

List of 30 elaborated  
recommendations on policy  
options and potential new  
issues for science and  
technology for the FP8  
research programme.

## Recommendations

During the CIVISTI workshop held in Sofia in June 2010, a group of experts transformed the citizens' visions into 30 recommendations on policy options and potential new issues in the science and technology domain for the 8<sup>th</sup> framework programme of the European union.

### 1. Humanistic research to explore what dignity during the dying process means to contemporary Europeans.

#### **Description of the recommendation**

Participatory research (anthropological) of an aging population in modern societies, where the impact of traditions and religion is fading should be conducted in a European comparative perspective.

This citizen-oriented activity will be done with an end to developing spaces, where citizens can dialogue with others to discuss and develop a community around their concerns about dignity during the dying process.

#### **Evaluation of the recommendations by the experts**

- **Novelty**

Euthanasia\* is novel in most EU member states while it is to a certain extent established in some EU and non-EU countries (Netherlands and Switzerland respectively)

- **Importance**

It is essential with EU societies moving towards values that respect individual autonomy. There is a need to enhance harmonization in this respect. European identity means acceptance of certain European values. A liberal framework introduced in all member countries would solve the problem of death tourism.

- **Timing**

Science and technology solutions already exist. Mentality and regulation ought to be changed together, along with an EU-wide communication campaign. This latter part can be included in FP8\* since it requires some resources, while changes in the regulation could come as a result of this campaign.

These changes do not require additional resources. It is up to the Parliament to make the necessary decisions

#### **Additional comments from the experts on the recommendation**

Scientific and technological solutions exist, but the legal frameworks are different in EU member countries.

A communication campaign should be started to raise citizens' awareness of the problems and of the consequences of disparities in regulation (death tourism: rich people can afford going to a Swiss hospital where euthanasia\* is allowed). This campaign is the start of a dialogue about European values and citizens can express their opinion about the necessity of changing national regulations. This dialogue process is part of the participatory research project that uncovers changing social perceptions, which then form the basis of changes in the regulatory framework.

**Vision the recommendation was derived from**

Vision 7: Being allowed to die in dignity, a companionship of dying in a network of family and relatives.

The recommendation is also related to:

- vision 11: The death passport.

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**\* Words marked with an asterisk are explained in detail in the glossary**

## 2. Tools for disabled people.

### Description of the recommendation

A policy that explores the state of the art in the development of tools for disabled people.

### Evaluation of the recommendations by the experts

- **Novelty**

The novel aspect has to do with the introduction of a balanced multidisciplinary approach to the issue, by involving experts from technological and social sciences.

- **Importance**

It is a very essential issue for disabled and elderly people, in an ageing society.

- **Timing**

The issue should be considered in the 8<sup>th</sup> Framework Programme and significant funding should be provided.

### Additional comments from the experts on the recommendation

The policy should be elaborated in close consideration and participation with social scientists. There are two roles for involving sociologists and psychologists – the first being the design and implementation of the tools for disabled people and the second the regulation and guarantee of the rights for diversity and personal choice to join or reject the new technology, regardless one's social status.

Awareness campaigns directed towards social scientists should be carried out, prior to their active involvement in the policy formulation and the development of the tools.

The tools should not only address disabled but also elderly people, to tackle the consequences of an ageing society.

### Vision the recommendation was derived from

Vision 9: Disabled people as fully valuable members of the society.

### **3. European TV – unity in diversity. A permanent lab for experimentation on building and expressing identity (IdenTVLab).**

#### **Description of the recommendation**

TV contributes to the creation of different forms of European identity and allows different cultures to cooperate, especially through the establishment of an experimental platform for collaborative projects developed by kids and youth.

#### **Evaluation of the recommendations by the experts**

- **Novelty**

The “IdenTVLab” concept can be realized if the approach and the instruments for its implementation are adapted to the age of the target groups – children and young people of all European countries. New interactive combinations of media should be tailored for that purpose.

- **Importance**

This interactive media will provide children and youth with educative and participatory means for learning the essentials on the European identity, thus building the prerequisites for developing and sustaining this identity.

- **Timing**

The “IdenTVLab” concept should be supported by the “Socio-Economic Sciences and Humanities” thematic priority of the 8<sup>th</sup> Framework Programme.

#### **Additional comments from the experts on the recommendation**

The “IdenTVLab” is based on the idea that children and youth in Europe are Europeans by origin, but have to learn how to be European citizens. European citizenship identity should be created along with the national identities and by incorporating them. The design of the appropriate media and the interface with the viewers is a key element for the project’s success (virtual space and modern communications should be employed along with the TV media).

#### **Vision the recommendation was derived from**

Vision 10: TV for the creation of a European identity.

#### 4. Plug and play communication: development of standards for smart gadgets.

##### **Description of the recommendation**

Make sure, through standardisation, that smart gadgets (supporting a smart society vision) can communicate with each other, regardless brand or type. Attention should be paid to security and privacy issues. Develop standards in a pro-active way, to avoid waste of time, money and resources

##### **Evaluation of the recommendations by the experts**

- **Novelty**

The idea of a smart society is not new, but it requires standards to be developed.

