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Between revolution and illusion

The governance challenge for knowledge policies

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Unit C.3 - Economic analysis and monitoring of national research policies and the Lisbon strategy

Contact: Marnix Surgeon
Address: 8 Square de Meeûs B-1049 Bruxelles
Office: SDME 9/91
Tel: +32 2 29-97800
Fax : +32 2 29-67026
E-mail: marnix.surgeon@ec.europa.eu

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Lisbon Strategy:
Between revolution and illusion
The governance challenge for knowledge policies

Synthesis Report of the Lisbon Expert Group

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Mandate and Members of the Lisbon Expert Group (LEG)

This report has been prepared by the "Follow up of the Lisbon strategy" expert group (LEG), a group established in 2006 by the Commission (DG Research) to provide support to its activities of analysis and monitoring of the development of research policies within the framework of the Lisbon strategy.

The expert group focused its work on the following activities:

a) A critical review of the research and innovation component in Member States National Reform Programmes (NRPs) and Progress reports (PRs), produced under the Lisbon process;

b) The analysis of Member State and EU level policy ongoing and emerging trends in research and innovation policy, as presented in NRPs and PRs, with a specific concern on governance issues;

c) The identification of new challenges for the development of these policies in a changing environment, with a particular focus on ERA;

d) The provision of advice towards the development of more effective knowledge policies for Europe.

From the outset, The Commission has broadened the mandate of LEG, originally focused on research policies, to incorporate innovation and knowledge policies in a broader sense.

This report provides a synthesis of the work carried out by LEG in 2006 and 2007. Previous LEG reports are mentioned in the references of this document and are accessible at the following URL:
http://ec.europa.eu/invest-in-research/monitoring/leg_strategy_en.htm

The members of LEG are:

Gonzalo León (Chairman)	Vice-rector for Research of the Technical University of Madrid; former Secretary General for Science Policy of Spanish Government, Spain
Susana Borras (from Sept. 2007)	Professor, Copenhagen Business School, Denmark
Maja Bucar (from Sept. 2007)	Professor, University of Ljubljana, Slovenia
Sylvie Inizan (until Sept. 2006)	Administrative and finance Director of the Observatory of Science and Technology, OST, France, former Deputy General Secretary of the

	National Committee for Research Evaluation, France
Raoul Kneucker	Professor, Political Science, University of Innsbruck; former Director General, Research and International Affairs of the Austrian Ministry of Education, Science and Culture, Austria
Stefan Kuhlmann	Professor, Foundation of Science, Technology, and Society, University of Twente, The Netherlands; Former acting Director of Fraunhofer Institute for Systems and Innovation Research (ISI), Germany
Claire Nauwelaers (Rapporteur)	Research Director, UNU-MERIT, Maastricht Economic and social Research and training centre on Innovation and Technology, University of Maastricht and United Nations University, The Netherlands
Jari Romanainen (Rapporteur)	Executive Director, Activation, Tekes, Finland
Véronique Timmerhuis (until Dec. 2006)	Secretary General of the Social and Economic Council of the Netherlands (SER).

Opinions expressed in this report are the opinions of the members of the expert group and do not necessarily reflect the opinions of their respective employers or the opinions of the Commission.

LEG acknowledges the contribution of experts: those participating in a LEG workshop on February 12, 2007, and those contributing to a dedicated workshop organised during the High-Level Commission conference “The Future of S&T in Europe” in Lisbon on October 8-10, 2007, including Valeria Bandini (ASTER) for her efforts in preparing the issues paper presented to this Conference.

LEG also thanks the Commission services for their support to the work of the group, and in particular Julio Rodriguez and Marnix Surgeon from DG Research.

Acronyms

EIT: European Institute of Technology

ERA: European Research Area

ERC: European Research Council

ESFRI: European Strategic Forum for Research Infrastructure

EU: European Union

FP: Framework Programme

GDP: Gross Domestic Product

ICT: Information and Communication Technologies

IP: Integrated Project

IPR: Intellectual Property Rights

ISI: Fraunhofer Institute for Systems and Innovation Research, Germany

JTI: Joint Technology Initiative

LEG: “Follow up of the Lisbon strategy” expert group

NRP: National Reform Programme

OMC: Open Method of Coordination

PPP: Public Private Partnership

PRO: Public Research Organization

PR: Progress Report

RTD: Research and Technological Development

RTDI: Research, Technological Development and Innovation

R&D: Research and Development

SER: Social and Economic Council of the Netherlands

SMEs: Small and Medium Enterprises

S&T: Science and Technology

TP: Technology Platform

UNU-MERIT: Maastricht Economic and social Research and training centre on Innovation and Technology, University of Maastricht and United Nations University, The Netherlands.

Executive summary

Eight years after its first launch, and three years after its re-launch, the fate of the Lisbon strategy still lies between success and failure. And a clear and resolute evolution towards an integrated European Research Area is not yet visible.

The construction of ERA is not a goal in itself, but an important roadway to the implementation of the Lisbon Strategy in the research domain. Hence policies conducive to ERA – which require a drive towards policy internationalisation - will need increased strength in view of the challenges of the re-launched Lisbon strategy. Rather than taking a narrow "free space for research" perspective, the focus needs to be placed on an integrated "European Knowledge Area".

The "Follow up of the Lisbon strategy" expert group (LEG) carried out an analysis of the research, technology and innovation dimension of Member States' National Reform Programmes (NRPs) and Progress Reports (PRs), in the light of the Lisbon and European Research Area (ERA) objectives. Several important issues such as the international dimension of R&D and innovation, the new, open mode of innovation, the need for policies to address the demand-side of R&D and innovation as well as the supply-side, etc. have not been sufficiently recognised in the Member States' NRPs and PRs. And these also demonstrate a lack of commitment to European level objectives. There is also limited evidence of the use of strategic intelligence to link policy goals to measures and instruments: the overall approach and focus of the NRPs and PRs is still mainly on administrative implementation rather than on strategic policy governance processes.

From this analysis, LEG identified **key challenges related to governance of research and innovation policies** and provides **recommendations for more efficient knowledge policies in the framework of Lisbon and ERA goals**.

The main message from LEG is that **governance weakness is becoming a key bottleneck preventing the advancement in knowledge policies in Europe**. Policy makers at the national and regional levels are faced with a difficult dilemma – how to design effective policies which are both serving the interests of their constituencies and helping Europe reach Lisbon and ERA objectives.

LEG advocates:

1. **A change in policy approach**: an evolution **towards open, dynamic and systemic knowledge policies in Europe**, based on a broad and efficient mix of policies and instruments, adapted to the diverse landscape of actors and S&T domains, and incorporating a multi-level dimension;

2. **New modes of governance** of knowledge policies: reinforcing the existing voluntary approach by enhanced strategic intelligence capacities, strengthened policy experimentation, empowerment of change agents, and the establishment of stronger incentives towards the Lisbon and ERA goals.

Open and dynamic policy mixes towards a "European Knowledge Area"

Appropriate mixes of knowledge policies presented in NRPs would need to consider the adequate **combination** of instruments at a given level, but also the **division of labour** between the various levels in charge of developing these policies. Nowadays, the design and implementation of R&D and innovation policies cannot anymore be conducted in a purely national context: opportunities for joint trans-national action need to be identified and capitalised upon; the facts that private R&D activities are organised on a multinational basis, and that public research actors are also increasingly internationalised, need to be incorporated in policy-making. **An "intra-European" policy level** emerges, referring to policies and measures that are national in nature but are designed to have an impact on European development.

A new conceptual model for knowledge policies is proposed: it is based on "**dynamic knowledge configurations**" where policy mixes take into account the specificities of individual S&T domains and industrial sectors, and bypass administrative, regional and national borders. In this model, a "**European Knowledge Area**" is built up in a multi-level, multi-actor and multi-domain landscape and in a dynamic perspective.

A fundamental challenge for policy makers is that of selecting **the most appropriate mix of instruments** for realising the ERA and Lisbon visions, notably instruments used at the Community level in support of national and regional actions. The aim would be to identify the most appropriate combination of instruments in each context and for all knowledge configurations, by using past experiences, notably with the combination between Structural Funds and other instruments.

Up to now, there is no clear **leadership** for that broad policy area and hence policy-making suffers from **lack of commitment** and subsequent **fragmentation** between traditionally defined policy domains. Hence there is a need for more **coordination** and **coherence** between levels (EU, national, regional, local) and domains (education, research, environment, health, etc.). To succeed in the ambitious plan of constructing a "European Knowledge Area", Member States and the European Commission should develop joint thinking between policy domains and across policy levels and adopt a more strategic and integrated approach to deliver more efficient policies. A **systemic view of R&D and innovation** as key drivers of economic growth and development needs to be embedded in policy-making.

In contrast to supply-oriented innovation policies (R&D subsidies etc.) **demand-oriented policies** are in most cases not administered by research or "innovation" ministries, but by governmental departments responsible for issue areas such as environment, consumer, energy, ICT, health, defence, transportation, etc. **Those policies are problem- and issue-driven**, and their considerable leverage potential stems from the development and diffusion of innovative products and services, as a higher demand will push producers in the innovative directions and make them invest in innovative activities. This leverage potential could play an enormous role for the achievement of the Lisbon objectives. Policy instruments from various areas need to be integrated in a coordinated way, which calls for new governance structures able to break a currently fragmented policy landscape. **The challenge would be to integrate demand-oriented policies explicitly in a strategic knowledge policy framework.**

Member States are taking manifold steps likely to foster **open innovation** practices in companies and in other public and private entities. However **there are structural, institutional and cultural rigidities that still hinder these developments**. Deeper understanding of the conditions of success for such policy efforts, more and better views on effective results obtained (in terms of real co-generation of knowledge and effective partnerships), are needed to support such policy developments.

Stronger incentives and enhanced strategic intelligence for intra-European policies

In the field of research and innovation, the Lisbon Strategy and the ERA initiative represent historical policy experiments, stimulating many research and innovation policy actors in the European multi-level system to invent and test a variety of options and instruments, also affecting policy governance. Much of this experimentation has a focus on **Intra-European policy** efforts, creating attractive and productive research and innovation environments crossing over national borders.

Policy experimentation is necessary because of the need to accommodate policy goals and instruments to a new dynamic context. Traditional approaches and measures are not valid anymore, and new ones need to be defined and tested against reality. The large variation in situations and capabilities across Member States makes this experimentation process possible, but also complex.

