



JANUS Workshop

Knowledge Society Development Paths
in Europe

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WORKSHOP REPORT

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1. Executive summary

The JANUS workshop began with looking at the global perspective of economic development patterns with the aim to provide a wider picture of Europe's future and European policymaking. . With R&D at the core of economic activity in the Knowledge Society, it was agreed that R&D policy will play an even more important role in the future. In order to improve the R&D capabilities in Europe, and to overcome the R&D investment gap with the US, the European Union will foster the ERA and aims to increase spending on R&D up to 3% of GDP in 2010. A possible scenario developed by OECD experts presents the Knowledge Society as a learning society, with know how, know why and know who as the growing and predominant forms of knowledge. This scenario exercise helps to identify unthinkable developments as well as a differentiation between possible, probable and desirable futures. Finally, the last key note speaker explained the relation of productivity, ICT production and diffusion with a view to the productivity gap between Europe and the US. This presentation showed that ICT has had similar stimulating effects on the economy in Europe, but that these were compensated by investments in other areas which were less successful.

The first workshop session was concerned with different development approaches and public governance at various levels. The changing power distribution and governance structure in general, and in Europe in particular was discussed. More specifically, the role of regions and even local authorities is becoming more important in attracting investment and people in a global competition of nations and regions. The drivers for these changes are clearly there, but in order to obtain better and more democratic governance in the end, a guided learning process needs to take place. Socio-economic research can provide valuable input to this learning process from a micro, evidence-based and bottom-up perspective. Policy initiatives, including eEurope, need to consider the very unique economic, social and cultural characteristics of regions. Only when building on the specific strengths and reducing existing weaknesses, and provided a deep understanding of values, successful strategies for development can be created.

The second session provided insights into current trends of different knowledge society developments in Europe. The standard regional Information Society model propagates the "copying" of successful concepts and strategies for regional development, including governance. Evidence, however, shows that regions develop their very own and unique concepts, sometimes related to rather circumstantial events or conditions. To create the conditions for competitive knowledge creation and innovation, regions must find the right balance between order and chaos, guided structure and people's creativity. National Information Society strategies vary strongly within the old EU member states, but also within the new member states and between the two groups. Applying a SWOT framework, it can be seen that some countries do not necessarily pursue an ideal and sustainable strategy. Evidence from the new member countries shows that production and usage of ICT lag behind EU-15 and vary considerable between the countries. The development of supportive Information Society policies by governments can have stimulating effects, keeping in mind the local social and cultural context.

In the plenary panel, participants stated the need to refine our understanding of a number of aspects, including public goods, changing boundaries between public, private and civic sectors and transformation patterns into the Knowledge Society. Finally, lacking a clear definition of the latter itself, it was agreed that at least a common vision of the Knowledge Society is needed. Following from this, there was strong consensus that socio-economic research can play a key role in developing this vision.

2. Summary of the JANUS workshop

2.1. *Introduction*

The last in the series of JANUS workshops took place on 21 September 2004 in Brussels. While the earlier workshops focused on specific phenomena of the Information Society, such as eGovernment and the Digital Divide, the final workshop adopted a broader perspective. It looked into different paths or trajectories of economic development in the Knowledge Society today and in the long-run. The central idea of alternative development paths is the possibility that regions, countries or even continents might be better off by pursuing paths of development that are not specifically based on high ICT penetration. In such an approach, they might place less emphasis on the common Information Society pillars, such as ICT infrastructure, eBusiness and eWork. The workshop addressed a number of specific questions:

Where is the Knowledge Economy heading in the long-term?

Using the terms of the theory of long waves in economic development, the current wave or 'Kondratieff cycle' is shaped by ICTs as the basic innovation (also referred to as general purpose technology) and is slowly coming to an end. A new cycle is about to evolve, but what are the most possible candidates for the next basic innovation? Will it be nanotechnology, biotechnology, environmental technology or something completely different? Which will be the industries where the economic dynamism induced by this technology will be felt most? What will be the rising and what the declining industries or even sectors? What will be the needs to be satisfied and what the economic value proposition? The answers to these questions were supposed to provide the global development perspective which provides the framework for country or regional development.

Are ICTs as crucial for economic development/growth as recently assumed?

The second question to be addressed was whether there are alternatives for economic development without placing ICTs at the centre of all economic activity. This encompasses ICT usage as well as production. The questions to be addressed were: Are these technologies as essential in every aspect of life as currently widely assumed in eBusiness, eGovernment, eHealth, etc? Can countries create sufficient economic dynamism in rather low-tech or less ICT intensive industries and sectors? Will those countries be able to keep up with the ICT 'tigers'? Will they become economically dependant on other countries producing ICT products and services?

What are the alternatives to ICT dominated development paths?

The answers to the previous questions raise in turn new questions: If ICTs are not the only trajectory to economic growth in the Knowledge Society, what are the others? Are these strategies sustainable or built on short- term competitive advantages in labour costs or less stringent standards? What are the risks of taking an alternative path?

Is public governance in favour of specific development paths justified, in particular in the domain of ICT?

JANUS is a policy- oriented research project and therefore, the final objective of the workshop was to derive socio-economic policy implications. The discussion focused on the question of whether public governance, in favour of specific technology trajectories, is effective or even useful. How comprehensive do policies need to be designed in order to

achieve results without blocking opportunities for alternative paths to develop? Is discretionary RDI policy justified? But the discussion was supposed to go beyond the issue of public governance for specific development paths. To use the terms of one of the key- note speakers, the main issue is to understand where we need and how to implement **continuity, reform and innovations¹ in policy** to achieve sustainable economic development in the long term.

2.2. Knowledge Society development paths

2.2.1. A scenario for the Knowledge Society

In order to make any assumptions on development paths and recommendations for policy we need to know where we actually want to get to. We need to understand what kind of societal functions, in terms of habits, institutions and patterns of everyday life, might lead to ICT becoming a pervasive technology in the future. Notably, there are two types of societal change: change that refines and consolidates the existing order and change that transforms; both incrementally. It is a plausible hypothesis that OECD countries might undergo such a period of transformation (transition scale change), enabled by ICT and in the end turning ICT into pervasive technology. Yet, what kind of changes are we expecting and how to induce them? What does the post-industrial society look like? Scenarios can help to reveal values and expectations and the possibility for change. For the purposes of summarising the argument, transition scale change can be seen to depend on technological, economic, social and governance dynamism

In a possible scenario, developed by OECD experts over years, the Knowledge Society displays the following characteristics in the four areas of transition scale change:

- new pervasive technologies
- a new dominant system for organizing production and consumption
- a new praxis of identity creation
- a significant jump in the capacity of people to make decisions.

This vision of a Knowledge Society is a learning intensive society because every dimension entails continuous learning. One can track this development by using the metrics designed for national innovation systems: know-how, know-what, know-who and know-why. In the learning society the average intensity of know-who, know-how and know-why (decision making capacity) are higher than in any previous societies.

Imagining a learning intensive society is one thing, getting there is another and this is where policy-making plays a crucial role. However, if this scenario of the learning intensive society is used to benchmark current policies then they mostly fall far short.

To illustrate the power of scenario techniques, consider the following attributes for the Knowledge Society derived from the OECD scenario:

1. There is no need for more university graduates
2. There is no more product market competition
3. The corporate form of organisation is marginal

¹ Miller, Riel (2001) ; Long-run Prospects : Policy Challenges for a World in Transition, OECD Policy Brief

4. Reducing classroom schooling to a minimum is the way to avoid fundamentalism
5. Planning causes failure & fails to reduce risk
6. Adherence to basic common values will become more stringent
7. Internalisation not socialisation
8. Experimentation not administration
9. The wealthiest societies will be the ones with the highest average age

Most will agree that some of these assumptions seem very implausible today, but the purpose of identifying these attributes is to challenge our current thinking of how a society is organized. These attributes are certainly possible, they might be desirable, as in corresponding to what current policy aims at, but not necessarily probable as too profound changes would be necessary that might violate too many interests.

2.2.2. *Diverse strategies in an enlarged Europe*

Turning diversity into competitiveness

Europe could leverage on diversity, if the challenges facing progress towards a European Knowledge Society can be overcome; these can be grouped into economic, political and cultural. With respect to the economic challenge, Europe faces a choice between continuing to give priority to agriculture and industry or moving towards a new economic model of the Knowledge Society. Addressing the political challenge, perhaps the most pressing one at present, involves managing three dynamics in parallel: the integration of new Member States, the modernisation of the European Union and globalisation requiring new forms of multilateral governance. Addressing the cultural challenge requires skills and experience in change management. Part of the cultural challenge also involves strengthening trust and confidence that are essential not only to exchange and communication, but also to innovation.

Europe needs a common vision of the Knowledge Society, but open and diverse strategies in the member states and regions in order pursue this vision.

Different country profiles demand diverse strategies

Comparing new and old EU member states, research has found that ICT production varies considerably amongst countries, as in any other industrial sector. A further differentiation is expected amongst countries in terms of local ICT production. Within Europe, processes of relocation from West to East Europe are underway. As the effects of globalisation increase, relocations are also taking place further east, towards Asia.

The available evidence on patterns of ICT usage shows that the New Member States and Candidate Countries are in a weaker position than the previous EU-15 countries, but that progress is being made.

Among EU-15 countries, a SWOT analysis of a number of countries helped to identify the strengths and weaknesses in the particular national Knowledge Society context. This exercise shows that different countries are currently on very different levels, but also display very different profiles of national Information Societies. Finland for instance, who is largely considered as a very advanced IS, needs to be careful to diversify more in the future, as its strategy so far is largely based on the success of Nokia. This leaves a risk for the Finish

economy should Nokia as a company fail one day. Greece, as a laggard in the IS, needs to first develop a national strategy based on its assets, instead of copying others. Such different national backgrounds have to be considered when developing effective strategies and promoting specific development paths.

A differentiation can be made between countries with pro-active ICT policies favouring specific technology trajectories and the more conservative ones. Considering the three waves of economic development - agricultural, industrial and informational - three possible overall Knowledge Society strategies can be distinguished. First, ICTs could be used to transform previous waves of development (agricultural and industrial) into key competitive sectors. A second strategy is to lead the informational wave by leading in areas of vanguard high technology. A third alternative is to develop a global presence in all three waves of transformation. Depending on the country specific factors strategies must be fine-tuned or altered to achieve competitive advantage. When considering these alternative development strategies, policymakers need to critically ascertain whether public support for specific technology trajectories is useful.

Finally, three emerging trends can be identified that also constitute challenges for Information Society developments in the enlarged European Union. The first trend relates to the social disparities that may be accentuated by Information Society developments. In particular, there is the concern that ICTs are adding complexity to growing regional and social divides. The second trend is demographic and relates to the aging of the European population. Third, globalisation continues to increase competition at the global level.