- **Importance**

Communication standards are very essential.

- **Timing**

The communication standards need to be developed first, because they are essential to realize a smart society.

##### **Additional comments from the experts on the recommendation**

One way to achieve the vision of a "smart society" is by embedding society in a smart environment. This smart environment might consist of a variety of smart gadgets like fridges that order products by themselves. This will require efficient machine-machine communication and could be enabled by adequate plug and play communication standards, which include privacy and security features. It is envisioned that a timely establishment of such communication standards will not only speed up the adoption of smart gadgets for a smart society but will also prevent the waste of money, time, and resources, by avoiding any non-compatible approaches.

##### **Vision the recommendation was derived from**

Vision 12: Smart society.

## 5. Foresight and research to explore sustainable options of decentralized energy production systems and the resolution of energy related conflicts.

### **Description of the recommendation**

Developing new options for a decentralized energy production is important, because we have to increase the integration of discontinuously delivering renewable energy sources, which are not fully being utilized in the existing systems.

Studying the governance challenges related to different scales and levels of production, distribution and decision-making is equally important. And so is the necessity to address the international political dimension of energy management by acknowledging that the energy issue is not an issue of competition and control but also a new means for multilevel, uniform governance, across European countries.

### **Evaluation of the recommendations by the experts**

- **Novelty**

At the political level, the conception of sharing energy is new.

- **Importance**

A fast implementation of renewable energy is important for a stable and efficient energy supply without making use of fossil fuels.

- **Timing**

Sustainable energy issues are being important already under FP7\* and will continue to be so under FP8\* and in the following framework programs in the near future.

### **Vision the recommendation was derived from**

Vision 13: Endless energy (independence of fossil fuels. Local and environmentally friendly production of energy).



## 6. A 'Platform for the future of work' at a local, regional, and global level should be considered within the upcoming calls of the SSH program\*.

### Description of the recommendation

This platform should address aspects like research about redefining work, 'flexicurity'\*, boundaries between professional and volunteer jobs, work-life balance, basic income, new jobs, and social responsibility. This platform should involve citizen participation. There is a need for research, development and social experiments on 'flexicurity'\*, including the voluntary work.

### Evaluation of the recommendations by the experts

- **Novelty**

The novelty of this recommendation lies in the opening up of borders between voluntary and professional work.

- **Importance**

This is essential for humanizing the labour market.

- **Timing**

Experimental research should start as soon as possible and involve the labour market's stakeholders, for example: unions and NGO's. Potentially this research could start in FP8\*.

This could include economic research and the examination of best practices in opening up the job market across Europe.

### Additional comments from the expert on the recommendation

The borders between professional and voluntary work should be opened up, through:

- 1) Investigating/increasing the possibilities for minimum compensation for voluntary work. This includes ways to 'pay' not with money but through a working time reduction. Develop a citizens' wage (non-money), to allow individuals for example to take care of family members, or get involved in voluntary activities. Examples of such voluntary activities could include caretaking, nature preservation, community work, etc.
- 2) New possibilities for people to obtain a working time reduction for reduced capacity (mental or physical).
- 3) Investigating/increasing the opportunities for citizens to make a living doing non-wage work. This could include for example, making available public monies for carers of disabled people.

### Vision the recommendation was derived from

Vision 17: Where there is a will, there is work (Employment for all. A vision about the balance between work and private life, voluntary work and full employment).

## 7. Stimulate research to expand/augment the human sensory capabilities.

### Description of the recommendation

For example, a person can distinguish a lot of sorts of the colour “white”, because its natural sensory capabilities are combined with a machine-brain interface.

### Evaluation of the recommendations by the experts

- **Novelty**

There is some recent research going on bionics and machine-human interfaces. The new approaches should focus on the psychological, ethical, and philosophical aspects of the subject.

- **Importance**

The research into this issue is essential, for both disabled and healthy people (in view of a further enhancement of their capabilities).

- **Timing**

The research on this issue should be carried out as soon as possible, because of its importance for some major social groups – disabled and elderly people.

### Additional comments from the experts on the recommendation

Expanding human sensory capabilities is an issue for some cutting-edge research on bionics and machine-human interfaces. The main focus is placed on the technological prospective and the related interdisciplinary collaborations in this field. We need to balance the knowledge generated by the recent studies with interdisciplinary research in psychology, ethics, and philosophy, in order to avoid any misuse of the technology for military purposes, or to violate human rights and equality.

### Vision the recommendation was derived from

Vision 19: Make me human! (A dream about health and wellness, technology and ethics).

## 8. Enhance the ethical reflection on science-based organic and “bionic” production.

### Description of the recommendation

Radically new genetic and technological treatments will exist by 2050. Ethical research councils and advisory bodies at a European level should systematically assess the ethical aspects of their development. The ethical review should take into account in a balanced way:

- the innovative potential of using robotic and “bionic” (interface of technical and organic world) devices in complementing and improving human contacts
- ways of promoting a science-based production of organic products, that respects the integrity of nature.