Realising the ERA has until now relied mainly on Community instruments (Framework Programmes including the new European Research Council, Joint Technology Initiatives, etc.) and a limited use of existing coordination instruments (art 169, ERA-NETs…and also Open Method of Coordination, OMC). There is however an **urgent need for much stronger incentives by Member States to evolve towards ERA**. A clear hindrance here is that the costs of non-ERA and benefits of ERA are not readily visible to national policy-makers, since they are not calculated and not easy to demonstrate. **The promotion of ERA should be based on a systematic highlighting of these costs and benefits** and contribute to an increased commitment to ERA as well as to the Lisbon strategy.

To support the move towards intra-European policies, LEG suggests a threefold strategy towards a reinforced incentive structure: (1) pushing for faster change by allowing **variable geometry** and facilitating and empowering **change agents**, (2) providing common **platforms** facilitating learning, networking and common action, and (3) managing the negative effects of the transitions through **cohesion policies**. If the incentive structures are stronger and support leadership of the change agents and leading actors, the role of cohesion policies become increasingly important in ensuring sufficient catching up by the followers and those lagging behind.

Constructing the ERA does not mean however that the role of non-European countries should be neglected: common intra-European initiatives towards **the rest of the world** should also be part of ERA construction. There is indeed a danger of misperception of ERA as a process of construction of a “Research Fortress Europe”. Reinforcing research and innovation in Europe would mean upgrading its capacity to open up and tap into global knowledge networks.

Any ambitious policy experiment needs to come along with **variation** (leaving room for diversity across knowledge configurations)**, learning and exit options**. Observation, comparison, and policy experimentation as a condition of policy learning require **‘Strategic Policy Intelligence’**. The **presence of full and integrated policy cycles** is required: this includes diagnosis, priority setting, instruments definition, instruments implementation, assessment of results, and feedback loops between all phases of the cycle. Specific mechanisms should be developed to **assess effectiveness of policy mixes**, in addition to single instruments evaluations. Strategic policy intelligence mechanisms and tools go along with improved **quality of human resources within public administration** and bodies in charge of policy

design and implementation: poor endowment in such resources is a fundamental barrier for good knowledge policy governance.

Especially challenging is the introduction of innovative governance tools to **increase shared commitment** and manage conflicting interests emerging when proceeding to further ERA development at all levels: European versus national, national versus national/regional, public versus private. The governance process should be based on active participation and commitment of stakeholders, particularly if we consider that leading actors are different for the different objectives. New forms of governance need to observe which stakeholders need to be involved, how and when to involve them in the process. Applying variable geometry approaches for intra-European knowledge policies requires rules for inclusion and exclusion of actors, and the identification of win-win situations, helping to mitigate conflicts of interest. The **participation of stakeholders**, would increase the chance of establishing robust concepts.

Within the framework of NRPs, a specific issue relates to the impact of the **OMC process as a learning device**. The "soft laws" of OMC can be translated in trans-national policy learning, policy coordination, or even policy convergence and joint policies. This implies, however, a cultural change for policy makers. Today, impact of OMC is not yet assessed. "Soft" platforms for policy experimentation involving exchange of ideas and mutual learning should also lead to "hard" initiatives, with joint funding involved: this is the case, e.g. with Technology Platforms leading to Joint Technology Initiatives.

LEG Recommendations

REC 1: *In order to speed up progress in the ERA construction within the Lisbon framework, Member States should* ***increase the ownership and enforce coordinated responsibility*** *of ERA activities. This would be a first step to help avoiding horizontal fragmentation in the design and implementation of related policy measures. This coordination should also extend beyond research policy domains to cover the broad spectrum of policies forming a* ***balanced policy mix*** *towards an integrated European Knowledge Area.*

REC 2: *The Council should emphasise the* ***knowledge dimension*** *in all Integrated Guidelines for Lisbon process, as a horizontal issue, rather than constraining it to Integrated Guidelines (IGs) 7 and 8. For that purpose, specific knowledge-based elements should be integrated in all IGs and be tackled in NRPs and PRs preparation.*

REC 3 *Member States should identify some* ***pilot areas of policy action*** *in which innovative policy mixes (crossing over domains and levels) could be designed and tested for effectiveness.*

REC 4: *Member States should be encouraged to create* ***trans-border bilateral and multilateral research and innovation platforms,*** *as a mechanism to integrate scientific or technological communities of several European countries on a stable basis (e.g. as Joint Technology Initiatives have started to do or the European Institute of Technology could do in the near future). This will support the development of stronger knowledge configurations in Europe, and provide the basis to demonstrate benefits of ERA from a pragmatic approach.*

REC 5: *The Commission should facilitate and partly finance some specific* ***variable geometry mechanisms*** *across interested Member States implementing multi-level and multi-domain integrated actions (from human resources to infrastructures) by*

*innovative regulations on the basis of Treaty provisions. The creation of **bilateral or multilateral R&D programme structures** will help to visualise at the national/regional level the support to pan European research activities. An evolution of instruments like ERA-NETS+ to cover common infrastructures could also be explored. This should also encompass intra-European initiatives geared towards **third countries**.*

***REC 6**: The Commission should continue to provide **platforms for experimentation** – such as OMC-Nets, ERA-Nets, Technology Platforms – and stimulate Member States to join in. Member States should engage in **mutual learning practices** especially for demand based and open research and innovation policies. Clear success criteria and exit plans would need to be set for such platforms.*

***REC 7**: Member States and Commission should facilitate the development, maintenance and use of advanced **Strategic Intelligence capacities** (organisations, networks, databases, human resources). The ERA construction process should be annually monitored through specific platforms and procedures for review and evaluation, with appropriate indicators, using coordination instruments to align and discuss progress made. The Commission has started to strategically observe developments (through analysis of NRPs, use of 'Expert Groups', ERAWATCH, …): such efforts should be professionalised and complemented by Member States' (improved) observation and evaluation activities. Policy experimentations need to be supported by impact assessment embedded into broader policy mix evaluations. This involves not only the establishment of new procedures and instruments but also the reinforcement of decision capacity in policy circles.*

***REC 8**: The **NRPs should evolve towards strategic documents**.*

The Commission should reinforce the guidelines for reporting on Lisbon strategy notably through the NRPs, to:

- *Include and visualise the differentiation between National, Intra-European, European and International perspectives and related policy measures;*
- *Place more emphasis on **policy impacts**, and include the improvements of **coordination** procedures, especially the OMC. This should include expanding the OMC to cover intra-European policy measures.*

Member States should explicitly state in their NRPs:

- *The overall **vision and strategy** for research and innovation to be pursued according to the Lisbon process and in the evolution of the national research and innovation systems by emphasising policy learning.*
- *The planned strategy in translating the vision into prioritised policy **measures**.*
- *The way to assess **effectiveness** of reforms and measures, beyond administrative reporting, using targets and indicators whenever relevant and possible, as well as external evaluations.*

1. Context and aim of the report

Governments in the EU are currently paying increased attention to "knowledge policies", integrating research, innovation and education into a coherent policy framework. The recognition of the contribution of these policies to competitiveness, growth and employment in Europe is at the core of the so-called **Lisbon strategy** launched in 2000.

By 2004 it had become obvious that the reach of policies implemented in the wake of the Lisbon process, was not sufficient to attain the stated goals. The Lisbon strategy was hence re-launched in 2005, with the aim of focusing the strategy and strengthening the commitment towards the objectives. The re-launched Lisbon agenda is essentially based on the same original objectives, but is more focused on economic growth and job creation. EU Member States were called upon to take ownership of the re-launched Lisbon process, paying special attention to fostering growth and employment in their countries. The European Council adopted Integrated Guidelines for Growth and Employment – a more concrete guidance on how to translate the above mentioned 'ownership' and strategic goals into national action plans. Based on the guidelines, Member States produced 3-year National Reform Programmes (NRPs) by the end of 2005, and subsequent annual Progress Reports (PRs). The National Reform Programmes are expected to become key instruments in the new economic reform governance system within the EU.

Since the purpose of the NRPs is to highlight what each Member State plans to do in order to reach the Lisbon objectives, the focus is naturally on **reforms**, i.e. the most recent and planned policy measures and those with the highest expected leverage with respect to Lisbon goals. The significance of the National Reform Programmes lies not just in the programmes themselves, but also in the changing roles of Member States and the Commission in the governance of the reformed Lisbon process. The "ownership" of the process is shared between the Community and the Member States and the role of the Commission is that of a facilitator and an equal partner, rather than a manager or a controller. Lisbon governance instruments rely on the use of the Open Method of Coordination (OMC) which provides a voluntary framework where individual Member States can support the reform of their own policies through mutual learning, and peer review with the rest of Member States.

Thus, the **National Reform Programmes**, **Progress Reports** and the governance processes related to these programmes, especially the **Open Method of Coordination** (OMC), are key instruments in the governance of the re-launched Lisbon process. The purpose is to hasten reforms at national level in all Member States, have governments take more responsibility in the Lisbon process, and help the European Commission identify, launch and reform EU level activities to better support the Lisbon process.

In parallel to this Lisbon process, the European Commission presented, in 2007, a Green Paper on "Future perspectives for the **European Research Area (ERA)**", to stimulate the debate on the relevance of ERA and on possible directions for the future. With the Green Paper, the Commission also launched a broad-based consultation process and specific expert groups with the mandate to assess the current situation and elaborate proposals on various dimensions of ERA. ERA's ability to become a genuine EU space for research is a basic ingredient for the future success of the Lisbon Strategy in its overall goal to bring about a true European 'knowledge-based society'. Nevertheless, the achievement of this overall goal could

be undermined and slowed down by the lack of appropriate governance structures capable of dealing with the EU challenges in time and with the necessary flexibility to accommodate the great diversity in status and structures of national and regional research and innovation systems in the EU.

The aim of this report is to discuss **key challenges related to governance of research and innovation policies** and provide **recommendations for more efficient knowledge policies in the framework of Lisbon and ERA goals**.

Four main challenges are highlighted and discussed in *section 2*: i) the need for a new conceptual approach and strategic instruments for knowledge policy design and implementation; ii) the necessity to take more into account the open character of innovation; iii) the new emphasis to be placed on demand-side policies; and iv) the problem of fostering internationalisation of research and innovation policies. Reference is made to key trends in research and innovation policies in the EU, identified in the NRPs and PRs.