Building innovative regions

Paradoxically the role of regions has become more important in a globalised world. As investors can choose to invest all over the world or outsource business real-time by using ICTs, the competitiveness of the region has become even more important. The traditional regional Information Society model emphasises the possibility to copy other regions and the use of public-private partnerships. The model seems too homogeneous in its approach in order to enable regions to really develop their specific competitive strengths. Examples of very different regional strategies/approaches include:

- The champion led model. In the Scottish Western Isles, a local resident returned after a career in international business. He managed to create 400 ICT jobs by combining his global networks with the specific assets of the region (high educational attainment).
- The Diaspora model. In Longford, Ireland, there has been a proactive cultivation of ex-residents now overseas to provide business links and markets for niche high quality products.
- The integrated local public sector push model. There are several examples of local authorities in remote rural regions of Scotland, Germany, Greece and Sweden working to integrate local government to attract investment and reduce costs for small entrepreneurs.

Success factors in common for most regional approaches include strong public policy support for investment, solid education systems and conducive regulatory frameworks; as well as particular regional strengths, such as human capital skills and industrial structures. Developing an appropriate regional strategy requires a more nuanced, subtle and bottom-up approach than that suggested by the standard Information Society model of regional

development. To create the conditions for competitive knowledge creation and innovation, regions must find the right balance between order and chaos.

2.2.3. Challenges for the Knowledge Society

Reduce the productivity gap between EU and USA

Since 1995, a gap in productivity in the US and Europe has persisted. In this context, the question has been raised whether the missing growth in Europe is somehow related to IT? But are we thinking of IT diffusion or IT production and in what sense do these relate?

Basically, there are two possibilities to explain the EU productivity crawl since 1995:

1. There was no IT revolution in Europe
2. IT diffusion has not paid off much, for a host of reasons unrelated to IT. Reasons could be that the structure of the economy did not match (management and ICT skills, labour and other regulation etc.)

Considering the first point, statistics show that the investment gap between the EU and US existed already in the early 1990s when the US productivity was lagging behind Europe (Solow paradox). The overall IT investment gap increased over the 1990s, but remained constant in the specific period 1995-01. Yet, the US experiences a bigger increase in the share of IT investment over total investment in the whole period 1990-2000. So, Europe has always tended to invest a smaller proportion in IT, yet there was no widening of the gap in the specific period of 1995-00. Therefore, the productivity gap in that period cannot be explained by a lack of IT investment and the argument of a lacking IT revolution does not really hold.

To consider the second possibility, we compose growth rate of GDP per man- hour in two components:

- Capital deepening: labour productivity increase due to increased capital per man hour
- Total factor productivity growth: labour productivity increase due to sheer improvement in techniques of production, such as reorganization and restructuring.

The labour productivity growth after 1995 in the US was mainly (nearly 80%) fuelled by high IT capital deepening, while total factor productivity growth was roughly constant over time ($\approx 1\%$ per year). Overall, this resulted in a 2.46 % labour productivity growth in the US compared to 2.02% in Europe in the period 1995-00. Practical evidence found substantial productivity gains particularly in IT-using industries, including wholesale and retail trade, finance and business services. In addition, Daveri (2002, 2004), EC (2003), OECD (2003) demonstrated that there was a decrease in the contribution from non-IT K in all industries and a decrease from TFP growth in non-durable manufacturing to labour productivity growth in Europe. Hence it appears that Europe's slower growth rates rooted in other sectors than IT.

The question of how to address the productivity gap between Europe and the US leads to a key question for policy makers: Should IT adoption be an intermediate target for policy-makers or should they be concerned with the ultimate sources of growth (R&D, regulation, education)?

Overcome the gap in R&D investment between EU and USA

If the second option is the more appropriate, then Europe needs to do something against the fact that it significantly lags behind the US in R&D spending as a percentage of GDP. This is particularly true for the business sector, where innovation mostly takes place. The ambitious target of the European Commission is therefore to increase GDP spending gradually to 3% in 2010. To encourage this increase, the EU aims to double its own research budget for FP7. This is not without the risk that the national budgets will be cut by the same amount.

Another critical challenge is the brain drain, with approximately 400.000 European researchers working abroad, mainly in the US. Conditions for researchers in the European Union need to be improved in order to avoid further brain drain or even re-attract some of the researchers.

Dare to build on successful technology

European countries are highly innovative and competitive in a number of technology areas such as micro- to nanotechnology, bio- and environmental technologies. What it takes is the courage to broadly support the take up of R&D and business in these areas. Closely related to the point made about EU spending, continuing excessive financial support of agriculture and industry in areas where Europe has no competitive edge in the short – to medium term, will not help to foster the development of these new high technology sectors.

Accept changes in governance and power structure

The power amongst the various levels of government is shifting, driven by contrasting trends such as globalisation and decentralisation, as well as ICTs innovation. As mentioned before, we face a specific political challenge in Europe coping with shifts in power distribution in an enlarged and modernized European Union. Three drivers of change towards a new paradigm of government have been identified. First, there is a need to improve efficiency, productivity and the quality of services without increasing levels of expenditure. Second, citizens' expectations have risen regarding the standards of service provision with respect to flexibility, personalisation and availability. A third driver of change relates to a weakening of traditional democratic institutions, particularly hierarchical ones led by national-level organisations. There is no guarantee that this new government will be a better, more transparent, user-oriented and democratic. These goals must be planned and strived for.

me-Government: new and improved?

As compared to eGovernment, eGovernance is a broader concept, and involves the application of ICTs to enhance citizens' participation in policy design, decision-making, implementation and evaluation. A new government paradigm which may maximise potential benefits is characterised by an approach centred on users and society. In this new paradigm, openness and ease of access could be achieved through multi-channel, multi-platform delivery systems. Services should be tailored to individual requirements, referred to as "me-Government". This means that they should be personalised, mobile and should facilitate active participation by citizens. Moreover, the new government paradigm is characterised by efficient and lean government. Adapting to the new governance structure would require a dramatic change in the interoperability and integration of government activities involving technical and organisational re-engineering. So far, however, the public sector has chosen to leave in place most established organisational structures and procedures.

eEurope online?

A large part of Europe – no doubts also thank to the eEurope initiative – now has broadband Internet access. However, a number of countries (not necessarily the new members) are lagging behind on the indicators used for eEurope. Despite being criticised as a simplistic supply side initiative, eEurope therefore will continue to have its relevance. However, the question in many countries now is “What’s next?” and eEurope will shift more to the demand side (applications, content) of ICT infrastructure.

2.3. *Conclusions for policy and leadership*

The main conclusion from the JANUS workshop was that socio-economic research, probably more than ever, is an essential ingredient in efficient and effective policy- making. Facing the great uncertainty and huge complexity in a transition phase like the current one into the Knowledge Society, socio-economic research can help to:

- derive a vision of a desirable future
- understand a new governance paradigm and “me-government”
- understand cultural and regional differences
- assess whether the socio-economic goals of a user-centric, inclusive technology policy are achieved

A number of recommendations concerning methods and context of policy- making can be derived. First of all, as a prerequisite, our understanding in a number of areas needs to be improved. These areas include:

- Our understanding of a public good which has shifted from access to physical infrastructure, to access to social and legal infrastructure and maybe to access to informational infrastructure, such as the Internet and software applications
- The changing boundaries between public, private and civic sectors as the shift in power distribution between regional, national, European and global bodies as well as between the public and the private sector
- The transformation patterns from the agricultural to the industrial and the knowledge society and whether they replace each other fully or in some areas, or whether they continue to exist in parallel
- Our understanding of the term Knowledge Society itself

A vision for a European Knowledge Society is needed

Given the fact that we currently lack a precise definition of the Knowledge Society, one of the main policy issues to be addressed in Europe is the need to formulate a coherent vision for the Knowledge Society for the enlarged European Union. In doing so, it has to be kept in mind that the Knowledge Society is not a new society itself, but another layer on top of the former.

In order to develop any vision, scenarios (scientific and neutral) can help to understand change, to reveal value and expectations and the possibility of change. They are therefore an important instrument for pro-active and continuous policy and they enable a differentiation between possible, probable and desirable futures. For instance, if the Knowledge Society scenario of a learning intensive society presented above was used to benchmark current policies then they mostly fall far short.

Accounting for regional and cultural differences

Such a shared vision is essential if a certain level of convergence is to be realised. However, it must also respect the diversity of national and regional development strategies. Moreover, it must recognise that new Member States are likely to adopt very different development paths. As pointed out earlier, the traditional regional information society model does not reflect these issues sufficiently.

Thus, the understanding of unique strengths and weaknesses is essential when developing regional strategies that improve competitiveness. Despite the importance of economic aspects, the propagation of the Knowledge Society must not happen at the expense of social equality and cultural acceptance. A required bottom-up approach and proximity to the people, favour an important role of local and regional governance. Therefore, authorities must be enhanced and empowered and they should not be afraid of taking the lead in driving change.

Learning governance

Just like for other actors in the Knowledge Society, the challenge is to manage transitions from bureaucratic governance, to emerging "best practice" governance, to networked learning governance. This learning also includes the understanding of values that are the real driving force in the adoption of the Knowledge Society. Research can provide valuable inputs to policy making from the bottom-up micro perspective that support decision makers to learn and adapt policy measures quickly.

R&D policy plays an essential role

If one thing is agreed on when talking about the Knowledge Society, it is the fact that research, development and innovation play an essential role in the economy and society as a whole.

The main instruments on the European Level will be the further integration of ERA and, as mentioned above, an increase of spending on R&D to 3% of GDP in 2010. To encourage this increase, the EU aims to double its research budget (with the possibility that national budgets will be cut).

Areas, where more effective regulation could have a stimulating effect on R&D activities are IP protection, product standardisation, competition and fiscal environment and radio spectrum in telecommunication. Thematically, the European Commission is looking for radical innovation reducing complexity, increasing effectiveness (transparency) and providing more security in ICT. A focus will be placed on the integration of areas in the future (for instance nano- and biotechnology in Health), and on an interplay of research, regulation and deployment in eGovernment. In addition, resources must be bundled to support the successful areas of technology. Success of the technology applications is hard to measure, though, and here socio-economic research is particularly needed. Framework Programme 7 will provide a number of instruments to tackle these challenges and to build on the European strengths, including European Centres of Excellence and Technology Platforms. R&D initiatives in the regions are important and need to be further supported, for instance through structural funds or the diffusion of R&D results.

Closely related to R&D policy is educational policy. The latter needs to ensure the implementation of educational reforms that better reflect emerging skills and learning requirements in the Knowledge Society.

Concluding message

For both technological development as well as socio-economic developments it was agreed that foresight and back casting are essential tools in the policy making process; not for their own sake but because they involve the people who implement change. Socio-economic research can play a vital role as an intermediary between the people and the decision makers in a transition period of relatively high uncertainty and complexity in order to develop a desirable vision of society and to find ways how to get there.

3. Individual contributions to the JANUS workshop

3.1. Key Notes

3.1.1. Research, development & innovation policy in support of alternative development paths

Dr Rosalie Zobel, Director IST Research, European Commission

Challenges

Europe's vision is documented in the Lisbon Agenda, which aims to make the EU the largest knowledge-based economy in 2010. The vision remains a challenge because Europe is not progressing as fast as foreseen and there are efforts of scaling back the ambitious plans. However, Europe has the capability and 2010 is still way off. The knowledge economy bears however a number of challenges including increased complexity, knowledge management, boundary-less organization and security that need to be thoroughly addressed.