### Evaluation of the recommendations by the experts

- **Novelty**

The design of a global ethical framework and of ethical research councils in the organic and bionic production to deal with the “super human” concept and to respect nature integrity is a quite new approach.

- **Importance**

The issue has a very high importance for both experts (in terms of new collaborations between sociological and life sciences domains) and citizens (by changing lifestyles and ethical concepts).

- **Timing**

Considering the pace of the technological development in the field, the related ethical review is already too late!

### Additional comments from the experts on the recommendation

Social scientists should be actively involved in the development and implementation of these technologies. They constitute an interdisciplinary ethical research team of social and life sciences experts, to actively frame this issue and its construction and implementation. This collaboration should be made a general practice, by systematically establishing an Evaluation Board to agree on evaluation criteria and protocols, when reflecting on technological issues with ethical aspects.

### Vision the recommendation was derived from

Vision 19: Make me human! (A dream about health and wellness, technology and ethics).

## 9. Optimization of urban space: towards dense European eco-cities.

### Description of the recommendation

The problem of current urban development is that if cities are let to grow freely, they will grow unlimitedly. So, space design and optimization, integrated knowledge and policies should be created, to support a well-balanced urban development. Such knowledge and policies should take into account present and future climate changes and improve urban life cultures.

Piloting a dense eco-city in a European context could provide new insights in how to manage urban planning in a more sustainable way, with respect to an efficient land usage. Citizens' participation should be essential in the whole process of planning and realizing the European dense eco-city.

There are several research questions that should be raised, while piloting the dense eco-city. These questions include, for example

- New waste management challenges, related to the dense structure of the eco-city (possibilities for closed cycles\* should be explored).
- Balanced management of urban space 1) acknowledging a reduction of land use and energy usage, and 2) increasing the (perceived) quality of life in urban areas.
- Developing effective transportation requires distances of movement to be shortened. Therefore new technologies should be explored, such as high-speed public transport.

Finally, a technically driven eco-city is top-down and therefore, in order to adopt citizens' perspectives, a participatory process should guide the development. A precautionary approach to urban space is justified, since developing and planning of urban infrastructures is a slow process that cannot be changed in a day or two. Building in flexibility helps to adopt a precautionary approach. Many of the sustainability problems come together in urban planning and land usage. That is a reason why multiple policies will be needed to approach the problems adequately. This would require an effective coordination between different policy sectors, with the focus on urban development. Developing new visions for cities by foresight might help to fulfil that requirement.

### Evaluation of the recommendations by the experts

- **Novelty**

There is much planning and research on urban issues, but there are no pilots on eco-cities yet.

- **Importance**

Developing ecological urban life is essential for the future of Europe (megacity problems will remain and need new solutions).

- **Timing**

This is a long-term process.

**Vision the recommendation was derived from**

Vision 20: A contemporary European city in the year 2050.

## 10. From CAP to European Agricultural policy: back to a gardening tradition.

### Description of the recommendation

Foresight studies\* and comparative analyses on the agricultural potential of different regions in Europe. To develop policies for re-establishing a gardening tradition in Europe that would deliver high-quality agricultural products, including policies for raising dignity of the work of peasants as knowledge-intensive activity. The EU should help Bulgaria and others to attract agricultural experts, by fostering agricultural institutes and policies.

### Evaluation of the recommendations by the experts

- **Novelty**

Redirecting the focus on agriculture in a dominantly industry-oriented focusing in the RDI programs.

Research and innovation policy on knowledge-intensive and organic farming.

Research on new structures of organizing agricultural work

- **Importance**

It is a new way to solve the problem of unemployment, new in the meaning that it is not well accepted yet.

In the coming global period of scarcity in producing food and other agricultural products, it is especially important for the EU to be one of the leaders in the world, in this field

Agriculture could develop into a lead market for many other technologies like ICT, biotechnology\*, expert systems\*, and living labs\*

This agricultural policy helps to sustain valuable old systems of living together and renew it on the basis of modern technologies

- **Timing**

It should be included in the first call of FP8\*.

The foresight analyses about the new gardens should be incorporated in SSH\*.

### Vision the recommendation was derived from

Vision 21: Bulgaria, the garden of Europe.

## 11. Research to overcome the tension between the use of highly complex materials in products and their recyclability.

### Description of the recommendation

Stimulate the upgrade of products, for example computers.

Develop means to combine the easy recyclability of products with high efficiency.

Invest in materials research that leads towards efficient products, made of fully recyclable material.

### Evaluation of the recommendations by the experts

- **Novelty**  
Recycling principles are in place but not at a level required to realize the vision.  
A new paradigm should be established in the development of materials.  
The introduction of this paradigm has to be economically attractive to all producers and to the customer. Financial incentives or governmental regulations will be necessary.
- **Importance**  
To save the planet.
- **Timing**  
Efficient use of all resources is at high stake to save the planet.  
Sustainability is a political issue

### Additional comments from the experts on the recommendation

In recent years, most materials that are used in technical or consumer products are "designed for application". That means that materials are highly specialized and consist of mixed materials or of materials with unique properties.