A new conceptual model for knowledge policies is proposed in *section 3*: from the LEG point of view, solutions to the above challenges will require the setting up of a new approach for policy design and implementation, based on "dynamic knowledge configurations" where policy mixes take into account the specificities of individual S&T domains and industrial sectors. The claim is that, to implement a systemic approach, it is necessary to use such a new conceptual framework, looking beyond national and regional boundaries and describing the configuration of ERA according to a multi-level, multi-actor and multi-domain landscape in a dynamic perspective.

Section 4 includes the recommendations of LEG for improved policy governance to reach the ambitious objectives of the Lisbon and ERA strategies.

The main message from the "Follow up of the Lisbon strategy" expert group (LEG) is that **governance weakness is becoming a key bottleneck preventing the advancement in knowledge policies in Europe**. This applies to national, regional and EU levels, and, crucially, to coordination between these levels. Policy makers at the national and regional levels are faced with a difficult dilemma – how to design effective policies which are both serving the interests of their constituencies and helping Europe reach Lisbon and ERA objectives. The key recommendation from the LEG group is to evolve **towards open and systemic knowledge policies in Europe, accompanied by stronger governance**.

2. Key challenges for research and innovation policies for Europe

LEG has examined the way Member States design and implement their research and innovation policies with the view of reaching the Lisbon and ERA objectives, through an analysis of National Reform Programmes and Progress Reports and other sources. From this analysis, key challenges for knowledge policies in Europe emerge.

Quantitative R&D spending objectives such as the Barcelona target are insufficient: the focus needs to be placed on long-term structural reforms of research an innovation systems in Europe. The success of structural reforms hinges on appropriate modes of governance of knowledge policies. The policy governance challenge is at the core of the success of the Lisbon process: much remains to be done to evolve towards efficient and integrated knowledge policies. Progress is required on four fronts:

- Internationalisation of knowledge policies: there is a need for intra-European perspectives, stronger incentives and stepwise approaches
- The open innovation reality needs to be firmly integrated into knowledge policies
- Shifting knowledge policies towards the demand side will help increase their contribution to knowledge and growth
- There is a need for systemic perspectives in research policy.

Quantitative R&D spending objectives may be useful but are insufficient per se: the focus needs to be placed on long-term structural reforms

One important component of the Lisbon strategy was the setting of a global quantitative objective for R&D expenditures, set at 3% of GDP by 2010, with two-thirds coming from the private sector, the so-called Barcelona goal.

The Barcelona goal has been criticised on several grounds: the measurement is not appropriate for research systems relying heavily on R&D tax incentives; the responsibility of Member States for the two-thirds private share of R&D in a context of worldwide mobile investments is very limited; the ratio is essentially a reflection of sector specialization; the distinction between private and public investments leaves out the crucial role of public-private partnerships for research; etc.

Although adopting such quantitative objectives can serve as a basis for paying higher attention to research and innovation at national level, there is a danger that this might take attention away from the need for structural reforms at all levels of the European research and innovation system. More important is that Member States seize this opportunity and **initiate reforms which have a longer term impact on the competitiveness of Europe**. The ways and means to design policies in view of such structural reforms is the focus of this report.

The success of structural reforms hinges on appropriate modes of governance of knowledge policies

The analysis carried out by LEG on the Member State's 2005 NRPs and subsequent PRs (2006 and 2007), shows that these are potentially useful tools to develop more efficient knowledge policies, but also that they suffer from a series of weaknesses.

The NRPs and PRs indicate that Member States have taken the re-launch of the Lisbon strategy seriously. However, it is quite clear that not all Member States have yet sufficiently recognised the true importance of knowledge – and of R&D and innovation – as key factors behind economic growth as well as social, infrastructural and environmental development.

The key bottleneck appears to be linked to the governance of knowledge policies. Despite the fact that Member States seem to be paying more attention to governance, the analysis indicates a **difficulty to incorporate the changing nature of innovation into policy setting.** NRPs and PRs are characterized by a lack of integration between knowledge-related and other policies and measures: this fragmentation between various policy areas is further reinforced by the Integrated Guidelines setting, which presents research, innovation and other relevant areas in separate guidelines. While there are increasing efforts to coordinate between policies, there is still a lack of truly holistic and horizontal mixes of policies. Several important issues such as the international dimension of R&D and innovation (and above all the intra-European level), the existence of a new, open mode of innovation, the need for policies to address the demand-side of R&D and innovation as well as the supply-side, etc. have not been sufficiently recognised in the Member States' National Reform Programmes and Progress Reports. There is also limited evidence of the use of strategic intelligence to link policy goals to measures and instruments: **the overall approach and focus of the NRPs and PRs is still mainly on administrative implementation rather than on strategic policy governance processes**.

The above challenges for policy governance are discussed in the next paragraphs.

The policy governance challenge is at the core of the success of the Lisbon process: much remains to be done to evolve towards efficient and integrated knowledge policies

The governance of R&D and innovation policies plays a key role in both setting and achieving the Lisbon objectives. Governance refers to processes and activities put in place to ensure that relevant policy needs are identified, appropriate policies are designed and implemented effectively and efficiently and that the necessary learning takes place by involving all relevant stakeholders.

The increasing importance of governance stems from the new role of governments; as facilitators and equal partners, rather than controllers of research and innovation systems. Furthermore, governments need to design and implement policies in increasingly complex, highly networked and multi-layered research and innovation systems that are continuously changing.

In this new role, governments need the contribution of all stakeholders to help them identify relevant challenges, design appropriate policies and implement them effectively. It is part of an extended ownership approach to increase the acceleration and sustainability of reforms. For instance, the adoption of open innovation approaches by private firms does not necessarily depend on policy measures.

The character of governance – including the way in which identification of policy needs, and the design and implementation of policies is organised in the form of processes and structures – can therefore have an enormous impact on the coherence of policy mixes and their effective and efficient implementation. Policy coherence has many dimensions:

- Horizontal coherence – coherence of R&D and innovation policies across sectors, ministries, departments, directorates, etc.;
- Vertical coherence – coherence of R&D and innovation policies across governance levels, e.g. between EU, national and regional;
- Temporal coherence (dynamics) – coherence of R&D and innovation policies over time, and predictability of policy changes.

In the NRPs, this question of governance is not well developed, and it is not easy to assess the stage reached and the challenges in each case. Several **challenges regarding governance of R&D and innovation policy** can be pinpointed:

1. There is a need for an **overall vision and strategy** for R&D and innovation policy: this implies **a systemic view on innovation and on related policy**

   Is there a strategy plan which links or encompasses all the separate policy lines in Member States, ideally within a pan-European scope? And does this work? Only a few Member States mention such a 'big picture' strategy in their NRP. While traditional research policies were basically legitimised by the concept of market failure, modern research and innovation policies also have to deal with system imperfections. This generates a need for horizontal and systemic policy co-ordination, which is reflected in a few NRPs only, and in an elusive manner. While, in several cases, the NRP process seems to have been instrumental in establishing coordination structures spanning over several policy domains, in order to coordinate "Lisbon-oriented" policies, the impacts of these new modes of organization are not (yet) visible in developments of "policy mix" considerations, focusing on interactions, overlaps and synergies between policy instruments from various policy domains. The analysis reveals that there is a lack of integration across policy measures pertaining to knowledge economy. This does not apply only within research and innovation guidelines, but also with other policy areas like infrastructures, employment, industry or education. It reveals the lack of systemic approaches to overcome fragmentation in policy-making due to governmental specialisation and the existence of hermetic boundaries between related policy areas. It should be noted, that despite the lack of truly systemic policy mixes in the Member States' NRPs, there are, however, signs of movement into this direction. Simultaneous launch of complementary policy measures, such as addressing human resources for R&D, large strategic projects and research infrastructure, indicate that there are increasing efforts towards better policy integration.

2. There is a need to **set priorities and identify the right balances**

   Relatively little attention in NRPs is focused on how or where to invest the intended additional R&D-funding, how to put the additional investment effectively to work. One key question is the balance in investing in structural bases (universities, infrastructure, human resources, and basic funding) versus project and therefore temporary competitive funding.

Another balance to take into consideration is emphasis on more fundamental research versus more user-oriented research, and of course amongst themes or fields of knowledge: prioritisation between the fields is not often based on sound bases. Yet another underlying issue that is not explicitly spelled out is: should the priority go to reinforce science-based innovation or to provide conditions for innovation in a broader sense?

There is no easy way to assess the "correctness" of balances in a given policy mix: what is important is that rationales for priorities are made explicit, are subject to sound analyses, and are openly discussed. The way priorities are being established is a key governance challenge because it links with the question of co-responsibility and co-funding among public and private stakeholders.

3. There needs to be a real and wide ranging **commitment of all stakeholders**

   Vision, priority setting and balance are necessary elements of good R&D and innovation policy governance. They are, however, not sufficient. How to ensure real commitment needed from the different partners involved in making the knowledge society a success (i.e. different parts of government, businesses, PROs, unions etc.) is also crucial to turn policy decisions into reality. Several, but not all, NRPs explicitly mention how Member States operate and how important a good social partnership is for their effectiveness. Ownership of NRPs is progressing over time. National governance processes seem to give more attention to stakeholder participation (e.g. in the form of seminars, presentations, etc.), which is likely to strengthen the commitment and shared ownership of the NRPs. Still, improvements will be desirable to raise higher attention and relevance among scientific and technical communities and promote their involvement and commitments to deep reform process in national innovation systems.

4. The **quality of policy implementation** needs attention and should be supported by sound **policy learning practices**

   In most NRPs or PRs, there is no consideration to be found on the quality of policy implementation. Meanwhile it is becoming increasingly clear that the overall effectiveness and efficiency of policies depends heavily on the quality of policy implementation: how to manage policies in the process of implementation, how to monitor and evaluate them? A central element of improved policy implementation is a **well-developed evaluation culture**. In terms of the Lisbon targets, policy evaluation aiming at an assessment of behavioural additionnality, is a central condition for successful attempts to increase research and innovation orientation in industry. Few PRs indicate that Member States have paid more attention to strategic policy implementation than to simple administrative implementation. The assessment of efficiency and effectiveness of policy measures is still suffering from a lack of indicators and methods. This increases the risk of incoherence between vision, strategy and measures.