Europe lags behind the US and Japan in R&D investment, and R&D investment from industry is particularly low. Public R&D investment in the EU currently amounts to 120 B€/yr. This represents just 50% of the US effort and the gap is widening since 1995. In fact, 52% of R&D efforts in ICTs in OECD countries are undertaken in the US as opposed to only 17% in Europe (22% in Japan). Within the EU some member states that are spending comparatively more on R&D than others seem to do economically better. When it comes to human capital, there are less scientists and engineers per 1.000 employees, i.e. 5.5 in Europe as opposed to 7.4 in the US and 8.9 in Japan.

Europe's goal

The Lisbon vision is to be realized through developing the EU into a single market for research (ERA) and an "online Europe" with its eEurope strategy. Europe wants to increase spending on R&D to 3% of its GDP by 2010. The EU member states are to progress jointly developing a common vision for the development & deployment of key technologies and using a coherent mix of policy instruments. The framework conditions for investment in R&D will be improved to trigger an increase of R&D spending from industry. Such measures include IPR protection, product regulations & standardisation, competition rules, fiscal environments etc.

Creating a favourable environment

The creation of a favourable framework includes a regulatory framework, as well as R&D policies and programmes for deployment. Regulating electronic communications and equipment includes promoting competition, digital broadcasting, regulating market access and other issues. Of particular importance is the radio spectrum policy as spectrum is limited and demand is high. In dialogue with Member States and spectrum users the Commission tries to drive forward an EU co-ordinated modernisation of radio spectrum regulation with the objective to create a single open market.

Benchmarking has turned out to be an effective tool to move policy issues and their implementation forward. Member states tend to dislike being the laggards in many indicator charts as used in the eEurope initiative. If political timing is right some countries start comprehensive initiatives to improve the situation in a defined area.

Currently, Information Society Technologies research and development focuses on:

- Future and emerging technologies
- Research infrastructures (e.g. GEANT)
- Knowledge technologies and interfaces
- Components and micro-systems
- Technologies for major economic and societal challenges
- Communications, computing and software

Socio-economic research on the Information Society is not as visible as it was in FP5. We are curious to see whether its integration in IPs or NoEs will work. There is need for socio-economic research to complement our technological work and to assess whether our socio-economic goals are achieved.

My Directorate, "Miniaturisation, Embedded Systems, Societal Applications", focuses its activities on intelligent systems. They consist of intelligent components (e.g. nano-MOS, photonic devices), intelligent sub-systems (e.g. Lab-on-chip) and intelligent end products and services for health and transport applications and for administrations. Intelligent products are a European strength on which future activities need to build. With respect to appealing services the Commission is looking for radical innovation reducing complexity, increasing effectiveness and transparency as well as for providing more security. These services should not only improve inclusion (people-centred, individualized, ubiquitous, intuitive, and protective) and enable organizational improvements, but facilitate European service integration and skills development for the Knowledge Society.

In some research areas the Commission will be looking for more integration of areas in the future. In the area ICT for Health, for example, the Commission is investigating how to link nanotechnology with cognitive and biotechnology. eGovernment aims at an interplay of research, regulatory and deployment activities with a particular focus on pan-European services for European Citizens.

Some IST research successes

There are some European IST success stories beyond the most quoted, the GSM standard, which was fostered under the ACTS Programme. Successes include the European semiconductor industry, where now three European semiconductor companies figure on the top 10 list and 5 European suppliers in top 10 wafer processing equipment list (VLSI Ranking 2003). Successes also include the worldwide recognition for Europe's micro-systems technology (breakthroughs in gas-, bio- & automotive sensors and the invention of field-emission display technology) as well as the development of the first « x-by-wire » system and the first fault-tolerant architecture for safety-critical applications. Success is more difficult to measure in applied areas. Here, socio-economic research is needed to spot success to justify investment in research and development on a European level.

Thinking about Framework Programme 7

Research & policy need to address Europe's challenges in the area of globalisation, outsourcing, brain drain, the skills gap, by improving innovation and creativity, R&D investment and engagement in international cooperation. As one element of a wider set of policies the European Commission has proposed the major elements of European research in the future:

- European Centres of Excellence: there will be collaboration between laboratories & research infrastructure and collaborative research such as Integrated Projects, Networks of Excellence, etc.

- Activities will be centred around 'technology platforms' (e.g. on mobile technologies, nano-electronics and embedded systems); such technology initiatives already exist in areas such as Galileo;
- Basic research: there will be grants for individual researchers/teams and open calls with no constraints on topics or timing;
- Attracting the best researchers (researcher mobility programme)
- Developing research infrastructure such as Geant
- Co-ordination of national research programmes to build the European Research Area and to help open up national programmes to European researchers
- A particular focus on space and security.

As Science & Technology are essential to Europe's future the goal has been set to spend 3% of the EU member states' GDP on research. Two thirds of the research investment should come from the private sector and one third from the public sector. The Commission's target is to double the EU research budget and thus to support achieving this public spending goal. It is obvious that it will be difficult to achieve this objective as net-contributing member states are not willing to increase their contribution; savings in other areas will be difficult due to the enlargement. As of 2006 the major part of the structural funds will be used in Eastern Europe. Also it remains difficult to scale back the agricultural budget which accounts for nearly half of the EU budget though this is slowly eroding. Whatever budget increase for European R&D is achieved, it needs to be ensured that this increase is not offset by a proportional reduction of national R&D funding!

R&D and innovation have strong regional aspects. Good examples are strong nano-electronics RTD centres (Dresden, Catania, Grenoble). Accordingly complementarities with Structural Funds will be sought by allocating funds to developing research capability (e.g. local research infrastructure, human resources, creation of intermediate bodies between SMEs & universities), or diffusing RTD results and excellence (e.g. emerging Health Information Networks).

Despite the comprehensive research and policy agenda, questions remain with respect to some key challenges such as the ongoing brain drain, the skills gap and outsourcing. How should we, for instance, deal with outsourcing, considering that for instance 60% of all investment in microelectronics today is made in China?

3.1.2. A path to the Learning Intensive Society

Riel Miller, Principal Administrator, Centre for Educational Research and Innovation, OECD [These remarks to the Fourth JANUS Workshop, Knowledge Society Development Paths in Europe, held in Brussels on the 21st of September, 2004, are the personal opinions of the author].

One of the main aims of this fourth JANUS Workshop, as I understand it, is to question the role of ICTs in the future. Today's workshop is meant to challenge the idea that the development and diffusion of ICTs will be both a necessary and desirable path for the future of Europe. I think this is a valuable challenge because it forces us to ask a crucial question – what kind of society do we envisage and what is the role of ICTs in that society? My brief presentation today of work underway at the OECD on long-run change starts from the premise that in order for there to be a significant change in the tools that are part of our daily lives (bronze age, steam age, "ICT age?", etc.) there have to be changes in the way society functions. These changes in the habits, institutions and patterns of everyday life are what allow new technologies to become pervasive and become the monikers of an age. Looking to the present the question, from the point of view of technologies like ICT, is what kinds of societal change might lead to ICT becoming a pervasive technology in the future?

I would distinguish between two types of societal change – both of which play a role, at different points in the cycle, in the diffusion of new pervasive technologies like the printing press, steam power, electricity, etc... One is change that refines and consolidates the existing order. The other is change that transforms. Both types of change are, in my view, incremental in nature but it is transformative change that opens the way for entirely new sets of tools, organisations and activities to predominate. Thus ICTs could become pervasive in this way, as enablers of a different economic and social order, if OECD countries undergo radically incremental change over an extended period. The question is what kinds of changes and what do we need to do to make them happen?

One way to answer this question is to look at scenarios or stories of the future. Using advanced scenario techniques we can begin to define in analytically coherent and policy relevant ways the attributes of the future knowledge society. But what do I mean by advanced scenario techniques? Briefly, there are an infinite number of stories we can tell about the long-run future, the challenge is to choose a few in ways that deepen our understanding of the choices we face today. Typically the stories we tell about the long-run future depend on two familiar techniques. One uses people's values to distinguish "good, bad and ugly" scenarios; meaning the scenario people do like, the scenario people don't like and the scenario that mixes the good and bad to generate a muddling through option which, generally speaking, most people consider what is likely to happen. The other technique extrapolates different rates of change, usually low, medium and high, in some variable (or set of variables) to generate three or more scenarios.

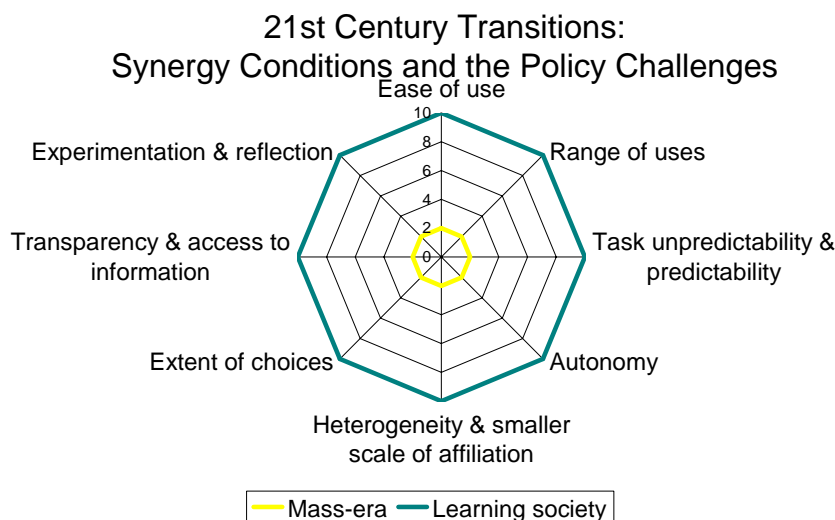
The strength of these two techniques is that they reveal values, expectations and that change can happen. People who build these scenarios and even those who simply examine the options begin to acquire what we call 'futures literacy'. However, as practitioners in the field have come to appreciate, these initial efforts to think about long-run change often lack clear and coherent models of change. Without well developed causal hypotheses it is difficult to define comparable variables or even dimensions of change. Consequently the implications of the changes depicted in the scenario are not clear for policy.

Overcoming the limitations to scenario work is becoming more important as the challenge of clearly defining what a post-industrial knowledge society might look like becomes central for policy makers to fulfil their mandates. Indeed, I believe that the Lisbon objectives and the policies meant to realise them are potentially in serious jeopardy if the scenarios of long-run change are inadequate. Without going into the details of the innovative techniques currently under development at the Centre for Educational Research and Innovation, a number of points are worth stressing here. First it is important to adopt scenario techniques that are neutral from a political perspective. Second it is crucial to be able to distinguish, on the basis of a rigorous methodology, what is possible from what is deemed desirable and probable. Third, and this ties in very closely to the issue of how policy can make a difference, the link between possible and probable is the choices that are made. Finally, these 'futures thinking' techniques need to be understood as part of the emergence of new risk management capacities that exploit the virtues of diversity and complexity to make more informed and creative decisions in real-time.