While this process fosters technical, economic, and ecological efficiency, at the same time it challenges our ability to reuse or recycle these materials for similar or different applications.

This problem could be solved by 2 approaches:

Either new materials will be developed, that deliver similar technical performances, while at the same time being easily recyclable or (re)usable, or new processes need to be developed, that allow for the recycling or reuse of high performance materials. Various technical and economic challenges will have to be addressed.

### Vision the recommendation was derived from

Vision 22: Eco-techno future.

## 12. Increase direct democracy through e-voting.

### Description of the recommendation

E-voting cannot only be used for parliamentary elections but also for general decision-making affecting the development of the society. Increase the proportion of decisions in which citizens are consulted, but not for all everyday decisions. Involve citizens through e-voting for a selected set of decisions.

### Evaluation of the recommendations by the experts

- **Novelty**

The technologies that enable e-voting exist, but their application is not yet widespread.

- **Importance**

E-voting is essential because it helps to optimize the democratic process. It broadens and simplifies the participation process. The impact should be measured.

- **Timing**

The introduction of e-voting should happen gradually, because politics and population have to get used to this process.

In the development of this system, participatory methods can be applied and developed, so that citizens can discuss on the pros and cons and make balanced decisions.

### Additional comments from the experts on the recommendation

The basic idea is to involve citizens more easily in political decision-making. Frequency of voting is important.

### Vision the recommendation was derived from

Vision 25: Link among the generations, space and time.



### 13. Recognition Policy.

#### Description of the recommendation

The development of a new research area that is called the 'Politics of Recognition' and that focuses on promoting the inherent uniqueness of an area, country, region, values, traditions, etc.

#### Evaluation of the recommendations by the experts

- **Novelty**

Since this research does not exist yet in the EU (nor elsewhere, as far as we know), this recommendation is extremely novel.

- **Importance**

This type of research is essential to overcome inequality in an era of growing diversity and might offer a strategy to help overcome this trend.

- **Timing**

Start up as a research program as soon as possible. If it is not possible to do this in FP8\*, then it can be incorporated in FP9.

#### Additional comments from the experts on the recommendation

A possible definition of the concept of 'Politics of Recognition': "a societal discourse about a community, region, or nation".

There are two ways of developing the research:

- 1) The first way can be developed through critical research of discourse/politics of recognition at the EU and national levels. This could target both regional development or tourism policy. It could, for instance, include tourism policies oriented towards branding what the inhabitants of a particular place wish to be recognized as.
- 2) The second way of developing the research could be through the development of citizens' workshops on how they want to be seen. This would result in the formulation of strategies for the future of the community/region/nation/Europe.

Part of the research could include assessing the impact of lacking recognition on tourism or regional development policies. This recognition could also be applied to areas outside of the EU, for example in relation to Africa. The research activities should include a participatory process and/or some form of action. research.

#### Vision the recommendation was derived from

Vision 26: One Bulgaria, one Europe, one world – one whole.

The recommendation is also related to:

- Vision 30: The EU Presidency touring Africa.



Project funded under the Socio-economic Sciences and Humanities



## 14. Develop Sofia into an eco-model for European capitals.

### **Description of the recommendation**

Establishment of a European “Eco City”-programme with significant funding for supporting the transition of European cities towards eco-models and the exchange of good practices.

### **Evaluation of the recommendations by the experts**

- **Novelty**

The novelty of the idea lies in its complexity, its interdisciplinarity as well as in the fact that it develops a model for European cities.

- **Importance**

An eco-city programme could become a model for complex urban development that uses natural resources, improves quality of life and is inclusive, since its target groups encompass all the society.

- **Timing**

This can be included immediately in the EU development programmes, both FP8\* and other related programmes. It is related to various other science-based programmes and will require a series of changes in regulation (use of land, etc.).

### **Additional comments from the experts on the recommendation**

An EU-wide Eco-city model programme is interdisciplinary, since it is related to many science-based programmes. It would help to solve huge social and environmental problems and at the same time improves the global quality of life and enhances inclusion.

Tenders and contracts should include and take into account solutions for air and water management, plans about new green areas as well as innovative solutions for existing environmental problems.

### **Vision the recommendation was derived from**

Vision 27: Sofia – the green capital.

## 15. Agreements with farmers organizations on avoiding antibiotics and hormones.

### Description of the recommendation

Antibiotic and hormone agreements should be implemented at a local or regional level, but harmonized at the European level. This may be more efficient than modifying legislation, since it creates responsibility and avoids disrupting international trade. By requiring implementation at the local level, responsible authorities are close to their areas of responsibility. By requiring harmonization at a European level, all producers in Europe will be placed on an equal competitive footing.

The system is to be self-controlled but should be supervised by private quality assurance agencies.

### Evaluation of the recommendations by the experts

- **Novelty**  
This area has begun to be investigated but does not yet belong to the mainstream research topics.
- **Importance**  
This recommendation has a moderate level of importance for European policy.
- **Timing**  
Foundational work for this would start in FP8\*. This research should focus on the ethical, legal, and philosophical status of the animal.