   The question of **quality of human resources within public administration** and bodies in charge of policy design and implementation is an important one here: poor endowment in such resources is a fundamental barrier for good knowledge policy governance.

> While there is clearly some mutual learning between Member States, especially between new and old Member States, it is still too early to say if the OMC will have a significant impact in enhancing it due to the lack of cross references on this learning process found in PRs. LEG is well aware of the pre-existent use of bi- and multi-lateral policy learning schemes in the European Union, which are not formally connected to Lisbon strategy or NRPs elaboration, but the value-added of OMC cannot be ascertained from the NRPs and PRs analysis.

Further improvements with respect to governance of knowledge policies will require deep structural reforms in public policy governance processes, including those that address framework conditions to boost investments in R&D and innovation. There is also a **need to implement new "integrated knowledge policies" using a wider, systemic and more holistic approach** (see section 3).

Internationalisation of knowledge policies: the need for intra-European perspectives, incentives and stepwise approaches

The construction of ERA is not a goal in itself, but **an important roadway to the implementation of the Lisbon Strategy** in the research domain. Hence policies conducive to ERA – which require a drive towards policy internationalisation - will need increased strength in view of the challenges of the re-launched Lisbon strategy.

Realising the ERA has until now relied mainly on Community instruments (FP including the new ERC or JTIs, etc.) and a limited use of existing coordination instruments (art 169, ERA-NETs…and also OMC). There is however an **urgent need for much stronger voluntary action by Member States to evolve towards ERA, even if it is approached by using variable geometry formula.** In reality, and despite their growing number and visibility, the role of European level instruments to realise the ERA, still remains limited in the short and probably even the medium term. Notably, the Framework Programme represents only a small percentage of overall investments in R&D and innovation in Europe. Most of the investment is still national, and hence the highest leverage for establishing a genuine ERA lies at this level.

In face of this, NRPs and PRs do not explicitly discuss the issue of national efforts towards the common European goals in the Lisbon strategy. Their outlook is national in character: the dual aspect of Lisbon strategy is, in fact, not recognized, i.e. the commitment to designing national policy measures that will meet the national goals and interests as well as the European goals of the Lisbon strategy ("intra-European"). Even where intra-European aspects are indicated, they are not part of the main strategic lines of the NRPs. Segments of possible intra-European actions are mentioned, but most of them fail to state or add appropriate national and/or intra-European policy measures. The priority in investing in public R&D (nationally) correlates to some degree with country size, probably reflecting the more widespread belief in the need for national R&D strongholds in larger countries. Indeed, the need for internationalisation of the R&D system is clearly more present in small and medium-sized countries where the pressure towards the opening up of their research and innovation systems is stronger.

One of the key problems faced by national governments on this road is the **difficulty to visualise the real benefits from ERA**. As long as the benefits – or to put it otherwise the "costs of non-ERA" – are not visible for policy makers, they and many research organisations in Member States still focus mainly on their regional or national policies and contexts for activity and funding, and see European programmes and activities only as means to add to their resources to help reach nationally- or regionally-oriented objectives. Many stakeholders even mix up European programmes

and activities with ERA and do not see which specific role they have to play in ERA construction.

ERA governance is currently mainly rooted in specific instruments provided in the context of FP6 and FP7. These instruments emphasise and encourage shared action between Member States (e.g. ERA-NETs, INNO-NETs, ESFRI) or between enterprises and research organisations (e.g. Integrated Projects, IPs, Technology Platforms, TPs, Joint Technology Initiatives (JTIs), and perhaps later increasingly also art 169 and 171). The recently launched Eurostars programme for R&D-intensive SMEs in the framework of EUREKA, is an example national initiative with joint EU-national funding. In this approach, the Commission has created a mechanism, where a promise of recognition and additional resources acts as an incentive for Member States and R&D and innovation actors to come together and launch shared action. Provided that this competitive approach is effectively based on appropriate selection criteria – as opposed to lobbying and protecting national interests – this can act as a strong incentive supporting the development of ERA. This approach creates a competition, which allows the most active Member States and R&D and innovation actors to advance faster and be active partners in building the upcoming ERA. There is a danger though that this results in cohesion problems due to increasing differences in the levels of advancement between Member States and between industries. However, as it requires commitment and emphasises voluntary leadership, this approach can also help shape or create new governance models that might also support the Lisbon process. **Careful thought and analysis would therefore be advisable before designing any overall governance model for ERA**: these should rely on and complement the current pragmatic approach, and not attempt to replace or create any barriers for it.

The creation of European institutions and initiatives might carry a danger to put excessive emphasis on an inward-looking European “research fortress”: ERA should also embed a dimension of **openness towards third countries**, and favour intra-European initiatives targeting partners outside of Europe. Joining forces is necessary inside the EU but also for establishing cooperation partnerships, joint facilities or platforms, joint research centres, etc. involving partners from third countries. Today these outward-looking strategies are mainly the result of individual Member States’ initiatives and the potential offered by ERA in this respect remains unexploited.

There is no ”invisible hand“ in the European partnership arrangement of multi-level national and intra-European policies: **coordination is indispensable**. The rationale of EU policy action was initially based on the principle of the ‘added value’ of EU in terms of avoiding duplication of national R&D efforts. Today, with an innovation perspective, there is a wide recognition that this is not enough in order to maximize the potential of innovation in Europe: therefore current attention is paid to issues of coordination of national policies. However, in spite of this, coordination has not been fully developed. More and better coordination is required. The Commission and the Council are (legally) charged with the coordination of national measures for European purposes, the Open Method of Coordination (OMC) being the explicit coordination procedure to date.

Soft mechanisms where money has not been explicitly allocated, namely technology platforms and research infrastructures through ESFRI, have demonstrated their usefulness for policy coordination. Until now, these have relied on the promise of recognition or its consideration as a European priority, and possible future funding. However, there might be a need to find other rationale and motivation to complement the incentives to support these softer network-building mechanisms also in cases, which are eventually not successful in gaining the desired highest levels of recognition and funding. This calls for complementary forms of governance.

Technology platforms (TPs) represent a bottom up coordination effort in selected industry-driven areas. In some domains, this process has generated common approaches at the national level reflected in national/regional platforms and open calls based on them. In 2007, a significant step has been made to increase the coordination between the European Commission and Member States with the effective approval of four Joint Technology Initiatives (JTIs). JTIs represent the next step in an interesting policy experiment, which allows for the development of various forms of governance structures. However, it is very important to complement this type of policy experiment with sufficient research and analysis to identify good practices and potential problems, especially related to governance.

ESFRI (European Strategic Forum for Research Infrastructures) is another example of soft policy coordination instrument in the context of ERA. The ESFRI "forum" was created with participation of national representatives, with the aim to identify the most important research infrastructures for the future research in Europe and to facilitate their funding and construction. While the process has been useful for the identification process of the needs (ESFRI roadmap), it did not encompass the selection and implementation process because ESFRI cannot take formal funding decisions. The consequence is the difficulty to move from a prioritised list to the implementation phase. Work on research infrastructures (Kroo et al., 2007) have also considered the use of article 171 for the implementation of new pan-European Research Infrastructures. The missing link between ESFRI (i.e. strategic prioritisation) and actual implementation shows that there is a need for an overall governance process, which would ensure sufficient commitment and resources for implementation in the wider context of ERA.

In short, ERA construction is still in its infancy and much more effort should be put on its governance structures to become a cornerstone of the building of the EU knowledge society. However, as the de-facto approach taken by the Commission has already proven to be a powerful incentive in creating voluntary action and leadership – much more so than the NRPs and PRs for the Lisbon process – care should be taken in developing more overall governance structures. In fact, **the overall governance structures should probably be kept to a minimum** with much more focus on creating and developing governance processes which are necessary for combining different aspects of ERA, e.g. strategies-implementation-intelligence or infrastructure-research-commercialisation.

One should acknowledge the fact that is not possible to get to the ERA in a single step: **a "staircase approach" would need to be adopted**. This stepwise approach is visualised in Figure 1. The staircase model distinguishes between 5 levels of internationalisation of RDTI efforts in Europe: this starts from an increased participation in European activities (level 1), and evolves through the internationalisation of research performers, the opening-up of national programmes and labour markets for researchers (level 2), the start of new trans-border actions (level 3), and the development of European- level research activities and institutions (level 4), all bottom-up. Level 4 corresponds to the objective of a genuinely European setting for R&D and innovation policy, in which all Member States put resources in common to develop European-level policy instruments and institutions. This would imply, e.g. that Member States participate in and propose new programmes according to Art 168 and 169 EC Treaty, especially for cross-border regional projects and programmes. A European PhD programme or setting standards for a European PhD would also be part of Level 4. The Framework Programmes also belong to Level 4, and so are the new European measures, the European Research Council (embedded in FP7) and the European Institute of Technology. National policies on levels 3 and 4 are intra-European in nature; they will not only promote and intensify European

cooperation with a view to establish the ERA, they will also change the present division of labour between national and European institutions. More than any other, they will promote and intensify European cooperation with a view to fully establishing ERA.

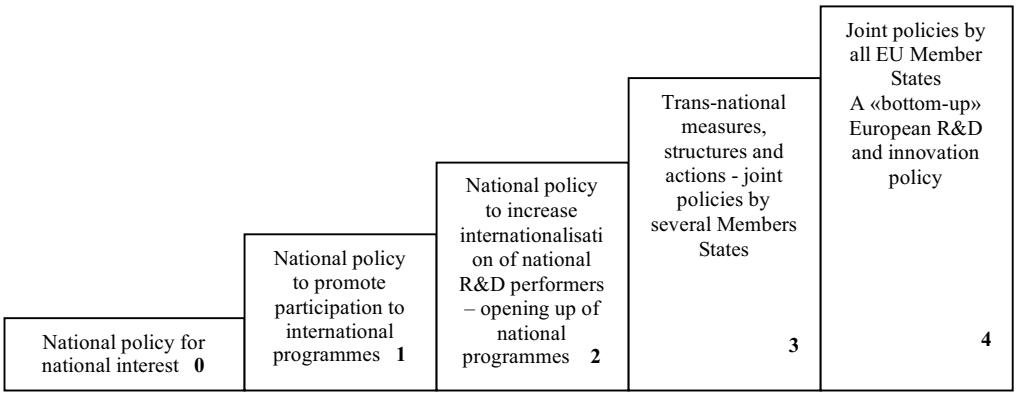

Figure 1. The staircase of Europeanization of R&D and innovation policies

A final important point about internationalisation of policies needs to be made: the focus on the emerging intra-European policies cannot result in the idea that Europe is isolated. The **international and global perspective** beyond the EU is a crucial element for the competitiveness of European enterprises and public institutions.