By way of illustration I want to offer a very quick overview of a rigorously imagined scenario of the "learning intensive society". This is only one of many scenarios, but it has the virtue of being the outcome of rigorous imagining. The hypothesis that this scenario tests is that transition scale change is plausible (not necessarily probable) over the next few decades. Transition scale change is a specific notion, related to the conduct of everyday life, where the basic contours of a society are transformed, like the shift from agricultural to industrial society. For the purposes of summarising the argument, transition scale change can be seen to depend on technological, economic, social and governance dynamism. Certainly these four dimensions of transition scale change are strongly rooted in the way we look at the attributes of industrial society. Some future society may privilege other dimensions, as happened in the transition from agriculture to industry, however from where we stand now these are the dimensions that appear pivotal.

Returning then to the hypothesis, it can be considered confirmed if it is deemed plausible that major accumulations of radically incremental change could occur in all four of these inter-dependent dimensions over the next thirty years. Note that the issue here is possibility not probability. Again, the plausibility of transition scale change rests on making the case that incrementally, radical changes in the technological, economic, and social and governance dimensions of OECD societies is plausible. To test the overall hypothesis, and the four sub-hypotheses upon which it depends, we can use a "possibility space technique" to rigorously imagine change in the four dimensions. This produces the eight vector radar chart below. Obviously I do not have the time to go into the details of each possibility space. However for illustrative purposes the point is clear, if changes happen that push to the outer edge of the chart then it means that are: new pervasive technologies, a new dominant (but still market based) system for organising production and consumption, a new praxis of identity creation and a significant jump in the capacity of people to make decisions.

This is a learning intensive society because every dimension entails continuous learning: Learning to use the tools that empower; learning to presume the fruits of our own creativity in an economy where the predominant source of value-added is generated by the act of unique creation (banal, not genius creativity); learning to build and adapt one's identity on a continuous and reflexive basis and, crucially since it is the enabling pre-condition, learning to make better decisions such that the overall capacity for governance improves throughout society.



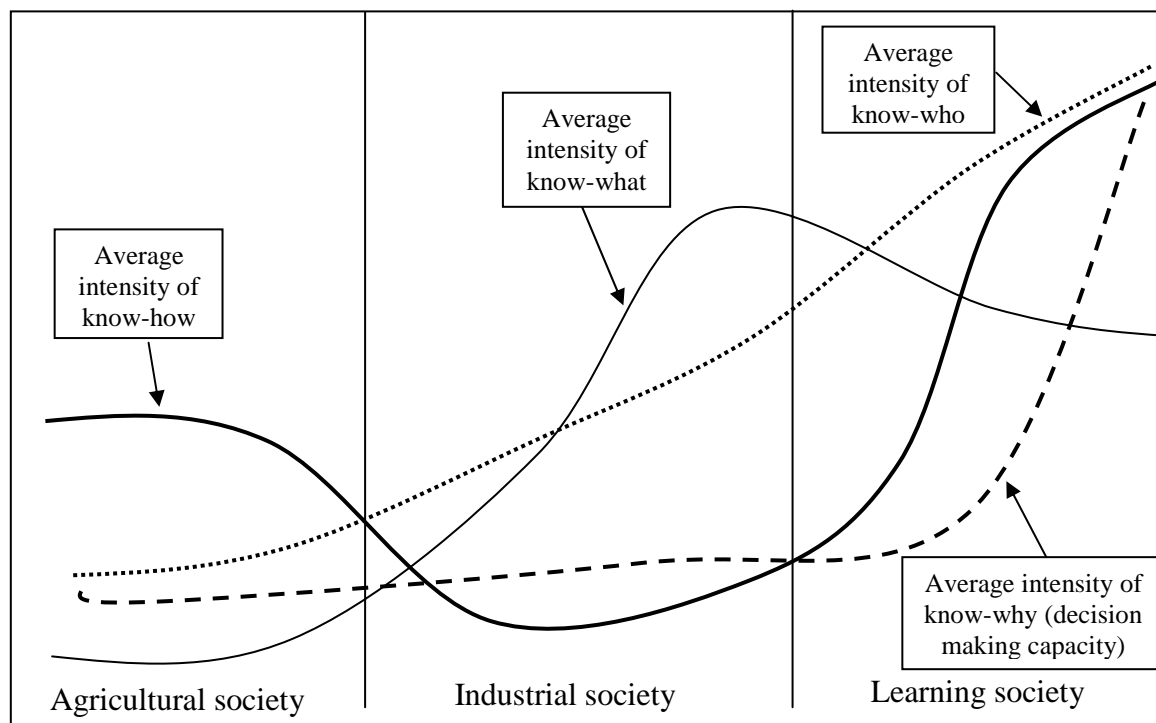
If this scenario depicts a society with a higher level of learning intensity how might we begin to track such a change? One way of defining knowledge intensity is to use the four categories developed in the work on national innovation systems: know-how, know-what, know-who and know-why. Presumably, tomorrow's knowledge society or, more precisely a future more learning intensive society would, on average, over a person's lifetime, manifest more acquisition and accumulation of know-how, -what, -who and why. Using this metric of the average learning intensity of daily life we can sketch, as in the figure below, the trends in average learning intensity of daily life from the agricultural to the industrial to the learning society. Whereas in the agricultural society the intensity of know-how was highest and the intensity of know-what is lowest, this situation reverses in the industrial society. In the learning society the average intensity of know-who, know-how and know-why (decision making capacity) are higher than in any previous societies. The average intensity of know-what (a surplus of useless information) decreases after its peak in the industrial society as filtering and selection capacities increase. Realistically, OECD countries can be pinned in the middle of the figure below if we think about: the low performance levels of such potentially pervasive technologies as ICT; the on-going predominance of the passivity of mass-production/consumption; the rampant crises in identity; and the inadequate levels of decision making capacity. Imagining a learning intensive society is one thing, getting there is another!

This is where policy comes in. If this scenario of the learning intensive society is used to benchmark current policies then they mostly fall far short. Indeed the premises of much policy are at odds with many of the attributes of the scenario. For instance, in a learning intensive society:

10. There is no need for more university graduates
11. There is no more product market competition
12. The corporate form of organisation is marginal
13. Reducing classroom schooling to a minimum is the way to avoid fundamentalism
14. Planning causes failure & fails to reduce risk
15. Adherence to basic common values will become more stringent
16. Internalisation not socialisation

- 17. Experimentation not administration
- 18. The wealthiest societies will be the ones with the highest average age

Average Learning Intensity of Daily Life



The point of this list of counter-assumptions is to push our thinking about what it might be like to live in a society that is really different from our own. I have not said anything about the degree of probability that this particular learning intensive scenario will actually occur. Nor have I talked about the extent to which this vision is deemed desirable. What I have tried to illustrate, in very condensed form, is an approach to thinking about the future that distinguishes possible, probable and preferable – and how this can enrich policy analysis and decision making.

If I might venture my views, I think that this scenario follows fairly closely the goals that today's politicians have outlined in their various efforts to articulate what a post-industrial knowledge society might be like. Certainly this scenario of the learning intensive society is not the only way of defining the Lisbon goals, but it is one variant that has the virtue of depicting in rigorous, policy relevant terms, what such a transformation might mean for daily life. When it comes to probability, however, and if I may venture a personal opinion, although many dimensions of this scenario of a learning intensive society have been deemed plausible at a series of OECD expert meetings, I believe it is improbable because the policy requirements are too stringent. The changes, meaning decisions by policy makers, that would need to take place to generate the kinds of technological, economic, social and governance dynamism upon which such transition inducing radical incrementalism depends would upset too many vested interests. Of course, one might reply, looking at the turmoil in each of the four dimensions, that change is already underway and that transition scale change has always disrupted the old order.

3.1.3. *The new economy's contribution to economic growth in Europe and the US*

Francesco Daveri, Professor of Economics, Università di Parma

The difference in labour productivity gains between the US and Europe could hardly be more apparent than it is today. While Europe had a considerably higher labour productivity growth than the US in the 1970s up to the mid 1990s, the situation between 1995 and 2002 has reversed. In this period the US has an average labour productivity growth of 0.8%, while Europe experienced a slowdown of 1.2 %.

What is the reason for this turnaround?

The US data show evidence of a close association between the productivity revival since 1995 (through today), and the increased production and diffusion of Information Technologies (IT). Is the missing growth in Europe perhaps somehow related to IT? But does this mean IT diffusion or IT production and in what sense do these factors relate?

There are two possibilities to explain the EU crawl since 1995:

3. There was no IT revolution in Europe
4. IT diffusion has not paid off much, for a host of reasons unrelated to IT. Reasons could be that the structure of the economy did not match (management and ICT skills, labour and other regulation etc.)

In the following evidence is presented for the two potential explanations. In order to assess the lack of the IT revolution in Europe as the primary reason for the labour productivity turnaround we look at IT investment data over GDP in the EU and the US. Figures show that the gap in IT investment between the US and Europe existed already in 1990. In 1990 the IT investment over GDP was already 1.1 percentage points higher in the US than in Europe, in 1995 the difference amounted to 1.6 percent and was still at this level 2001.

In addition the IT investment over the total investment grew in the US from an average 24.3 % in the period 1990-95 to 28.0 % in the following five years 1995-2000. This represents an increase of 3.7%. In Europe, the figures of IT investment figures over total investment were again considerably lower. In the period 1990-95, the figure for the UK was 12.9%, for France 10.1%, Germany 13.7 and Italy 14.1%. Also, increases from 1990-95 to 1995-2000 were low in the four European countries. The UK increased its IT investment share by 2.5, France by 2.6 %, Germany and Italy by 1.1 and 1.3 % respectively.

In conclusion, the investment gap between the EU and US existed already in early 1990s when US productivity was lagging behind (Solow paradox). The overall IT investment gap increased over the 1990s, but remained constant in the specific period 1995-01. Yet the US experiences a bigger increase in share of IT investment over total investment in the whole period 1990-2000. So to some extent the IT revolution took place in Europe and the argument of a lacking IT revolution does not really explain the labour productivity turnaround.

Has IT diffusion paid off?

To answer this question, we decompose growth rate of GDP per man hour in two components:

- Capital deepening: labour productivity increase due to increased capital per man hour
- Total factor productivity growth: labour productivity increase due to sheer improvement in techniques of production, such as reorganization and restructuring.

We then ask to what extent IT contributed to each component. Table 1 shows the labour productivity growth of the US and EU 4 (UK, F, D, NL) in the periods 1979-95 and 1995-00 and the contribution of IT capital, Non-IT capital, TFP growth and labour quality to labour productivity growth. While the in the US the average labour productivity growth more than doubled in the two compared periods, the EU4 experienced a slowdown in labour productivity growth.

The labour productivity growth after 1995 in the US was mainly (nearly 80%) fuelled by high IT capital deepening and (IT induced) TFP. Compared to the period 79-95, the value for IT capital after 1995 was twice as high and for TFP four times as high. Unsurprisingly everybody talked about the new economy in the US. In the EU4 (UK, F, D, NL) some contribution to the labour productivity growth came from IT capital deepening. Total factor productivity growth was roughly constant over time ($\approx 1\%$ per year). At the same time there was a major reduction in the non-IT capital growth contribution and a decrease in labour quality (human capital) which lead to the slowdown in labour productivity growth in EU4 in the second half of the 1990s.