### Additional comments from the experts on the recommendation

There is an ethical component to the treatment of animals. There is a body of work to build on, which investigates our views of the status of what animals are.

In developing an ethical response to animal rights and the treatment of animals, we may need to move closer towards an ethically-based paradigm rather than a solely economic paradigm about how to treat animals. This would include for example re-examining the idea that humans are "above" animals at an existential level.

We could begin with the development of a program (philosophical, ethical, scientific, legal), to investigate and set the baseline around the idea that animals are not just products, but may or may not have legal rights. This would allow us to begin to see what the current legal status of various animals is and to put it under review.

This would encompass a reconfiguration of the view of how we raise, treat, and kill animals, and how they are currently viewed as objects rather than sentient creatures. This is predicated upon the idea that the separation between humans and animals is in some ways illusory.

**Vision the recommendation was derived from**

Vision 31: Responsible animal production in the EU.

## 16. Innovative participatory structures.

### **Description of the recommendation**

Large-scale exploratory action research\*, based on trying new methodologies and including new communication technologies for citizens' political communication debates. This should address the political culture. An area of investigation is how new participatory structures affect the political system\* and the people participating in it. This would include the development of participatory structures, which promote democratic processes.

The new methodologies should be developed with an eye to the local political context. One methodology may not be completely applicable to another context. European identity needs to be grounded in a more local identity.

### **Evaluation of the recommendations by the experts**

- **Novelty**

Novelty: this idea is still not embedded into the research structure but it has much room for growth in Central and Eastern European Countries.

- **Importance**

Such approaches could be linked and incorporated into corporate social responsibility codes. This approach is essential because it has a dual use for participatory democracy as well as to enhance the societal impacts of research results. Experiences show that this topic is not well accepted in the new member states, coming from the previous socialist countries.

- **Timing**

Such approaches should be implemented immediately, because such a suggestion entails a change in the processes that lead to the development of priorities and programs

### **Additional comments from the experts on the recommendation**

Action research\* should include:

A survey that helps to map what approaches and structures already exist for citizen participation in Europe. Also, some of the approaches that already exist may need to be strengthened. Technology assessment approaches could be strengthened, e.g. through the European Parliamentary Technology Assessment (EPTA) network\*.

Apply the living lab\* concept to research and priority setting.

Some participatory approaches have been applied to nanotechnology and biotechnology\*.

Such approaches have a lot of potential in improving policy transparency in the Central and Eastern European countries.

**Vision the recommendation was derived from**

Vision 32: EU for the people.

The recommendation is also related to:

- vision 36: Mass communication replaced by masses communicating (by providing communication technologies to facilitate the participatory structures)
- vision 42: Europe TV (by providing a medium for these methods)

## 17. Social innovations for aging societies are needed.

### Description of the recommendation

Research should be done to investigate the effect that a transition period between full-employment and full-retirement would have on the labour market. The aim of this would be to re-evaluate the rigid retirement age/pension system that currently characterizes pension policy.

This would include the introduction of an easy access to new voluntary activities for individuals during this longer transition period.

This should take into consideration best practices\* and the experiences of employment transition periods already in place.

### Evaluation of the recommendations by the experts

- **Novelty**

It is novel in some EU member states, whereas others, such as Sweden and other Scandinavian countries, already have some kind of transition period

- **Importance**

It is essential in knowledge economies, where work and hobby are interconnected and citizens do not want to stop working after a certain age. It is essential in an aging Europe, since it might help to solve some of the serious problems with the pension system. It increases individual liberty and the ability to plan one's career and it also allows to do something else that one has always wanted to do.

- **Timing**

The mental framework is there and it should be done immediately

### Additional comments from the experts on the recommendation

Changes are needed in the pension regulation of aging societies and in knowledge economies in which professional life and hobbies are increasingly interconnected, so that people could decide to continue working after the age of retirement. This can be linked to civil volunteering as well as payment schemes for the employment transition period. In some countries in the EU, there is no mandatory retirement once the retirement age is reached, while in others it is mandatory and causes psychological problems for many knowledge workers.

The new scheme/regulation recommended here does not require much money from the nations but rather a new mentality and new regulations. Of course, employment-related problems in some jobs will have to be solved (if someone does not retire, there is no new job opening). Nevertheless, at the age of sixty, when people do not need to care for their children anymore and have more free time, they have the potential to be the best part of

the workforce. They are experienced, have a high level of routine and developed adequate work habits. Why should we "send them away", if they do not want to retire?

**Vision the recommendation was derived from**

Vision 33: The ageing man/woman is a resource.

The recommendation is also related to:

- vision 17: Where there is a will, there is work.
- vision 50: Support for starting and maintaining a family - and the EU.



## 18. Promote technical and social innovations that can enhance people's access to and use of public transportation.

### Description of the recommendation

Promote innovation towards environmentally sound public transportation, by providing individual access to the community-owned and shared transport schemes and vehicles.