The development of stronger incentives structure for the voluntary approach towards Lisbon and ERA

In the current European Union construct, the governance of the transition towards the knowledge society embedded in the Lisbon process can only rely on a voluntary approach. The challenge with all voluntary approaches is how to encourage anyone to take action. So far, the Lisbon process has emphasized a very soft approach – make every actor aware of the European challenge in the global competition and it should be obvious to them that they need to act and if and when they want to act, they can make use of the many instruments and initiatives provided by the Commission and Member States. But this voluntary approach has shown obvious limits. To make the current voluntary approach stronger, one **needs to add a stronger incentive structure** to it.

The stronger voluntary approach would be based on the following elements: a common vision, a strategy with an adequate incentive structure, and an appropriate governance system.

A common **vision** is already in place as part of the Lisbon agenda; while the vision for ERA would arguably need to be developed further (Georghiou 2008).

An appropriate **strategy** would be based on three key elements. First, equal opportunity for all should be made possible through the establishment of shared platforms and learning processes: this is already in place, but there is a need for reinforcement and professionalization. Second, sufficiently a strong incentive structure would need to be put in place to encourage the most capable actors to take leadership and act as change agents: this is only starting to emerge. And third, support need to be available for those left behind. This is the role of specific cohesion policies: even more emphasis is needed on knowledge-related policies in the future.

A robust **governance** system would include features such as: strong strategic intelligence to allow continuous learning and redirection of policies in a changing environment: this is currently not strong enough (see next section); competitive approaches for identifying leading actors, empowering and facilitating them to act as change agents: this is emerging; appropriate incentive structure to drive change towards the common vision: this is emerging; and support and encouragement for policy experimentation: this is emerging.

While the stronger voluntary approach calls for changes in the current governance of the Lisbon process, many of the necessary changes are already emerging. These features simply need to be more openly recognized and strengthened.

Incentive structure refers to a mix of incentives put in place at the same time to make reaching the objective even more desirable. While some of these incentives can be based on hard policy measures, most of them should support the voluntary approach in the Lisbon context. The most appropriate incentives are likely to be ***recognition***, ***additional resources*** and ***power through leadership***. Other soft incentives might include access to policy design and strategic intelligence processes, regulatory flexibility, etc. However, even hard measures should not be excluded, especially in contexts like common markets, lead markets, IPR or mobility.

One of the most powerful ways of driving change is **creating change agents**, i.e. identifying actors that given the opportunity and power are able to initiate and lead changes. This typically requires an incentive structure which combines recognition and additional resources with empowerment. Good examples of this are emerging in the form of JTIs and ERA- and Inno-nets, where the Commission is recognizing the most promising consortia and empowering them and giving them additional resources to take action that is in line with both Lisbon and one of its main tools, the ERA. Some of the characteristics of change agents in the context of Lisbon agenda are:

- committed to reform
- committed to intra-European
- able to learn
- able to lead by example
- innovative
- willing to experiment
- willing to take risks
- able to tolerate failure
- effective and efficient in implementation.

Needless to say, these are not typical features of public organizations. It is therefore likely, that many of the change agents are going to be private actors. Intelligent incentive structures can be put in place to encourage actions from private actors that support the Lisbon process and objectives. This will also create a fertile ground for advanced public-private partnerships by bringing private actors closer to public actors through highlighting common objectives.

The dynamics of incentive structures should not be forgotten either. The incentive effect should change over time to allow optimal impact. At the initiation stage, the incentive structure should create a valid promise of recognition, additional resources and empowerment. The launch stage should be selective, but not too selective to allow for sufficient experimentation. The implementation stage should include sufficient strategic intelligence (evaluation, monitoring, foresight, assessment, etc.) and performance criteria. The exit stage should include plans how to exit from poor performance as well as good performance. It should also include plans how to document and transfer relevant experiences. All of these should be transparent as

early as possible to provide a sufficiently predictable environment to allow for experimentation.

Mutual learning and experimentation platforms are already in place (cfr. ETP->JTI, ERA-Net, Inno-Net -> ERA-Net plus, EIT, Pro Inno Europe and Europe Innova, etc.): the strategic approach to these networks and platforms can be reinforced with common vision and strategy describing the role each of these play in the wider context of the governance of knowledge related policies in Europe. Based on the previous, clear success criteria and exit plans would need to be put in place for both those that do not meet with their objectives and those that do. Improved design of the instrumentation for these platforms and networks, including all different types of instruments will need to be searched. Identifying and assigning leadership to actors themselves combined with the appropriate incentive structures would also be necessary. Finally, combining experimentation and strategic intelligence is at stake, with more emphasis on developing new methods for evaluation, foresight, monitoring and assessment to the more advanced platforms and networks.

The open innovation reality needs to be firmly integrated into knowledge policies

Today, European companies are challenged in their traditional innovation processes due to the following new requirements:

- The need to use **multidisciplinary approaches** to deal with system complexity. Speeded up by emerging technological convergence, requirements for larger system design, and new application fields, the probability to base new products on in-house technologies only becomes very low;
- The need to create and deliver solutions for real or potential customers within **shorter delays**. The pace of technological change makes the use of internal teams for complex product development an obsolete option. It becomes more and more relevant to join forces with other institutions, and such partnerships for specific purposes need to be created in relatively short time;
- The need to increase **organisational flexibility** to reduce costs and to adapt companies to new markets and regulations. The consequence is a rich emergence of more agile organisations where the core business (with some key technologies) is retained while other non-crucial aspects are externalised or approached on a cooperative basis. Under this approach, companies intend to identify what are or should be the key knowledge they must possess in-house and, simultaneously, to build a network of external partners or experts to be used on demand.

Three types of open innovation models can be identified: subcontracted, cooperative, and open community. All of them could coexist in a given company or private entity:

- Subcontracted innovation model**.** Within this innovation model, research and development needs of a company (contractor) are subcontracted to another company or to a public research centre or university. It corresponds to the well-known model of contract research widely used for companies in the past decades;
- Cooperative innovation model. This innovation model – also known as consortia-based innovation – is based on the need to share knowledge, risks and benefits amongst a set of individual “partners”, both public and private. This model is widely supported by public administrations, aware of the beneficial spill-overs on society;

- ∞ Open community innovation model. This is an emerging innovation model based on open patents, publications and stimulation to others' innovative solutions. In this model, different actors post their solutions looking for acceptance and reuse. Sometimes, they compete with other "open communities" proposing other type of solutions. Benefits come from a very rapid evolution of the field: as a result, the economic advantage for early adopters is higher.

The consequence of these evolutions on the strategic positioning of private companies is that **innovation is addressed by combining knowledge from several entities. This is the basis for "open innovation" model, which needs to be fully reflected in policies.**

Although all these three types of open innovation models can be implemented by involving different types of private companies only, it is common to find public research organisations (PROs) involved in these kinds of partnerships.

In most cases of cooperative open innovation models involving PROs, they are only focused on national entities due to the legal and mentality barriers existing at national level to allow funding of foreign entities. Nevertheless, trans-border approaches are slowly becoming more common in cases where different governments agree to act along the same lines and some symmetric behaviour (not necessarily funding) is in function. One can observe cases where PROs belonging to different European countries are starting to join forces by creating different legal structures or simply signing formal agreements to impulse convergence in their research agendas, and a strengthening of their positions to capture European or inter-governmental funds. Incentives from the European Commission around networks of excellence, large research facilities, or bilateral or multilateral agreements amongst several Member States indicate the need to give more stability to research co-operation.

According to the PRs, **there is an increasing emphasis on long-term and more institutionalised forms of public-private collaboration in R&D**. While there are various underlying motivations for this, one aim is indeed to create environments more conducive for open innovation. Still, structural reforms in public systems are addressed in the majority of PRs from the knowledge transfer perspective, while the full adherence to open innovation would rather require a shift of perspective towards sustainable knowledge sharing and mutual learning models. It seems that the consequences of open innovation are not completely adopted by Member States in formulating reforms in public research organizations.

Most of the policy measures presented by Member States target PROs and Public-Private Partnerships (PPPs). As a result, PROs are increasingly required to address strategic needs defined by industrial sectors both from the education and research standpoint. Many countries rely on the reform of traditional structures of PROs by creating specific centres of excellence (or competence) to ensure long-term partnerships. These centres are typically connected to "sectoral clusters" in order to facilitate exchange of expertise and innovation although provisions to facilitating joint public-private management are not always explicit. Patenting is used as an indicator of relevance of research by PROs. PROs use several mechanisms to establish long-term partnerships like joint research centres, enterprise-university chairs and new start-up companies. Many governments are trying to optimise technology transfer structures, especially those targeting the creation of new technology based companies from public institutions and licensing technology to industry. The specific needs of SMEs in traditional sectors are also recognised in this context. Clusters and S&T parks continue to be supported in many Member States. It seems also that more emphasis is being placed on regional "knowledge clusters" instead of conventional S&T Parks, although it introduces a critical governance problem. PRO-industry

cooperation and mobility are stimulated by governments with specific policy measures by emphasising institutional involvement in open innovation.

Member States are thus taking manifold steps likely to foster open innovation practices in companies. However **there are structural, institutional and cultural rigidities that still hinder these developments**. The problems relate notably to research exclusivity and IPR issues, which can create barriers for cooperative endeavours; to conflicting objectives for PROs between support of national industry and insertion in global excellence research networks; to lack of effectiveness of structures created with the objective of fostering PPPs; to outdated rules and incentives within PROs which need more flexibility for hiring and conducting research; to mobility barriers for PROs staff involved in spin-offs, etc.

Deeper understanding of the conditions of success for such policy efforts, more and better views on effective results obtained (in terms of real co-generation of knowledge), are needed to support such policy developments.

Shifting knowledge policies towards the demand side will help increase their contribution to knowledge and growth

There is growing awareness among experts and policy makers that **boosting demand side research and innovation policies can help to stimulate innovation-based economic dynamics and growth**.