	US		EU-4 (UK, F, D, NL)	
Business sector	1979-95	1995-00	1979-95	1995-00
Labour productivity growth	1.21	2.46	2.30	2.02
Contributions to labour productivity growth from:				
IT capital	.46	.86	.33	.53
Non-IT capital	.35	.43	.70	.25
TFP growth	.26	1.05	.94	1.07
Labour quality	.13	.13	.33	.18

Source: Daveri (2004), "Delayed IT diffusion: really the drag on Europe's productivity?", CESifo Economic Studies, Vol. 50, 3/2004, 397-421

Industry evidence for the findings

Looking for US industry evidence, Stiroh (AER, 2003) and Nordhaus (BPEA, 2002) found substantial productivity gains particularly in IT-using industries, including wholesale and retail trade, finance and business services. There is evidence of productivity gains spreading from innovating industries (*i.e.* computers, semiconductors) into industries able to effectively use IT. Also Van Ark, Inklaar and McGuckin (2003) showed that the bulk of US-EU growth gap stems from a handful of IT-using industries including wholesale and retail trade as well as the brokers industry. In addition Daveri (2002, 2004), EC (2003), OECD (2003) demonstrated that there was a decrease in the contribution from non-IT K in all industries and a decrease from TFP growth in non-durable manufacturing to labour productivity growth in Europe. It can be concluded that something else went wrong in Europe, not related to IT.

Conclusions

As opposed to the US, Europe is experiencing a slowing labour productivity growth since 1995. The common explanation for this development is the delayed IT adoption in Europe. Though this is certainly a contributing factor, we have shown that there is also evidence that something else not related to IT went wrong. These findings lead two key questions for

policy makers: Should IT adoption be an intermediate target for policy-makers? Or should they be concerned with the ultimate sources of growth (R&D, regulation, education)?

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3.2. *Session II: Development approaches and public governance*

3.2.1. *National and regional approaches to governance in the Knowledge Society*

Gabriella Cattaneo, Senior Researcher, Databank Consulting

I will focus my presentation on the importance of sound governance to achieving progress in the Knowledge Society. This is a complex area since the balance of power amongst the various levels of government is shifting, driven by contrasting trends such as globalisation and decentralisation, as well as ICTs innovation. I will pay particular attention to the diversity of roles that regions can play in the emergence of networked government by mediating between local and national administrations. A typology of these roles based on empirical research will be discussed, as well as the challenges faced by regions in formulating and implementing these governance strategies.

Recently a shift in focus from eGovernment to the broader concept of eGovernance has occurred. eGovernment is the use of ICTs in public administrations, combined with organisational change and the development of new skills, to improve public services and democratic processes, and to strengthen support for public policies. eGovernance is a broader concept, and involves the application of ICTs to enhance citizens' participation in policy design, decision-making, implementation and evaluation. eGovernance is about the management of institutions to enhance participation, not only effectiveness. If public sector organisations are to realise the promise of eGovernance, they must learn to manage the huge repositories of information they hold in ways that create knowledge and add value. Given the large proportions of GDP devoted to public services, there is an enormous potential for the public sector to lead the way.

Three drivers of change towards a new paradigm of government have been identified. First, there is a need to improve efficiency, productivity and the quality of services without increasing levels of expenditure. Second, citizens' expectations have risen regarding the standards of service provision with respect to flexibility, personalisation and availability. A third driver of change relates to what Manuel Castells refers to as "the variable geometry of power, commitments, alliances and subordinations" arising between institutional stakeholders. The twin trends of globalisation and localisation have led to a weakening of traditional democratic institutions, particularly hierarchical ones led by national-level organisations. New networks of relationships amongst government organisations are emerging, an example of which are the interactions between regional level authorities and the European Commission. Local and regional governments will proliferate, leveraging flexibility, networking and their strong links with local identities, which enhances their legitimacy.

There is no guarantee that this new government will be a better government, more transparent, user-oriented and democratic. These goals must be planned and strived for. The new government paradigm which may maximise potential benefits is characterised by an approach centred on users and society. In this new paradigm, openness and ease of access could be achieved through multi-channel, multi-platform delivery systems. Services should be tailored to individual requirements, referred to as "me-Government". This means that they should be personalised, mobile and should facilitate active participation by citizens.

Moreover, the new government paradigm is characterised by efficient and lean government. Achieving this vision requires a dramatic change in the interoperability and integration of government activities involving technical and organisational re-engineering. So far, however, the public sector has chosen to leave in place most established organisational structures and procedures.

Research is needed to develop our understanding of how progress can be made towards this new government paradigm. The STAR project study is relevant in this respect, since it provides insights into the strategies being adopted in the regional implementation of eGovernment, based on interviews with regional administrators in nine European Regions within four countries (Germany, France, Spain, Italy) plus contacts and desk research in the UK.² The study focused on a range of factors that influence the formulation and implementation of such strategies, such as the institutional framework, the powers of the region in the vertical chain of government, the political and organisational relevance of the eGovernment plans. STAR study's findings show that successful innovative strategies can be very different, depending upon local historical and socio-economic conditions.

I would like to provide two examples of contrasting strategies from the STAR project's typology that appear to be delivering results:

- The "master" region: Catalunya, in Spain, designed a master plan for the implementation of eGovernment focused on the development of a single interface and platform for eServices, winning the support of local administrations through the creation of a series of joint ventures.
- The "negotiating" region: Lombardy, in Italy, faced with local administrations with a tradition of strong autonomy, adopted a strategy of variable alliances for specific projects and application areas, pushing faster where consensus was easier to reach (or to command).

Although these strategies were discussed most extensively, there are other possible strategies, explored in depth in the STAR project, with which regions may be able to achieve progress in other contexts. The appropriateness of the strategies depends on, among other factors, the management of the cooperation between the region and the other local administrations, and the power of the regional governments in the national systems.

In conclusion, I would like to identify, in my opinion, the main challenges being faced in the course of pursuing the new government paradigm. As traditional government hierarchies prove unable to face present challenges, the role of regions as crucial nodes for effective governance becomes more important. Regional governments should not be afraid of taking the lead in driving change: to do so they should achieve a better understanding of the shifting balance of demands and powers between institutional and private stakeholders affected by innovation initiatives. Attention must also be devoted to the processes of negotiation and transaction amongst administrations as well as the design of public-private partnerships. Meeting these challenges requires overcoming what I describe as cognitive presbyopia; while the vision of where we want to go is becoming clearer, the next steps towards the realisation of that vision are uncertain.

² *"Evaluation and Benchmarking of E-government at the Regional level: a pilot study"*. STAR is a research project on the development of the digital economy in Europe, funded by the EU IST Programme in 2000-2003, led by Databank Consulting. Data collection was carried out in 2003 and there may have been changes since then in some Regions – for example in Catalunya the political orientation of the government changed following general elections.

3.2.2. *Public policy in the Knowledge Society: new member states issues*

Carine Dartiguepeyrou, Senior Research Analyst, RAND Europe

The overall question I want to address is how to transform Europe's asset of diversity into competitiveness. For this purpose, I have reviewed an extensive body of research on the transitions in Central and Eastern Europe with a view to identifying the lessons learned from their experiences, the issues currently being faced, and the possible strategies that can be adopted in pursuit of progress in the Knowledge Society.

So what are the lessons learned from the developments in Central and Eastern Europe? Certainly, stable macroeconomic policies, incentives and regulatory environments have proven to be important to achieving progress. Successfully attracting foreign direct investment has depended not only on early transitions to market economies, but also on high levels of adult literacy, cultural proximity and relatively rapid rates of IT penetration. A country's capacity to adapt to change is the most essential factor. Such adaptability requires high levels of human resources, not only the presence of infrastructure and info structure (services and applications). Human resources are part of a broader set of cultural and sociological factors that is important for driving change: adaptability, flexibility, language skills, values and risk taking.

Enabling this process of change requires developments in a number of key areas. This also raises issues for public governance that need to be addressed. The key areas where developments are needed are increases in creativity, knowledge-based work, innovation and the strengthening of venture capital. State funding, if applied appropriately, can nurture longer-term research that is essential to competitiveness. Private funding is likely to focus on development rather than research. Venture capital could help in the development of new and innovative businesses. As such, the capacity to attract venture capital is one of the most important issues in the short term for job creation in the longer run. Among the governance issues that must be addressed is the need to formulate a coherent vision of the Knowledge Society for the enlarged European Union. Such a shared vision is essential if a certain level of convergence is to be realised. However, such a vision must also respect the diversity of national and regional development strategies. Moreover, it must recognise that new Member States are likely to adopt very different development paths.

We can identify three broad sets of challenges facing progress towards a European Knowledge Society: economic, political and cultural. With respect to the economic challenge, Europe faces a choice between continuing to give priority to agriculture and industry or moving towards a new economic model of the Knowledge Society. Addressing the political challenge, perhaps the most pressing one at present, involves managing three dynamics in parallel: the integration of new Member States, the modernisation of the European Union and globalisation requiring new forms of multilateral governance. Addressing the cultural challenge requires skills and experience in change management. Part of the cultural challenge also involves strengthening trust and confidence that are essential not only to exchange and communication, but also to innovation.

A diverse range of strategies is relevant to addressing these challenges. The diversity of existing strategies is likely to be reinforced by new Member States' development policies. The European Union is likely to be typified by differences between countries with pro-active ICT policies favouring specific technology trajectories and others defending a more balanced

or traditional economy. Considering the three waves of transformation, agricultural, industrial and informational, three possible strategies can be distinguished. First, ICTs could be used to transform previous waves of development (agricultural and industrial) into key competitive sectors. A second strategy is to lead the informational wave by leading in areas of vanguard high technology. A third alternative is to develop a global presence in all three waves of transformation. When considering these alternative development strategies, policymakers need to critically ascertain whether public support for specific technology trajectories is useful. But for European level policymakers the most important question will be *how* these diverse development paths can be transformed into competitiveness.

The following are some of the practical measures that need to be taken into account when developing appropriate public governance strategies. A deeper understanding of values is required. As mentioned before, cultural factors, such as values, are more important than geographic proximity to driving progress in the Knowledge Society. Furthermore, in developing the European Union, we need to work on what the Union means for its members, and in particular what values drive their will to participate. New tools of measurement are needed to examine values systematically and dynamically, and to benchmark these with different types of economic development. Benchmarking is the right approach to adopt, since a country or region's development strategy cannot be imposed from above. Instead, a layered approach, consisting of regional, national and European levels, is required.