### Evaluation of the recommendations by the experts

- **Novelty**

The idea is quite innovative, since it will involve the use of artificial intelligence to develop a technical and social infrastructure that is focused on the promotion of environmentally sound public transportation.

- **Importance**

Very essential. Solves part of the traffic problems and enhances the current research in environmentally friendly vehicles, because it creates a demand for technology. It solves social problems too for people with poor access, for instance in case of emergency. Faster transportation means increased productivity. This is assumed to promote social inclusion by enhancing mobility for socially deprived people, where lack of transport can be an obstacle to inclusion or access to jobs.

- **Timing**

Very relevant. This should be done immediately. The mental framework is already in place. Scientific and technological solutions exist.

### Additional comments from the experts on the recommendation

Promote technical and social innovations to improve people's access to transportation schemes, through an intelligent and interactive network. Such a network will promote people's uses of both traditional public transportation modes and individual access to shared vehicles (e.g. private car sharing). This organic, intelligent, and living (self-adapting) network\* should cover and integrate both local and trans-national travelling, in a flexible, user-friendly, and environmentally sound way.

These innovations should enhance economic productivity by reducing home-to-work travel time, and promote social inclusion, by facilitating the mobility of socially deprived populations.

### Vision the recommendation was derived from

Vision 35: Environmentally sound transportation throughout Europe

## 19. Develop avatars that are able to act as a remote physical representation of myself.

### Description of the recommendation

For example, the avatar takes care of my house, my sheep, etc., when I am on holiday. Or it might travel to the top of the Mount Everest to collect impressions on how air smells over there and to create the feeling of being in the mountains. These avatars would have to include brain-machine interfaces for smell, taste, ...

### Evaluation of the recommendations by the experts

- **Novelty**

This is rather new.

- **Importance** It is essential at the moment.

It can substitute travelling and avoid people going into dangerous situations.

- **Timing**

There are many research questions, not only in a technical respect (authentication), but also concerning legal (e.g. identity theft), insurance, and social issues (human contact). Will we need avatar ethics and laws on avatar crime?

### Vision the recommendation was derived from

Vision 36: Mass communication by masses communication.

## 20. Select or develop plants and techniques for areas with extreme climate conditions.

### Description of the recommendation

We need plants for local production in wet or dry areas. They should withstand extreme climate conditions and be pest-resistant, etc. This means that we will need genetically modified plants to avoid using chemicals on the fields. We also need technologies to reduce the need for resources and management tools to implement closed cycles\*.

### Evaluation of the recommendations by the experts

- **Novelty**  
This is not new. The concepts are being developed, but more effort and resources have to be put into it.
- **Importance** This is essential to reduce global warming and feed the growing population.
- **Timing**  
This has been already incorporated in FP7\*, but at a too low level. The issue will be part of the joint programming activities and must be a serious part of FP8\*

### Additional comments from the experts on the recommendation

#### Problem

Sustainability has to be improved, alongside with developing tools for feeding the growing world population, which is expected to double before 2050. So, research efforts have to be intensified in creating new plants and cultivation concepts that can reduce resource consumption, use of fertilizers and pesticides, stop desertification, revive desert lands, and increase plant production in wet areas, too.

#### Plants and technologies to be developed

1. resistant plants or cultures to avoid the use of pesticides, either resistant plants or plants that can protect the production culture
2. plants to grow in hot and dry areas, to avoid watering
3. plants resistant to heavy rain
4. technologies to reduce energy consumption such as weed removing robots
5. bio-refineries for bringing back minerals to the soil and for the reuse of bio-energy

### Vision the recommendation was derived from

Vision 39: Food production in the EU is sustainable.

## 21. Policies towards immigrants and refugees appreciation.

### Description of the recommendation

European immigrant and refugee policies are currently too threat-focused. Adopting a more comprehensive view of the role of migration processes would help European citizens to understand immigration as an enrichment, instead of a threat. Coordination of educational, cultural, migration, and media policies is needed in order to change the mental framework of citizens and bureaucracy towards appreciation of immigrants (as human beings) and a better understanding of migration processes (also covering people emigrating from Europe). A trans-European research program into the historical and current role of migration processes in the building of European societies could provide a new understanding of the migration question. The value of multilingual cultures and the potential of more human migration policies at the European level should be better recognized.

### Evaluation of the recommendations by the experts

- **Novelty**

To consider immigration as a positive political process is totally new (e.g. Schengen rules etc. are merely measures to control)

- **Importance**

Supporting multiculturalism is necessary for the high level of cohesion in Europe.

- **Timing**

This is a slow and historical process, which should start now, however, in order to have an impact in the years to come.

### Vision the recommendation was derived from

Vision 40: Strengthening of language and culture.

## 22. Foster the use of biorefineries\*.

### Description of the recommendation

Use biorefineries\* to produce natural-based, biodegradable chemicals and to replace fossil-based chemicals.

### Evaluation of the recommendations by the experts

- **Novelty**

Biorefineries\* are not new. The concepts are being developed at a very first step.

- **Importance**

This recommendation is of a very high importance since fossil resources are running out. And use of renewable resources may reduce the degree of global warming.