A problem with traditional views of research-based innovations, is that, often, technologically "mature" innovations don't achieve a market breakthrough or don't spread quickly enough (Edler 2007):

- ∞ High market entry costs may threaten first users of innovations since they would have to cover part of the manufacturer's development and learning; innovation customers are not adequately informed about the benefit, safety or reliability of new products, hence early users bear a greater risk. Here public policy can act as a risk-taker: the state can lower transaction costs by timely use of an innovation and demonstrating its use or by setting financial incentives;
- ∞ A radical change in technologies is often retarded by lock in-effects and path dependencies: since "old" technologies work with specialised infrastructures and complementary products, users of established technologies are "locked in" – breaking out these trajectories is costly and needs strong incentives;
- ∞ Products whose consumer benefit grows with the number of users (such as telecommunication) are initially less attractive and run the risk that the network effects will not occur; inadequate interaction between demanders and manufacturers may hamper innovation. State policy (such as foresight exercises) may help users to communicate their needs clearly to potential producers or collaborate with them on innovative solutions, thus facilitating the emergence of innovations for which a promising market exists.

Here, demand-side policies, defined as a *"set of public measures to induce innovations and / or speed up diffusion of innovations through increasing the demand for innovations, defining new functional requirement for products and services or better articulating demand"* (Edler 2007), can help boost innovation from another angle than traditional supply-side policies.

In contrast to supply-oriented innovation policies (R&D subsidies etc.) demand-oriented policies are in most cases not administered by research or "innovation" ministries, but by governmental departments responsible for issue areas such as environment, consumer, energy, ICT, health, defence, transportation, etc. **Those**

policies are problem and issue-driven, they are set up to make consumers save energy, use advanced ICT, take advantage of efficient home building materials etc. Their considerable leverage potential stems from the development and diffusion of innovative products and services, as a higher demand will push producers in the innovative directions and make them invest in innovative activities. This leverage potential could play an enormous role for the achievement of the Lisbon objectives.

Due to their problem-driven nature, demand side policies are hardly addressed in NRPs and PRs. However, it remains open whether Member States don't run demand-oriented policies or just don't report on them. There is evidence from other sources that more and more Member States are broadening their scope of demand-oriented policies towards research and innovation, hence contributing to Lisbon objectives. **The challenge would be to integrate these explicitly in a strategic knowledge policy framework.**

The focus of the few demand-side measures reported in NRPs and PRs, as relevant for knowledge policies, is on public procurement and private demand supporting in ICT and (renewable) energy technology. Other potential growth areas like health technology and services, advanced environmental friendly transportation, are less frequently covered in the PRs. Also, regulation (and standards & norms) as an instrument of demand-based research and innovation policy are hardly mentioned in the reports. The concept of lead markets, combining demand and supply oriented policies, is not explicitly addressed either.

A basic bottleneck for a greater impact of demand-oriented innovation policy is the lack of awareness and readiness in sectoral ministries. These policies are indeed often delivered by other ministries than S&T ministries, hence **reinforcing the need for systemic views and coordination**. Demand orientation has the highest leverage when combined with sectoral policy goals. There is hence a need to mobilise sectoral ministries and agencies for the innovation dimension. This calls for new innovation policy governance, which gives more room to horizontal coordination between the various Ministries and Agencies involved.

The need for a systemic perspective in knowledge policy

The previous discussion has addressed four main topics: the challenges for the governance of research and innovation policy, the necessary trend towards internationalisation of R&D and innovation policies in Europe, the idea of open innovation and its policy translation, and the shift towards demand-oriented policies. Those four topics are intimately linked.

Given the new trends in private sector R&D generated by globalisation, and the small scale of individual European Member States, long-term public-partnerships for innovation, involving a critical mass of specialised actors, need to be seen in an international perspective. Hence, they are naturally conducive to a shift towards "intra-European" initiatives, helping policy makers in Europe to climb up the Europeanization staircase for policy.

Developing demand-oriented policies represents a rather radically new approach for conducting R&D and innovation policies, distinguishing it from the traditional supply-push policy approach. To conduct such new policies, which are geared towards the satisfaction of societal needs in various areas, it is essential that the governance of innovation policy is organised so as to foster inter-ministerial and inter-agencies coordination. Policy instruments from various policy areas need to be integrated in a

coordinated way, which calls for new governance structures able to break a currently fragmented policy landscape.

New policy instruments, such as cluster-type policies, inspired by the open innovation concept and conceived in a demand-oriented context, cannot successfully be implemented without the support of sound monitoring and evaluation practices. As new, experimental approaches, their effectiveness needs to be tested against results and impacts. This requires a lot of strategic policy intelligence, to build up new concepts, new indicators, new methods to assess relevance and effectiveness beyond traditional methods.

This calls for **a new conceptual model to underpin the design of open and systemic knowledge policies**. The following section presents such a model.

3. Towards open and systemic knowledge policies for Europe

NRPs, PRs and other governance processes established under the Lisbon strategy, such as the OMC, represent **a new approach in the European research and innovation policy governance –** an approach that is owned and driven jointly by all Member States and the Commission. It is based on building shared understanding and commitment and it emphasises joint efforts and mutual learning – all of which are characteristics that are becoming increasingly important in research and innovation governance globally, both in the private and in the public sector.

The Lisbon process should therefore be seen as a unique opportunity to modernise and strengthen intra-European research and innovation policy governance. The uniqueness is not in the preparation of guidelines, programmes, reports and other documents. It lies in the governance processes, i.e. the way in which the discussion, interaction and work is organised and conducted in order to facilitate participation, openness, transparency, mutual understanding and eventually shared commitment, and in **emphasising a goal-oriented approach to policies to boost the necessary structural reforms.**

The new approach adopted in research and innovation policy governance in the context of the Lisbon strategy could prove to be a true innovation, provided that the Member States and the Commission seize this opportunity. The re-launch of the Lisbon strategy in 2005 presented new opportunities by **suggesting a systemic approach to policy and requesting a close interaction between knowledge-related policy domains** which historically had developed in isolation.

To reach the Lisbon and ERA goals, the development of effective systemic policy mixes for the knowledge society will indeed be crucial. Policies related to the Lisbon strategy would have to take into account the links between economic growth, innovation, competitiveness, sustainability and social development. Such a holistic notion of policy making would incorporate the interdependence between general and more sector-specific measures. Without an integrated view of educational and life-long learning policies, of research, infrastructure and innovation programmes, no progress seems possible in any of the individual sectors of the economy. This widens the range of stakeholders that should be invited to participate in the design and implementation of knowledge-related policies, and who should also be committed to the related strategies and actions. Without **commitment of all stakeholders** no new impetus to development can be expected.

As mentioned above, using a systemic approach to policy-making involves overcoming three main types of policy fragmentation: vertical fragmentation between the various levels of actors in charge of designing and implementing knowledge-related policies; horizontal fragmentation between the various instances in charge of developing knowledge-related policies at one level; and temporal fragmentation.

A systemic approach to policy-making would thus involve the development of coherent "**policy mixes**", understood as the combination of policy instruments – including rules, regulations, organizations, programmes, etc. – from various policy domains, and from various government levels, which together contribute directly and indirectly to create more favourable conditions for creation, transfer and use of

knowledge in the pursuit of knowledge-based Europe. Today, such a coherent development of policy mixes is still in its infancy.

In addition, the need for a progressive development of intra-European approaches to knowledge policies, to fulfil the ERA and Lisbon goals, has been put in evidence.

These systemic and open approaches for knowledge policies in Europe need to be based on a new conceptual model.

A new conceptual model for open and systemic knowledge policies

R&D and innovation policies need to adapt themselves to a very dynamic context where their role and goals are strongly dependent on the evolution of the economy and society. The consequence is the need to deal with uncertainties and fuzzy systemic and competence borders in policy-making as well as fast variations in inter-dependences. What is needed for the future is to reduce the policy fragmentation described above, and to introduce additional flexibility in policy design and implementation.

More specifically, it is necessary to define **a new conceptual framework overcoming national and regional boundaries**, which is able to describe the configuration of "European Areas" such as ERA, according to a **multi-level, multi-domain and multi-instrument landscape**, and at the same time provide a framework for designing **systemic, holistic and dynamic policy approaches**.

A "European Area" can in fact be displayed along three dimensions:

- Knowledge-related **policy domains**: science and education; research; technological development; innovation and markets; societal (including environmental) needs and public goods;
- **Levels** of relevance and action: Member State; European Union; region; "intra-European", i.e. bi- and multilateral cross- Member State initiatives of national or regional actors; global cooperation;
- **Instruments**: shaping of the institutional setting, including financial regimes; targeted policies and programmes; regulation, reaching from intellectual property rights to professional career rules; "soft tools" such as OMC.

Figure 2 schematically depicts the idea of interaction along these three main dimensions.

In a fully-fledged European research and knowledge area, activities of science, research and education organisations, industrial and service companies, and public policy agencies would develop irrespective of national borders. They would rather be driven by a combination of requirements of thematic knowledge dynamics, demand and markets, institutional environments, and targeted public policies, called a **"knowledge configuration**" (Larédo 2006;'Larédo & Kuhlmann 2007). Knowledge configurations evolve at the intersection of developments in knowledge production, transfer, and utilisation on the one hand, and different domains, levels of action and policy instruments involved on the other. They are driven by knowledge dynamics, an inherited but evolving institutional setting (traditions, techno-industrial dynamics, market characteristics, user behaviour, and regulation), actor strategies, and coordination mechanisms including specific mixes of public policy measures. Within different configurations, specific policy instruments, such as national or regional institutes and programmes, European programmes (including ERA-NET, ERA-NET+, Article 169, …) and mixes of instruments across levels, play different roles in configurations and shape them differently. The graph visualizes the 'space' to define

and implement policy mixes from an 'intra-European' perspective, including policy design, strategic intelligence, implementation, evaluation and learning.