3.2.3. *eEurope in an EU of 25 member states*

Ken Ducatel, Head of Sector eEurope, DG INFSO, European Commission

I will provide you with an overview of the development of the eEurope action plans from 2000 to present, including the approaches taken by the various action plans and the contributions they have made. I will also turn to the issues currently shaping the development of new policies in this area.

eEurope 2002 was launched in the year 2000 as part of the overall Lisbon agenda. Its main aim was to get Europe online. As such, its focus was mainly on the supply side, on building ICT infrastructures. A similar action plan, eEurope+ 2003 aimed to encourage developments in the Accession and Candidate Countries. eEurope 2005 was launched in the year 2003. The objectives of the previous action plans were somewhat adapted in eEurope 2005. There has been an increased downstream orientation, whereby the objectives are also concerned with the take up of ICTs, not only the supply side. At present, the midterm review of Lisbon has just been completed, and the next steps are being considered.

The eEurope initiatives clearly have a role to play in pursuing the Lisbon objectives. Despite criticisms of the supply side focus of the early action plans, eEurope has made an important contribution by focusing politicians' attention on the need to take action in this area.

Developments in the numbers of broadband subscriptions illustrate the progress being made. Broadband subscriptions as percentages of countries' populations have increased sharply in recent years. However, there is much diversity in the enlarged Union of 25 Member States. Although some of the New Member States are performing relatively well on indicators of progress towards the objectives set out in eEurope, others are lagging. This suggests that some of the simplistic supply side policies are of enduring relevance.

Regarding the next steps to be taken in future policy developments, a new communication is currently being drafted by the European Commission. Particular attention is devoted to the development of both connectivity and content. Central issues are whether the services being rolled out are being used and whether they make a difference. Other issues being given more prominence in current policy developments are eInclusion and citizenship, skills for the Knowledge Society, and security and consumer confidence.

3.3. Session II: Trends in the European Knowledge Society

3.3.1. One size does not fit all -- evidence-based policy making in Knowledge Society development

Jeremy Millard, Senior Consultant, Danish Technological Institute

In this presentation, I want to emphasise the importance of diversity, pluralism and the adoption of bottom-up approaches when formulating regional strategies for making progress in the Knowledge Society. All regions are affected by the Knowledge Society, typified by the conscious commercial creation and exploitation of knowledge, not only to improve existing products and services, but also as a commodity in its own right. Nevertheless, regional responses may differ according to their existing resources and traditions, and the type of knowledge most relevant to their development.

Basically, there are two types of competitive innovation, based on different types of knowledge. These have important implications for regional development due to the particular attributes of the types of knowledge they depend on. Cost-driven innovation and competition are based on the improvement of profitability by increasing sales of existing products or services, or by lowering the costs of inputs of production or delivery. This type of innovation is often associated with highly explicit or codified knowledge. As such, this type of innovation takes place in low cost environments with stable and flexible workforces. By contrast, value-added (R&D) driven innovation and competition are based on identifying and commercially exploiting R&D conducted within firms, research institutions or clusters. This type of innovation is often associated with highly tacit knowledge. It demands high levels of skills, an innovative environment, and the proximity of specialised services.

Regional differences are becoming increasingly important in the Knowledge Society. This may have come as a surprise to some who believed that the importance of place would diminish. ICTs have helped loosen the constraints on location decisions by companies. As a consequence, regions need to attract investment based on their unique characteristics. Clearly, not all regions are able to do this effectively. The evidence suggests that there are striking differences in economic performance between central and peripheral regions. In many countries the regional differences in economic performance have been widening.

If regions are to adopt development strategies that are appropriate to their particular circumstances, the standard Information Society model of regional development must be challenged. This model assumes that the problems of lagging regions can be solved if they copy more successful regions. There has also been an assumption that the development of public-private partnerships is the appropriate vehicle for driving regional development in almost all situations. The standard model generally underplays the role of the state in supporting development. This rather homogeneous model of regional development policy has been advanced by the European Union's structural funds.

Despite the ubiquity of the standard Information Society development model, there are other successful models from which lagging regions could learn, such as the following three examples:

- The champion led model. In the Scottish Western Isles, a local resident returned after a career in international business. He managed to create 400 ICT jobs by combining his global networks with the specific assets of the region (high educational attainment).
- The Diaspora model. In Longford, Ireland, there has been a proactive cultivation of ex-residents now overseas to provide business links and markets for niche high quality products.
- The integrated local public sector push model. There are several examples of local authorities in remote rural regions of Scotland, Germany, Greece and Sweden working to integrate local government to attract investment and reduce costs for small entrepreneurs.

The variety of appropriate regional development models is also illustrated by the findings of the Tigers Project (2002). It examined developments in six European regions or small countries outside Europe's core. The project identified common success factors including strong public policy support for investment, solid education systems and conducive regulatory frameworks. Furthermore, the development of these regions capitalised upon particular regional strengths, such as human capital skills and industrial structures.

Developing an appropriate regional strategy requires a more nuanced, subtle and bottom-up approach than that suggested by the standard Information Society model of regional development. To create the conditions for competitive knowledge creation and innovation, regions must find the right balance between order and chaos. Finding this balance - "the sweet spot" - means enjoying the advantages of both centralised and decentralised approaches while avoiding their disadvantages. For example, although this is ultimately a political question, minimum standards must be guaranteed while avoiding bureaucratic homogeneity and unresponsiveness; local needs must be taken into account while avoiding parochial and isolationist tendencies; standardised centrally-imposed structures ensure efficiency and transparency whilst local adaptation delivers on the ground impact.

There are several ground rules regions could follow when formulating appropriate development strategies. Local physical, institutional and human assets must be linked directly into the process of competitive knowledge creation. To do so effectively, regional policymakers need to understand the types of knowledge and innovation activities their locality can use to develop and compete. For example, as mentioned above, cost driven and value added innovation both rely on different types of knowledge and supportive environments. The local recycling of economic and social benefits, rather than excessive asset leakage out of the region, can help build local strength. Depending upon the existing patterns of organisation and support in the region, changes in governance traditions might be necessary. The challenge is to manage transitions from bureaucratic governance, to "best practice" governance, to networked learning governance. Such transitions require not only process re-engineering, but also mindset and cultural re-engineering. Much greater emphasis needs to be placed on policy learning and evidence-based policy making if localities and regions are to design strategies appropriate to their own needs and potentials within wider national and global networks.

3.3.2. Strengths and weaknesses of European Knowledge Societies – Finland, Germany and Greece

Werner Korte, Director, empirica

The EUFORIA Project, a project of the European Foundation for the Improvement of Living and Working Conditions led by PREST at the University of Manchester, was dedicated to providing information on the implications of the Knowledge Society, particularly for working life and living conditions. The project developed an indicator framework which was applied to Finland, Germany and Greece, thus providing detailed country profiles of in relation to the Knowledge Society. These profiles were then analysed by country specialists. In these analyses, the specialists identified the drivers and national specifics of each country's development, and the strengths and weaknesses of their present situations.

In my opinion, the indicator framework used in the EUFORIA Project provides an important contribution to the workshop discussion by illustrating a way of measuring the Knowledge Society empirically. The indicator framework contains two broad types of indicators: those relating to prerequisites for participation in the Knowledge Society and those relating to outcomes. Indicators on prerequisites are divided into:

1. Infrastructure and resources, containing data on media penetration and education;
2. Socio-economics, containing data on individual requirements such as employment, training and skills, and relevant socio-economic issues like social inclusion and welfare, and security and trust; and
3. Policies, containing data on government involvement in the development of the Knowledge Society.

Indicators on outcomes are divided into:

1. Innovation ability, measuring patent applications and R&D expenditures;
2. Work flexibility, containing data on flexible working arrangements such as telework;
3. E-applications, such as e-commerce and e-health, containing data on usage and usage barriers, as well as digital literacy; and
4. Quality of life, containing data on economic wealth and individual attitudes towards work.

Taken together, these indicators provide a rich overview of the current state of the Knowledge Society in the countries examined.

The three examples of Finland, Germany and Greece illustrate this indicator framework can. In these profiles, each country's performance on each indicator was standardised, so that it could be measured against the average of the EU-15. This enables the relative strengths and weaknesses of each country's performance to be identified clearly. For example, a relative strength of Finland is the use of new media at acceptable levels of cost, while a relative weakness is the low spread of broadband access. Germany performs very close to the EU-15 average. Internet usage is just above average, but the costs of Internet access are relatively high. The indicators show that Greece has quite a way to go before it reaches the level of the other EU-15 countries.

These country profiles were then presented to panels of country specialists who were asked to identify the main drivers and national specifics behind the development of the Knowledge

Society in each of the three countries examined. Analyses of the strengths, weaknesses, opportunities and threats (SWOT analyses) were then conducted on each of the three countries. These analyses provide a wealth of detailed reflections on the most important aspects of the Knowledge Society in each of the countries. In addition, these analyses were summarised in the form of a single statement that captures the essence of the current situation and choices faced.

- Finland: "From NOKIA driven knowledge society to socially, economically and ecologically sustainable knowledge society". This statement acknowledges the strengths of Finland's current performance while recognising the need for diversity in the future.
- Germany: "From average to excellence or business as usual". This statement emphasises the very average performance of Germany on the Knowledge Society indicators and also the difficulty of realising fundamental policy change in a large federal country.
- Greece: "From following others' footsteps to jointly building our own way". When making progress in the development of the Knowledge Society, Greece need not follow exactly the same development models as other countries have. An appropriate development strategy must be formulated that capitalises upon that country's existing assets.

The following are the key insights gained from the EUFORIA Project and empirical studies of progress in the Knowledge Society. In particular, more progress needs to be made in the areas of educational reform and R&D. These are important prerequisites for advancing in the Knowledge Society. Strategies should also be formulated that take into account European strengths. The tacit knowledge is available and there are also strong social, cultural and institutional foundations. Research can help inform such strategies by contributing to a consistent Knowledge Society framework, as illustrated in the EUFORIA Project. Future research also needs to devote more attention to the concept of "social capital" in order to gain a better understanding and measurement of the Knowledge Society.

3.3.3. *New member states scenarios towards the information society*

**Clara Centano, IST Scientific Officer, European Commission, DG JRC,
Institute for Prospective technological Studies**

The aim of this presentation is to give an overview of the current status of Information Society developments in the New Member States and Candidate Countries, the most relevant factors behind these developments, and emerging trends and challenges for an enlarged European Union. I will provide a brief summary of three years of research conducted at IPTS with the support of around 200 experts and in the last two years, by a large consortium. The main aim of this research has been to contribute to an understanding of the policies that can help Member States and Candidate Countries meet the Lisbon objectives.

A significant amount of qualitative and quantitative information has been collected on each country. However, in order to provide a comparable view among all these countries a broad range of indicators has been used to measure Information Society developments in the New Member States and Candidate Countries. These included a range of structural indicators, such as per capita GDP and labour productivity, ICT production indicators, such as the ICT sector's share of GDP and the size of ICT exports, and ICT usage indicators, such as the number of PCs and Internet users.

With regard to ICT production, research has found that ICT production varies considerably amongst countries, as in any other industrial sector. This is influenced by several factors: the quality and quantity of available human and physical capital, economic policies, the size of the economy and geographical factors. Further differentiation is expected amongst countries in terms of local ICT production. Within Europe, processes of relocation from West to East Europe are underway. As the effects of globalisation increase, relocations are also taking place further East, towards Asia.

