community-centred, not technology-centred thinking, ..., stakeholder learning process, institutional innovation, and convergence of R&D policies to bridge innovation domains.”

“Citizen participation may ... be an important resource to promote and strengthen research.”

4. A ‘take-home message’

Science in society represents a complex relation. Any contribution to the Lisbon Strategy, therefore, requires an adequate model to understand the processes we are currently undergoing.

In this complex situation science must be ‘open’ for societal demands and perspectives. It has to develop skills and to adjust curricula in order to be prepared for a constructive dialogue on all levels. On the other hand, the prerequisites for, and the links between basic research, applied research, and product development must be strengthened.

EU Policy should offer instruments to coordinate relevant national policies by enabling the articulation of goals and interests between research actors, interest groups, and professionals to activate the necessary synergies. Instruments such as the Open Method of Coordination should foster exchange and co-operation, while safeguarding the freedom and autonomy of research, at the same time.

5. Final remarks

Session 1 covered a thematic field that is in the context of ‘Science and Society’ generally rather controversial. As the grand debate on the following day showed, certain concerns creep around the relations between innovation policy and science policy. These concerns, on the one hand, express anxieties about a ‘technocratic-economic’ dominance over scientific and democratic developments. On the other hand, they relate to the fear that science policy might lag behind the political necessities, which come up on the path towards knowledge-based society.

The rapporteur’s impression is that the contributions to session 1 and the debates during the day manifested an overall balance in the views upon science, society and the Lisbon Agenda, neither an over-stressed technocratic ambition, nor an over-stressed participatory euphoria. It was consensus that there are no guarantees for success in this process, that the situation is rather open and that there are still some obstacles on the way to knowledge society. There is, therefore, a strong motive for joint endeavours in science and politics.