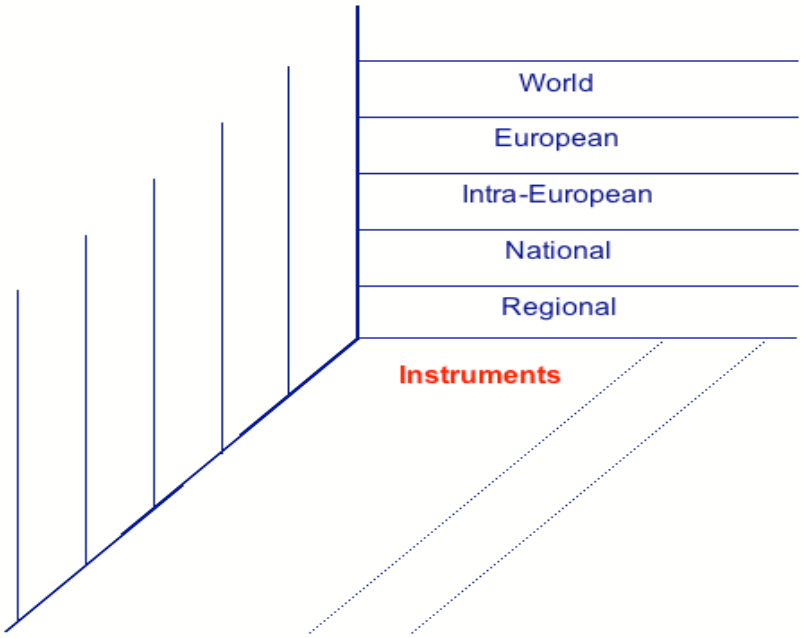

Figure 2. European Research and Knowledge Area: A Multi-level, multi-instrument and multi-domain landscape, a three-dimensional relationship

Adopting this perspective has implications for an 'advanced' ERA: **different knowledge dynamics evolving in different 'configurations' will require different policy mixes.** Policy development in Europe might miss the point if it does not take into consideration the historically quite specific dynamics of thematically different knowledge configurations, embodied in variety of inter-linked organisations that drive the governance of R&D and innovation, within and across national and regional systems.

As a consequence, the traditional EU subsidiarity policy model appears too mechanic. In socio-economically relevant fields purely national policy approaches fall too short while, at the same time, also 'federal' policy approaches (like the Framework Programme) don't suffice any more: new mixed 'intra-European' institutional settings and policy approaches are likely to be needed. Both experts and policymakers have to acknowledge such dynamics and understand them better if they want to develop effective policy approaches towards the Lisbon targets.

New knowledge dynamics configurations must be considered being aware of:

- the increasing value of **multidisciplinary knowledge** (integration of knowledge from different scientific domains);
- the presence of **new "institutions"** (promoted or supported by the EC such as ERC, EIT, Technology Platforms, …) that are more than initiatives based on the coordination of national actors and that should contribute to the development of future knowledge dynamics;
- the emergence of **new forms of knowledge creation, transfer and utilisation,** making existing configurations and instruments obsolete . Particularly relevant is the challenge introduced by the increasing role of virtual end-user communities in knowledge processes.

As a consequence, it is crucial to start thinking about a **European Knowledge Area** and not to limit ourselves to the ERA concept as it was defined since 2000.

The need for enhanced policy intelligence

When following such new conceptual approaches, it become obvious that policy-makers cannot rely on a one-size-fits-all R&D and innovation policy portfolio to be implemented in standard manner. Instead, **policies need to be tailored to the needs and characteristics of specific knowledge configurations**.

Furthermore, there is path-dependency in policy-making, meaning that not all policy approaches can be imported and implemented directly, but instead need to be combined with the existing policy context and history. Hence, the composition of the policy portfolio, the balance between policy instruments, and the design and mode of implementation of instruments, are all crucial for the effectiveness of policy action. As a result, the **governance aspects – focusing on strategic capabilities and on effectiveness of policies- are at least as important as quantitative issues** (such as increase in funding allocated to R&D and innovation in public budgets) or the presence of several specific types of instruments in policy portfolio.

To conduct strategic and effective policies and support reflexivity throughout the whole policy cycle, policy-makers need to rely on **tools to assess the relevance and impacts of their policies**. The use of quantitative indicators is one typical response to this need: they can be used at the diagnosis stage, either to discover or to confirm trends and issues; they can be used to define objectives at the stage of priority setting, at the stage of instruments definition, and at the monitoring and evaluation stages. Quantitative indicators are typically also very easy to communicate, which makes them ideal for political purposes – both in good and in bad. At best, quantitative indicators can be used as understandable tools to indicate strong commitment to complex issues such as knowledge-related policies. At worst, they can be used as simple measures of success or failure or oversimplification of complex multi-dimensional issues. A set of complementary indicators would serve as proxies to a complex reality, while summary or composite indexes are used for communication and awareness-raising purposes. As the value of quantitative indicators is limited, they need to be supplemented by more qualitative analyses rather than being used in a mechanistic fashion. Regular, independent and learning- and impact-oriented evaluation practices are crucial to feed the strategic policy-making practices.

More important than specific indicators or types of indicators is the role and interplay of various processes related to strategic intelligence, i.e. gathering and analysing knowledge necessary for improving the effectiveness and efficiency of the design and implementation of knowledge-related policies in the complex environment of knowledge configurations. Most of these processes are either ad-hoc or detached from other strategic intelligence processes. This often results in separate consecutive or parallel processes, which at worst end up with inconsistent analysis serving the motivation and interests of different lobby groups. There is a need **to better integrate strategic intelligence processes and make them more systematic and coherent over time.**

Most typical and often used tools for strategic intelligence are various types of evaluations and foresight exercises. The problem with most evaluations is that they are typically instrument-based, narrow ex-post snap-shots, overlooking the true characteristics of the relevant knowledge configurations and especially their dynamics. In order to develop evaluation to better support systemic, holistic and

dynamic knowledge-related policies, **there is a clear need to introduce or strengthen four key elements in evaluation practices**:

- systemic and holistic approach to capture the real phenomena in true knowledge configurations, instead of looking at randomly limited set of instruments and actors in a geographically limited space;

- goal orientation to capture the impact of the policy mix instead of a single instrument and at the same time to allow more insight into the true nature of knowledge configurations and innovation systems;

- impact modelling to capture the processes through which the eventual impact of policy intervention actually takes place either verifying the original rationale or challenging it to reveal new rationales important for future policy design and implementation;

- dynamic approach which focuses on processes and impact mechanisms allowing faster feedback, quicker corrective steps to be taken to improve policy effectiveness and efficiency, and continuous learning.

Foresight activities are powerful instruments in enhancing common understanding of the key challenges and how innovation systems can react to them. But foresight should not just be seen as exercises to identify survival strategies. Future is not just happening, it can also be shaped. Furthermore, foresight activities often have an inbuilt inconsistency. They increasingly invite wider stakeholder participation, but focusing mostly on technology foresight, the outcome is targeted to professionals and policymakers, leaving the wider stakeholder groups in the society outside the implementation and thus emphasising the division between them and professionals. **Foresight activities could therefore be strengthened** by:

- widening their focus to capture more socio-economic and even cultural aspects and thereby to bring the process and its impact to a wider audience instead of just knowledge professionals, which would most likely help build stronger political commitment;

- making them more proactive to move from reactively identifying survival strategies for predicted pre-determined futures into identifying approaches to proactively shape the future e.g. through managing perceptions;

- integrating them better into policy-making at all levels to enhance common understanding of the key trends, challenges and opportunities among all stakeholders, including the wider population of end-users and citizens.

4. Conclusions and Recommendations

Eight years after its first launch, and three years after its re-launch, the fate of the Lisbon strategy still lies between success and failure.

This report has identified several challenges linked to knowledge policies governance, which prevent further dynamic and mutually reinforcing implementation of the Lisbon Strategy and the building of ERA. This section reviews them and provides recommendations to Member States and the European Commission for the development of appropriate knowledge policies in Europe.

The four challenges identified by LEG for making the Lisbon strategy a success are:

1. **Linking Lisbon and ERA**: Knowledge needs to be re-introduced as a driving force of the Lisbon strategy and ERA needs to be integrated into the broader policy agenda of the Lisbon strategy

2. There is a need for further support for policy experimentation within a new conceptual framework for knowledge policies: this calls for more **strategic policy intelligence**

3. To evolve towards more "intra-European" perspectives in knowledge policies, the **Costs of non-ERA and the benefits of ERA** need to become more visible

4. There is an urgency to design and implement **more efficient Community and Member States policy mixes**, with variable geometry approaches

From these four challenges, the following recommendations are proposed:

1. Linking Lisbon and ERA: Knowledge needs to be re-introduced as a driving force of the Lisbon strategy and ERA needs to be integrated into the broader policy agenda of the Lisbon strategy

Knowledge and innovation should not be seen as separate objectives in the Lisbon context. They should be at the very core of Lisbon process. The whole mix of knowledge-related policies have to be designed to address the needs of real knowledge configurations instead of focusing separately on single isolated challenges or geographically limited spaces. Knowledge-related policies need to be brought at the forefront as key drivers of the economic and societal reform agenda.

With the revision of the Lisbon strategy in 2005, R&D and innovation policy are less clearly put at the forefront as key drivers of the economic and societal reform agenda. There is insufficient integration between various knowledge-related policies and measures. There is no clear **leadership** for that broad policy area and hence policy making still suffers from **lack of commitment** and subsequent **fragmentation** between traditionally defined policy domains.

The Lisbon process calls for serious **modernisation and strengthening of intra-European R&D and innovation.** On the other hand, the Lisbon process should be seen as a unique opportunity to reform the European R&D and innovation systems. Without successful implementation of ERA, the objectives of the EU, set forth in the Lisbon strategy, may be seriously jeopardised. Hence ERA should be considered as one cornerstone for the European knowledge society and a core element of the Lisbon strategy.

To succeed in this ambitious plan, Member States and the European Commission should develop joint thinking between policy domains and across policy levels and adopt a more strategic and integrated approach to deliver more efficient policies. A **systemic view of R&D and innovation** as key drivers of economic growth and development needs to be embedded in policy-making. This does not mean that ERA should be diluted into the broader Lisbon; on the contrary, specific targets and progress on ERA construction could be annually traced in all Member States. This "ERA" chapter could explicitly appear as part of the PRs.

More energy should be directed towards designing a European vision on development of ERA within the framework of the Lisbon strategy. From the perspective of R&D and innovation policy governance, the challenge here is to define tools enabling a joint vision across borders and across policy levels on ERA development and in addition to this the **governance of change and transition,** rather than the governance of established systems.