The available evidence on patterns of ICT usage shows that the New Member States and Candidate Countries are in a weaker position than the previous EU-15 countries, but that progress is being made. Nonetheless, the evidence also shows significant differences amongst countries in the extent to which they are making progress. While ICT usage is expected to converge towards the European Union average, time lags are also expected, and the delays are likely to be longer for some countries than others. There are few signs that "leap frogging" is taking place: that New Member States are skipping intermediate stages of development in their progress. Rather, the process is more one of "catching up" with the EU-15 countries.

A range of economic, political and socio-cultural factors influence Information Society developments in the New Member States and Candidate Countries. A careful consideration of these factors can provide guidance for the formulation of appropriate policies. For example, the economic factors include growth, macro-economic stability and public finances. Important political factors include the formulation of supportive Information Society policies by government. European Union accession has created awareness amongst the politicians of the New Member States that such policies are required. Research has also revealed that both ICT production and usage impact upon economic growth. However, there is no clear causal link between ICT production and usage, which is understandable given the usually modest size of the ICT sector.

Three emerging trends can be identified that also constitute challenges for Information Society developments in the enlarged European Union. The first trend relates to the social disparities that may be accentuated by Information Society developments. In particular, there is the concern that ICTs are adding complexity to growing regional and social divides. The second trend is demographic and relates to the aging of the European population. Education systems need to be transformed so as to use ICTs to achieve growth while addressing the demographic squeeze. Third, globalisation continues to increase competition at the global level. ICTs must be used in combination with Europe's existing assets as tools to drive increased competitiveness and growth.

3.4. Plenary Panel: Policy strategies for economic development in the Knowledge Society

Finally, the Plenary Panel responded to some of the day's discussion points in a round table with four discussants. These were Athanassios Chrissafis (European Commission, DG INFSO), Maarten Botterman (RAND Europe and coordinator of the JANUS project), Clara Centeno (IPTS) and Riel Miller (OECD).

Athanassios Chrissafis addressed the critical needs for early evidence on the progress and impacts of new developments when planning for the future. He cited the sudden explosion of the Internet just after the launch of FP4 which dramatically changed the ground rules and emphasised the importance of rapid and flexible reaction by the RTD community. Anticipating such developments can be facilitated by starting with some basic concepts:

- Our changing understanding of the nature of a 'public good'. Twenty years ago this was defined mainly in terms of public facilities and utilities (roads, electricity, water, waste disposal, etc.), whereas today we also think in terms of social and legal infrastructures and institutions supporting both citizens and the market. We are now in a situation where the market itself can also supply much of this, and we are also asking questions like are software and digital access themselves to be considered as public goods? The nature of governance in the Knowledge Society, and the role of government in this, is crucial and evolving questions.
- The changing boundaries between public, private and civic sectors, for example in the form of public-private-partnerships, decentralisation and centralisation, the structure and distribution of power at local, regional, national, European and global levels, the role of NGOs and other actors, communities of interest and communities of practice, etc.
- Transformations from agricultural, industrial to learning societies, and whether subsequent societies completely replace previous societies, or whether each new transformation builds upon earlier ones retaining vestiges and dimensions not explicable only with reference to the latest transformation. The latter is more believable given that we still see large -scale starvation. It is thus not simply a question of discarding the CAP or changing the Structure Funds (which were both revolutionary initiatives when first introduced), but building a European community taking account of diverse needs at the same time as anticipating and responding to the need for rapid change.

How can JANUS-type work assist us in understanding the above so that we are in a stronger position to make considered and effective choices? Such work has a low profile in FP6, and this will probably also be the case in FP7, so we need to think about enlarging the socio-economic research community in other dimensions, and not only through specific projects. For example, some countries (like Denmark and the UK) have embarked upon initiatives to measure the output of government, there is a similar OECD study on its way and the Commission is to launch its own study soon.

Maarten Botterman took up the workshop theme of Knowledge Society development paths and reminded us that technology is neither good nor bad, but what counts is what it is used for. The Knowledge Society is not one society but a thin layer across many different societies; each with its own characteristics, aspirations and judgements about what is 'good' and 'bad'. Society and people themselves need to decide and know what they want, but this

is challenging given the dramatically increasing speed of change. They must therefore be supported by a research community which is able to bridge out to decision makers in both public and private sectors, and provide statistics, evidence and policy assessments based upon sound socio-economic understanding and good foresight. The future is different for everybody, but we can help in managing these differences and creating these futures by learning from our experiences. The question is, how to learn faster and better.

Discussion raised the crucial question of what is the Knowledge Society. In order to have political impact, definitions are important, and language and terminology do matter, so we can agree what we are talking about. A common language of discourse is required, but one which also links to other discourses and domains. For example, do we want a discourse shaped by the language of economics, or of politics, or what? There is also the issue of English as a lingua franca, and the continuing role of other languages.

A recurring question revolved around the point that the Knowledge Society is effective as a concept, but does it actually succeed in creating more and better jobs, solve the digital divide, and tackle issues of data privacy and the knowledge elite as well as the profound uncertainty about the future? Should we promote new ICTs because they spur economic growth and ignore issues of social acceptance? These are critical issues and are linked to the public understanding of science. The approach to date has been “we need to educate the public to correct their misunderstanding”, whereas perhaps we should be saying something more like “let’s hear what you have to say so we can take your concerns into account”. This may mean we have to lower our growth expectations. What is more important, the Knowledge Society or happiness?

Clara Centeno stressed the importance of defining priorities and focusing on a better understanding of each country’s and region’s unique strengths and weaknesses. Looking back on the evolution of the Information and now Knowledge Society, many concepts and priorities reappear and get re-cycled, such as Bangemann’s 10 steps, or the understanding and exploitation of telework now labelled eWork, but there are also clear and significant new developments. One such encompasses the importance of learning, knowledge and good practice exchange, especially when linked to the policy making process. It is becoming increasingly vital to approach this also from a bottom-up, micro perspective, including evidence-based policy making, and linking this to democratic and participatory systems.

Riel Miller returned to the issue of why are we talking about the Knowledge Society and posed a series of questions, designed to motive and focus rather than provide quick or easy answers. These are based more on human values than on probabilities, and each invites different routes to get there:

- Reconcile greater freedom with collective choices?
- Embrace greater diversity without inviting fragmentation & chaos?
- Foster greater creativity without increasing burn-out & stress?
- Inspire responsibility?
- Motivate change without resorting to fear?
- Manage risk without hierarchy?
- Combine respect for complexity while still gaining depth of understanding?

Athanassios Chrissafis reminded us that we now have a long past and much experience to draw on. There has always been a Knowledge Society; it is just now that knowledge is becoming a critical factor in economic growth and societal progress which at the same time might raise serious risks and challenges. For example, how do we adapt education and

health to the new conditions, how do we ensure the efficiency of new producing services, and how do we become wiser and not just cleverer?

Maarten Botterman, answering a question as to why the Information or Knowledge Society was not an issue in the current US Presidential election, unlike in 2000, pointed to the fact that in many ways this issue has matured and moved into mainstream and is not so much a hotly-debated subject . But this does not mean, of course, that the issues are now straightforward or clear. On the contrary, awareness and 'being there' remain critical. We still need tools like forecasting and backcasting, not for their own sakes but because they involve people who are the ones responsible for change. And, foresight based on, but not shackled by, hindsight is more important today than ever.

The socio-economic research community, and thus the context within which JANUS has operated, has changed remarkably over the last two and a half years since the project began. Despite a lack of space for research in the Framework Programmes, there is nevertheless much benefit and opportunity in consolidating, exploiting and extending research networks. JANUS has contributed significantly to building a platform from which this can be done. Its products, insights, reports and events, have done much to develop this community, and it now stands in a good position to take this forward as part of a wider framework of activity.

ANNEX 1: Workshop Agenda

Knowledge Society Development Paths in Europe

21 September 2004, Diamant Building, Brussels

Time	Activity		
0800	Registration		
0900	Welcome & Keynotes – Global Development Patterns	Welcome	Prof. Ursula Huws, Analytica, Chairperson of the day
0910		RDI policy in support of alternative development paths	Rosalie Zobel, DG INFSO, European Commission
0930		The learning society and the next long wave of global economic development	Riel Miller, OECD
1000		The new economy's contribution to economic growth in Europe and the US	Prof. Francesco Daveri, University of Parma
1020		Questions and answers	
1040	Morning Coffee		
1100	Session 1: Development Approaches and Public Governance	National and regional approaches to governance in the Knowledge Society	Gabriella Cattaneo, Databank
		Public policy in the Knowledge Society: new member states issues	Carine Dartiguepeyrou, RAND Europe
		eEurope in an EU of 25 member states	Ken Ducatel, Head of Sector eEurope, DG INFSO, European Commission
		Questions and answers	
1230	Lunch		
1400	Session 2: Trends in the European Knowledge Society	One size does not fit all -- evidence-based policy making in knowledge society development	Jeremy Millard, DTI
		Strengths and weaknesses of European Knowledge Societies – Finland, Germany and Greece	Werner Korte, empirica
		New member states scenarios towards the information society	Clara Centeno, IPTS, Foresight on Information Society Technologies in Europe (FISTE)
		Questions and answers	
1530	Afternoon Coffee		
1600	Plenary Panel	Policy strategies for economic development in the Knowledge Society	Athanassios Crissafis, European Commission Maarten Botterman, RAND Europe Clara Centeno, IPTS Riel Miller, OECD
1700	End		

ANNEX 2: Speakers' Biographical Notes

Ursula HUWS is Professor of International Labour Studies at the Working Lives Research Institute at London Metropolitan University, an Associate Fellow of the Institute for Employment Studies and the Director of Analytica Social and Economic Research Ltd.

After beginning her career in educational publishing and television, with stints of employment in both the public and private sectors, she has been carrying out economic and social research on various aspects of the restructuring of labour markets, the impact of technological change, teleworking, globalisation, equality of opportunity and the future of welfare systems for over twenty years for clients including international organisations, national and local government organisations, large and small corporate clients, research foundations, trade unions and NGOs.

Her work for the European Commission extending over the past 15 years has included research and consultancy for DG Employment and Social Affairs, DG Information Society and DG Research as well as acting as an evaluator, reviewer and rapporteur. She is currently the director of the EMERGENCE and RESPECT projects, funded under the IST Programme.

Formerly a senior lecturer in research methodology at the University of North London (1990-1995), she is the author of a large number of books, articles and reports and has lectured widely throughout Europe and in Canada, the United States, Australia, India and Malaysia.

Details of her publications can be found on www.analytica.org.uk

Rosalie A. ZOBEL was born in England. She received a bachelor's degree in physics from Nottingham University, UK, in 1964, and a PhD in radiation physics from London University in 1967.

She started her career in the Information Technology industry in ICL in 1967, and later held positions as a systems engineer in CERN (Centre Européen pour la Recherche Nucléaire), Geneva, Switzerland, the Atomic Energy Research Establishment, Harwell, UK, and the Max-Planck Institut für Plasmaphysik, Garching, Germany. At the latter she became operations manager of the first CRAY Supercomputer centre in continental Europe.