- **Timing**

Biorefineries\* are being given attention in FP7\* and in the U.S. research programs. They have to be strongly integrated in the FP8\* and in European national research programs too.

### Additional comments from the experts on the recommendation

Shortage of fossil resources is not only a question of energy resources, but also a shortage of raw materials for producing chemicals such as food nutrients, packaging materials, tyres for bicycles and cars, various medicines, etc. We need renewable materials to replace the fossil raw materials. We also should develop the technology for producing the necessary materials in a sustainable and biodegradable form. The technology is called biorefinery\*. It has to be implemented as a research program on the European and national levels. In order to reduce transportation of biowaste, biorefineries could be in various sizes. So, small biorefineries doing the first refining of biowaste could be put in place locally, where the waste is produced and the basic chemicals could then be transported to processing plants where they are further developed into the needed goods (for example tyres or packaging materials).

Local biorefineries can produce bioenergy\*, which can be stored and used locally to reduce the need for external energy sources in agriculture or processing plants and act as a buffer\* when other renewable energy sources, such as wind or solar energy, are short.

### Vision the recommendation was derived from

Vision 44: The worst environmental threats have been beaten.

## 23. Project for Finnish best practises to be disseminated and used in other countries.

### Description of the recommendation

Finnish science and technology policy-makers should present their policy methodology, while other EU countries comment on it, identify its weak points, and suggest complementary and /or alternative solutions.

### Evaluation of the recommendations by the experts

- **Novelty**

The novelty of the recommendation is that it turns attention to focusing on partial analogies with the Finnish practice as best practice.

- **Importance**

Economic and social systems increasingly depend on research and development. Therefore, learning from pioneering practices is a basic precondition to keep pace with the EU's science-based competitors.

It enhances dissemination while at the same time it ensures European added value.

This type of interactive dialogue would stimulate new innovative ideas among decision-makers developing a country's innovation policy.

- **Timing**

Immediately (relevant for FP8\*)

### Additional comments from the experts on the recommendation

Finland's success in innovation should be communicated and commented upon by other EU member states, as possible best practice example. A series of exchanges of ideas will improve the flexibility of policymaking. Since technology always changes over time, this requires continuous changes in policy approaches and policy-making institutions, as well as in innovative companies and organizations. Therefore the communication of Finnish best practices should be followed by some feedback from decision makers of other EU member states, who are concerned about the innovation policy of their countries. This may uncover emerging deficiencies in Finnish policy. The exchange of ideas will contribute to the formation of new ideas and to the emergence of other best practice cases.

### Vision the recommendation was derived from

Vision 45: Finland as a pioneer of innovations.

## 24. Go and re-appropriate the countryside!

### Description of the recommendation

In our contemporary life, the countryside can provide an important place for different experiences, practical education and distant work. However, people continue moving away from countryside to urban areas and there is not enough awareness about the food production challenges of the future. Therefore, measures have to be created to make the countryside more attractive, especially for younger people, and to provide an infrastructure that also takes into account the needs of elderly people.

Foresight projects could be established to develop a new vision of the future for countryside planning, generating new views on the role of the countryside in contemporary life. Research could contribute to find the economic and cultural strengths of the countryside, which can bring people into active productive, industrial, and business- or service-oriented activities. Special research questions are related to the following themes:

- transportation systems for individual mobility
- cultural and political life in the countryside
- new employment opportunities
- maintaining the balance between production-oriented and recreational values

Environmental aspects of developing agricultural production should encompass possibilities for closed circuits\*, balanced management of natural resources at the local level, the use of fertilizers, energy management, and small local production units, such as biorefineries\*.

There are also important recreational / leisure time-related aspects connected with the generation of ideas about what might attract younger people to the countryside.

### Evaluation of the recommendations by the experts

- **Novelty**

There are already programs that support living in the countryside, thereby contributing to its economic survival, but the existing programs mainly focus on the local level, while such programs will also be needed at the national and European levels.

- **Importance**

Supporting living in the countryside is essential for all European citizens. It is essential to ensure that growing populations can be fed.

- **Timing**

FP8\* will provide a good context for including this kind of measures and foresight activities.

### Vision the recommendation was derived from

Vision 49: Go countryside!



## 25. European integrated policies on sharing work.

### **Description of the recommendation**

Population growth, aging, and increased productivity involve the risk that work will have to be shared in new and radically different ways in the future. For this reason, there is a need for new definitions and models of work and income, integrated policies on a European level, and research into new models of work, employment, earning, and way of living. Existing models should be investigated and compared, such as the Japanese women cooperative, in which one million women help each other (e.g. in child care) and create a new system of mutual support and cooperation.

Sociological, philosophical, and economic research should be conducted and an argumentation developed, to revise the future European way of working and living, in a way that will be characterized by the decoupling of working and making money. Such research should take into account different dimensions of human life: working, family, leisure, relaxation, values, spiritual development and technological communication and interaction.

### **Evaluation of the recommendations by the experts**

- **Novelty**

There are existing studies about work and employment, but at the European level of governance, such models are lacking.