REC1: *The Council should emphasise the* ***knowledge dimension*** *in all Integrated Guidelines as a horizontal issue, rather than constraining it to IG 7 and 8. For that purpose, specific knowledge-based elements should be integrated in all IGs and be tackled in NRPs and PRs preparation.*

REC2: *The ERA construction process should be* ***annually monitored*** *through specific platforms and procedures for review and evaluation, with appropriate indicators, using coordination instruments to align and discuss progress made with Member States.*

REC3: *In order to assess progress in the ERA construction within the Lisbon framework, Member States should* ***increase the ownership and enforce coordinated responsibility of ERA activities*** *in order to avoid confusion and horizontal fragmentation in the design and implementation of related policy measures.*

2. Intra-European initiatives require leeway for policy experimentation: this calls for more strategic policy intelligence

In the field of research and innovation, the Lisbon Strategy and the ERA initiative represent a **historical policy experiment** (as relevant as the introduction of Framework Programmes in the mid 1980s), stimulating many research and innovation policy actors in the European multi-level system to invent and test a variety of experimental exercises, not the least dealing with or affecting policy governance. Much of this experimentation has a focus on **Intra-European policy** efforts, creating attractive and productive research and innovation environments.

Relevant governance **dimensions** are of a **systemic** and of a **multi-level** character, and they can cut across **different** types of policy targets and **instruments** like border-crossing **multilateral research centres** or **multilateral funding programmes** in relevant thematic fields. Any ambitious policy experiment needs to come along with

variation (leaving room for diversity across knowledge configurations)**, learning and exit options**.

Observation, comparison, and cross-analysis as a condition of policy learning and revision require **'Strategic Intelligence'**. This can partly be acquired from existing statistics and socio-economic research. At the same time we are witnessing unprecedented, new governance and knowledge dynamics that cannot be measured and analysed with conventional approaches and methodologies. While in a first step it is appropriate to leave room for exploring new policy approaches, in a second step, there is a need to carefully observe, evaluate and compare the variety of policy and governance options developed since the start of the Lisbon Strategy and the ERA initiative and to assess their validity in specific contexts.

Policy-makers need to be able to create a link between national innovation systems diagnosis, the definition of overall strategic goals and priorities, and the elaboration of instruments responding to the stated priorities. The **presence of full and integrated policy cycles** is required: this includes diagnosis, priority setting, instruments definition, instruments implementation, assessment of results, and feedback loops between all phases of the cycle.

In the current European Union construct, the governance of the transition towards the knowledge society embedded in the Lisbon process relies on a voluntary approach, which shows limits. To make the current voluntary approach stronger, one **needs to add a stronger incentive structure** to it. LEG suggests a threefold strategy towards a reinforced incentive structure: (1) pushing for faster change by allowing **variable geometry** and facilitating and empowering **change agents**, (2) providing common **platforms** facilitating learning, networking and common action, and (3) managing the negative effects of the transitions through **cohesion policies**. If the incentive structures are stronger and support leadership of the change agents and leading actors, the role of cohesion policies become increasingly important in ensuring sufficient catching up by the followers and those lagging behind.

Within the framework of NRPs, a specific issue relates to the impact of the **OMC process as a learning device**: is it visible in the design or implementation of the R&D and innovation policy mixes? The "soft laws" of OMC can be translated in trans-national policy learning, policy coordination, or even policy convergence and joint policies with minimum effort; nevertheless, it implies a cultural change for policy makers. "Intelligent benchmarking" taking place thanks to the OMC setting (or through other channels) could be expanded by learning from non-EU countries' experience.

Learning means to understand, to do better, and where necessary to revise structures and activities: hence there is a need to establish **exit options** when policy analyses detect a need for change. In light of achievements and experiences, and based on systematic observation, evaluation and comparison, the Council and the Commission should carefully prepare and launch a serious political debate of accomplishments and pitfalls of new instruments and governance practices tried and tested during this historical experimentation phase.

REC 4*: The Commission should continue to provide* ***platforms for experimentation*** *– such as OMC, ERA-Nets, TPs – and stimulate Member States to join in. Member States should engage in* ***mutual learning practices*** *especially for demand based and open research and innovation policies. Policy experimentations need to be supported by innovative regulations and impact assessment embedded into larger evaluation procedures.*

REC 5*: Member States and Commission should facilitate the development and maintenance of advanced* ***Strategic Intelligence capacities*** *(organisations, networks, databases, human resources). The Commission has started to strategically observe developments (through analysis of NRPs, use of 'Expert Groups', ERAWATCH, …); such efforts should be professionalised and complemented by Member States (improved) observation and evaluation activities.*

REC 6: *Member States and Commission should commit themselves to launch experimental initiatives with* ***serious exit options****. An organised political debate on achievements from the experimentation phase should be completed by 2010, and should result in a sober revision of the policies developed, identifying bad and highlighting good experiences.*

REC 7: *Member States should explicitly state in their NRPs:*

- *The overall* ***vision and strategy*** *for research and innovation to be pursued according to the Lisbon process and in the evolution of the national research and innovation systems by emphasising internal policy learning.*
- *The planned strategy in translating the vision into prioritised policy* ***measures****.*
- *The way to assess* ***effectiveness*** *of reforms and measures, beyond administrative reporting, using targets and indicators whenever relevant and possible, as well as external evaluations.*

3. The Costs of non-ERA and the benefits of ERA need to become more visible

A clear hindrance in establishing the ERA has been that the costs of non-ERA and benefits of ERA are not readily visible to national policy-makers, since they are not calculated and not easy to demonstrate to their electorate. Societal benefits from research are mostly indirect and difficult to measure in general, and this is further compounded by the complexity of measuring national benefits from operations spanning across several national borders. What is worse, there might even be costs of ERA, or benefits of non-ERA, that might be more visible to national stakeholders, if e.g. Europeanisation of R&D and innovation policies would entail displacements of some of their national capacities to places where the synergies could be more fully exploited.

The costs of non-ERA are obvious where national borders are too narrow and a supra-national dimension is needed for carrying out research activities, requiring competencies and a critical mass of investments not available at the national level. The costs of non-ERA might therefore be more easily visible for small countries, which with ERA have the opportunity to participate within the larger framework of European-level R&D. For lagging behind countries the benefit will depend upon the development level of their science and technology systems and their capacities to take advantage of the ERA-related opportunities. Furthermore, the cost of non-ERA lies in the consideration of spillovers from specific RTD investments to other sectors and for socio-economic goals and consequently to non-achievement of the Lisbon strategy goals. **The promotion of ERA should be based on a systematic highlighting of these costs and benefits** and contribute to an increased commitment to ERA as well as to the Lisbon strategy.

By establishing new cross-border policy experimentations **on a voluntary basis, with variable geometry, and in stepwise mode**, benefits of ERA would become more easily visible. The concept of variable geometry does not mean division of countries according to their size or level of development, but strictly and only according to common interest and commitment.

REC 8: *Member States should be encouraged to favour **trans-border bilateral and multilateral research and innovation platforms,** as opposed to pure national ones, as a mechanism to integrate scientific or technological communities of several European countries on a stable basis (e.g. as JTIs have started to do or EIT could do in the near future). This will support the development of stronger knowledge configurations in Europe, and provide the basis to demonstrate benefits of ERA from a pragmatic approach.*

REC 9: *The Commission should facilitate the creation of **bilateral or multilateral R&D programme structures** to visualise at the national/regional level the support to pan European research activities. An evolution of instruments like ERA-NETS + to cover common infrastructures could also be explored.*

REC 10*: The Commission should reinforce the guidelines for reporting on Lisbon strategy to:*

- *Include and visualise the differentiation between National, Intra-European, European and International perspectives and related policy measures;*
- *Place more emphasis on policy impacts, and include the improvements of coordination procedures, especially the OMC. This should include expanding the OMC to cover intra-European policy measures.*

4. There is an urgent need to design and implement more efficient Community and Member States policy mixes, with variable geometry approaches

A fundamental challenge for policy makers is that of selecting **the most appropriate mix of instruments** for realising the ERA and Lisbon visions, notably instruments used at the Community level in support of national and regional actions. The question of policy mix, that is now becoming a hot issue at national and regional level, will need to be extended to incorporate interactions with EU instruments. The aim would be to identify the most appropriate combination of instruments in each context and for all knowledge configurations, able to contribute to the broader ERA and Lisbon objective, by using past experiences, notably with the combination between Structural Funds and other instruments.

Being effective in building the ERA will increasingly require a **flexible approach**, taking into account the specific needs of different actors and sectors and using different types of instruments where they are most appropriate. Room should be given to approaches of a **truly variable geometry**, with policy experimentation, evaluation and continuous learning, being essential ingredients of the construction of the ERA policy portfolio, as argued above. This last point is a crucial one: without specific mechanisms to **assess effectiveness of policy and policy mixes**, the whole process of research policy coordination cannot develop on a reliable basis. This process should increase flexibility in the implementation process to adapt them to specific needs and levels.

Appropriate mixes of policies would need to consider the adequate **combination** of instruments at a given level, but also the division of labour between the various levels in charge of developing knowledge policies. An open and constructive discussion between Member States and the Community on an appropriate division of labour is called for. In addition, an emerging "intra-European" level has to be taken into consideration, referring to policies and measures of ERA and Lisbon that are national in nature but are designed to have an impact on European development. Nowadays, the design and implementation of R&D and innovation policies cannot any more be conducted in a purely national context: opportunities for joint trans-national action need to be identified and capitalised upon; the facts that private R&D activities are organised on a multinational basis, and that public research actors are also increasingly internationalised, need to be incorporated in policy-making.

Especially challenging is the introduction of innovative governance tools to **increase shared commitment** and manage conflicting interests emerging when proceeding to further ERA development at all levels: European versus national, national versus national/regional, public versus private. The governance process should be based on active participation and commitment of stakeholders, particularly if we consider that leading actors are different for the different objectives. New forms of governance need to observe which stakeholders need to be involved, how and when to involve them in the process. Applying variable geometry approaches for intra-European knowledge policies requires rules for inclusion and exclusion of actors, and the identification of win-win situations, helping to mitigate conflicts of interest. The **participation of stakeholders**, would increase the chance of establishing robust concepts.

REC 11: *Member States should identify some **pilot areas of policy action** in which innovative policy mixes (crossing over domains and levels) could be designed and tested for effectiveness.*

REC 12: *The Commission should facilitate and partly finance some specific **variable geometry mechanisms** across some interested Member States implementing multi-level and multi-domain integrated actions (from human resources to infrastructures) by innovative regulations on the basis of Treaty provisions.*

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