In 1981 she moved to the USA and took up a position in the AT&T Headquarters, Basking Ridge, USA. She held positions as senior marketing manager for open systems software both for the USA and international markets, and was responsible from 1983-1986 for the international UNIX business. In 1986 she became senior marketing manager for information technology products in AT&T Japan.

She returned to Europe in 1988 as Deputy Head of Unit of the European Community's ESPRIT Business Systems unit. In 1991 she launched the initiative in Open Microprocessor systems (OMI). From 1995 she was the Head of unit "Business systems, multimedia and microprocessor applications", and EU-coordinator of the G7 Pilot Project "Global Marketplace for SMEs". From 1999-2002 she was Director of "New Methods of Work and Electronic Commerce". From 2003 she is Director of "Components, Subsystems and Applications" in the Information Society Directorate-General of the European Commission.

Riel MILLER is Principal Administrator at the Centre for Educational Research and Innovation, Organisation for Economic Co-operation and Development (OECD), Paris, France. His primary responsibilities involve co-directing the Schooling for Tomorrow Project, which engages ministries of education in a range of different countries to field test methods for questioning the assumptions decision makers use when thinking about the future. He has written numerous articles that explore key methodological and measurement issues in the field of long-run thinking as well as the basic question of developing strategic visions of the learning intensive society of the 21st century. He is the author of **Unique Creation – Possible Futures: Four Scenarios for 21st Century Schooling** (with Tom Bentley, 2003) and *Measuring What People Know: Human Capital Accounting for the Knowledge Economy* (1996). He has also been one of the main authors of OECD books on 21st century technologies, the prospects for a long-boom, social dynamism and governance (<http://www.oecd.org/dataoecd/12/42/1903212.pdf>).

Francesco DAVERI (Piacenza, 1961) is a professor of economics at the University of Parma and a Research Fellow at IGIER (Milan). He is also a Visiting professor in the MBA and the Master in Economics programs at Bocconi University.

His main research field is the analysis of the relation between information technology, policy and growth in European countries. On these topics, he has been an advisor to the Italian Ministry of the Economy (2002), the CEPS (Brussels; 2002 and 2003) and the World Bank (1997).

Gabriella CATTANEO is the international projects co-ordinator (since 1996) of Databank Consulting, which she joined as researcher in 1990. Databank Consulting is a business unit of the Databank group, leader in Italy and Spain for competitive and customer intelligence (recently acquired by Seat-Pagine Gialle). Databank Consulting is specialised in marketing research and consulting in the ICT (Information and Communication Technologies) sectors in Italy and Europe. Cattaneo has ten years experience in socio-economic research for the European Union. Her studies focus on the analysis of the socio-economic and techno-economic processes of change in the transition towards the European Information Society, at the regional, national and international level. She has also studied the impacts of advanced information services with a specific focus on E-commerce and Internet evolution in Italy and Europe. She's presently coordinating the e-Europe evaluation activities workpackage in the SIBIS project (Statistical indicators for benchmarking the information society) and is project leader of STAR (Socio-economic trends assessment of the digital revolution).

She graduated in Political Sciences Magna cum Laude from Milan State University and is also a member of the Italian Professional Journalists Order. She is fluent in English and French.

Carine DARTIGUEPEYROU is a Senior Research Analyst at Rand Europe focusing on Information Society, R&D and Innovation issues. Prior to that, she worked as a strategy consultant designing European development strategies for large corporations, advising foreign direct investors and setting up venture capital funds across Central and Eastern Europe and the Former Soviet Union. She graduated from the Sorbonne University (Phd, Political Science), the Institute of Politics in Paris (Master, Soviet and East European Studies) and the London School of Economics (Master, Politics of the World Economy).

Ken DUCATEL is Head of Sector eEurope at DG INFSO, European Commission. Prior to this he was a project manager at the Joint Research Centre's Institute for Prospective Technological Studies, which is a service of the European Commission. His main responsibilities were to reinforce the position of the JRC as a centre of reference in foresight and prospectives in Europe and to co-ordinate horizontal projects on Science and Technology prospectives. Recently completed studies include Scenarios studies on the Future of Sustainable Manufacturing and on Ambient Intelligence for 2010.

Ken had joined the IPTS in 1997 on long-term leave from his post as Senior Lecturer at PREST (Programme of Research on Engineering Science and Technology) at the University of Manchester, where he had been since 1989. Ken's degrees come from the Universities of Lancaster (BA), Cranfield (MSc) and Bristol (PhD). Before joining PREST he worked for two years as a doctoral research associate at the Centre for Urban and Regional Development Studies, University of Newcastle.

Jeremy MILLARD has 30 years experience working with new technology, education and training and in consultancy for technology suppliers, user groups, public authorities, governments, the European Commission, the World Bank, and the Danish and Swedish Aid Agencies. He has worked on all aspects of the Information Society, often taking the leading and management role. EU Programme work of relevance includes COMETT, RACE, DELTA, STAR, ORA, TELEWORK, ESPRIT, MLIS, the Telematics Applications Programme (TAP), ACTS and IST. He was employed by the UK Open University from 1971 to 1984 and then moved to Denmark to work with Tele Danmark Consult until March 1999. From April 1999 he is employed by the Danish Technological Institute as a Senior Consultant.

As a geographer and social scientist, Jeremy has focused heavily on regional development issues, especially in relation to new forms of work, e-commerce, e-services and e-government, and new business and organisational change projects in the context of the new digital networked economy. He has worked extensively with local and national government and regional development agencies in all types of area across Europe as well as in other parts of the world: rural, urban, core and peripheral. He has been involved in analysing the impacts of change at the local and regional scale, both from a theoretical perspective and in terms of practical implementation, for example by advising regional development agencies on policy formulation and practice. At present he is involved in developing a set of practical indicators for regional development, collecting and analysing cases of good practice in regional development, and coordinating a handbook for local developers on how to exploit the opportunities of the knowledge economy.

Werner B. KORTE is director of empirica and responsible for managing many of the largest empirica research and development projects in the area of information society and statistical indicators for benchmarking and eEurope. He was and is project manager of large-scale international empirica projects in these areas providing policy evaluation and assessment and benchmarking results to public and private customers including different DG's at the EC, national ministries and Federal state and regional governments and ministries since the early 1980s and has been responsible for several market research, monitoring and benchmarking studies. Since 1989 he has been external expert to the European Commission for the development of the work programme as well as evaluator and technical reviewer for the ESPRIT Programme. From 1996 to 1999 he has been responsible for co-ordinating workgroups and directing all operations in the "Forum Info 2000: Germany's way into the information society", a major government initiative supported by the economics and research

ministers. Currently he is amongst other project manager of the projects "SIBIS - Statistical Indicators Benchmarking the Information Society" and working on "EUFORIA - European Foresight Project" and "SUSTEL - Sustainable Teleworking".

Clara CENTENO has degrees on Telecommunication Engineering and Business Administration. She worked 13 years in electronic payments business, systems and technology aspects across Europe, providing independent management advice and solutions to national and international payment service providers, concentrating mostly on new technology areas. Since 2001, she is working at the Institute of Prospective Technological Studies of the European Commission (DG JRC) carrying out prospective research on ICT policy related areas, such as: internet payments, security and consumer trust, PKI and digital signatures, internet banking, cyber-security, e-Government and Foresight on Information Society and ICT Technologies in the enlarged European Union.

Athanassios CHRISAFIS studied economics (PhD) at the University of Sussex, UK. After a four year period on research and academic carrier in England during 1985-1989, he moved to Brussels where he works in the European Commission. His responsibilities over the years included research and technology strategies in the field of information and communication industries, socio-economic research activities in the Esprit Programme (R&D on information technologies) and relations with the Structural Funds (the EU programme for regional and socio-economic cohesion).

From 1999 to 2002 he worked in the Information Society Technologies programme, Directorate for "New Methods of Work and Electronic Commerce". His main responsibilities were the Directorates' activities on socio-economic research, on the Enlargement and South Eastern European countries, and on the digital regional economy. He is currently working in the eGovernment unit of the Information Society Directorate General.

Maarten BOTTERMAN is project manager of the JANUS project. He is also program director for Information Society at RAND Europe. Before joining RAND he worked for 4 years as Scientific Officer for the Framework Research programme on Communications Technology and Information Society, managed by the European Commission DG Information Society. His responsibilities included participation to programme preparation and evaluation activities and he initiated and managed telework initiatives and a comprehensive telework programme across Europe. Other relevant experience includes being Head of Unit for an IT Department in the Dutch Ministry of Transport, Public Works and Water Management (1987 - 1991). He holds a degree in business economics from Erasmus University Rotterdam and is an internationally recognised expert in new methods of working.

ANNEX 3: Participants List

Mette	Abrahamsen	MindLab, Ministry of Economic and Business Affairs
Effie	Amanatidou	ATLANTIS CONSULTING S.A.
Karl-Erik	Andersson	TietoEnator Government Services
Hans	Arents	Ministry of Flanders
Hippolyte	Aziakou	Groupe de Recherche et d'Action pour la Solidarité et la Pai
Maarten	Botterman	RAND Europe
Almudena	Bravo	Diputació Barcelona
Ionut	Burchi	DX Webs
Gabriella	Cattaneo	Databank Consulting
Clara	Centeno Mediavilla	European Commission, DG JRC
Yulrae	Cho	European Commission
Athassios	Chrissafis	European Commission
Daniel	Chux Uzorka	The Vrije Universiteit Brussel
Ian	Culpin	Martech International SA
Simone	Dahlmann	Analytica
Carine	Dartiguepeyrou	RAND Europe
Francesco	Daveri	Università Bocconi
Donaat	De Boodt	LEARNING BANK
Ken	Ducatel	European Commission
Vida	Elskyte	Vilnius Gediminas Technical University
Sylvie	Feindt	SFC
Philipp Oliver	Gross	Deutsche Telekom Brussels Office
Stijn	Hoorens	RAND Europe
Jonas	Iversen	Danish Technological Institute
Peter	Johnston	European Commission - Information Society
Maya	Jolles	Independent Consultant
Ana	Juarez	Ernst & Young

JANUS workshop on Knowledge Society development paths

Maciej	Lewandowski	PR of Poland
Henk	Mannekens	BT plc
Jeremy	Millard	Danish Technological Institute
Riel	Miller	OECD
Mercedes	Moraz	Gobierno de Aragón - Oficina en Bruselas
Monika	Neumann	Representation of the Regions of Hungary
John	Nolan	European Commission DG INFSO
Matthias	Nöster	SFC
Noël	Parmentier	SPACECONSULT
Raymond	Peeters	Computer Associates
Birgitta	Persson	BiVision
May	Pettigrew	European Commission
Mark	Reilly	Enterprise Ireland
Jan	Roukens	Strategic Intl., / IOS Press B.V.
Aleksandras Vytautas	Rutkauskas	Vilnius Gediminas Technical University
Virag	Sandor	European Commission
Judit	Schrick	Representation of the Regions of Hungary
Kristian	Takac	Stockholm Region
Robert	Thomson	RAND Europe
Helga	Treiber	Icons
Ursula	Huws	Analytica
Werner	Korte	Empirica
Rosalie	Zobel	European Commission