- **Importance**

In order to manage the increasingly difficult balance between work, leisure, and life long learning, it is important to study new models of employment.

- **Timing**

Changing ways of working, leisure activities and structural trends is a gradual process, but it is important to intervene before problems would become unmanageable.

### **Vision the recommendation was derived from**

Vision 53: A happy day – Tuesday, 16<sup>th</sup> of April 2045.



## 26. Develop effective urban infrastructures supporting a multigenerational lifestyle.

### Description of the recommendation

Ensure that there will be possibilities for the traditional family model to survive in the future. Support the development of communication and mobile technologies that help to maintain family value structures. Support urban design and infrastructural developments that provide a friendly environment for large families and their changing needs during familial life cycles

### Evaluation of the recommendations by the experts

- **Novelty**

Answering the future challenges that will be raised by our higher average life expectancy and the need for sustaining family structures.

- **Importance**

Because of the aging society, the costs are rising very steeply. That means that turning the costs into a more efficient pathway can be coupled with the humanistic idea of sustaining family structures in an era of multi-age-families.

- **Timing**

SSH\* research, ICT research and economics should immediately take into account these requirements in the 8th FP\*.

### Additional comments from the experts on the recommendation

A living lab-approach\* can help to sustain and reinforce the connections inside the multigenerational families.

### Vision the recommendation was derived from

Vision 56: Traditional, multigenerational family model in the EU.

## 27. Encourage alumni work in corporate governance\*.

### **Description of the recommendation**

Encourage alumni councils and networks in the context of corporate governance\*. Include reporting about alumni work and forms of cooperation with formal employees in corporate governance codes.

### **Evaluation of the recommendations by the experts**

- **Novelty**

There have been some preliminary discussions on this issue. Alumni (former employees that are on pension) work happens in corporate governance<sup>1</sup> but not in an organized manner.

- **Importance**

In the case of our ageing society, an enormous amount of knowledge is lost when the pensioned employees leave their company. A competitive knowledge-based economy cannot afford that kind of loss.

- **Timing**

It should be considered in the 8<sup>th</sup> Framework Programme's\* priorities.

### **Additional comments from the experts on the recommendation**

European companies should be stimulated to establish Elderly Councils to take advantage of the knowledge and know-how of the former employees within advisory teams. Knowledge accumulation should be a priority in company governance.

### **Vision the recommendation was derived from**

Vision 59: Tranquil elderly period – actively.

## 28. Worldwide collaboration on space technology.

### Description of the recommendation

Encourage the establishment of a well-funded international collaboration project in the area of space travel and development of life-support on other planets. The ultimate ambitious objective is to develop the means to support human life on other planets

### Evaluation of the recommendations by the experts

- **Novelty**

This is a new programme, not known to exist currently. It could built upon existing collaborative structures, such as the International Space Station ISS, but goes way beyond the scope of any currently active organizations

- **Importance**

This is of the very highest priority. Without global action now, we expect the tendency in the longer term will be that elites (perhaps privately funded, very wealthy and powerful elites) will prepare their future at the expense of the populace, so that the efforts will not benefit mankind as a whole

- **Timing**

We need to act now to ensure that grassroots decision-making contributes to the very early stages of planning for the unavoidable future transition to non-Earth living, and to the definition of the form this future will take. Things need to start being done now.

### Additional comments from the experts on the recommendation

Title: We are Here To Go!

This matter, i.e. exploration of space, is too large, complex, and expensive to be addressed by either a single country or a group of existing cooperating countries, such as the EU. It is by definition a global collaboration. It is also a global matter in another crucial respect: the threats to life on Earth in the longer term are common to us all and we need a common global response to the fact that eventually we will have to leave the Earth.

Create popular support for the start of a new, internationally funded mega-programme along the lines of the space programme in the 1960s, with the overall objective of ensuring the longer term survival of human culture, when the world is burned out.

The global research collaboration will ensure that global communities will share the results of the process, which we expect to be as fruitful as the space programme of the 1960s, to the benefit of all.

### Vision the recommendation was derived from

Vision 60: Outer space exploration for future solution.

## 29. Project to explore global governance.

### **Description of the recommendation**

Explore conditions for transnational governance working for global justice and peace.  
Start looking at EU institutions in the first phase.

### **Evaluation of the recommendations by the experts**

- **Novelty**  
The concept is central in the Western tradition.
- **Importance**  
According to all governments, the world peace is the most important issue for humanity.
- **Timing** Studies should start as soon as possible.

### **Additional comments from the experts on the recommendation**

The 8<sup>th</sup> Framework Programme\* should begin with educational and exchange programmes for creating a world citizenship identity and with the elaboration of a catalogue of the existing legal frameworks.

### **Vision the recommendation was derived from**

Vision 63: A brighter future – or just a dream?

### 30. Stimulate research on human-machine interfaces.

#### **Description of the recommendation**

Natural access to ICT services by all natural human communication channels and brain interface. First of all, unstructured data (gestures, video, language) should be pre-processed and then passed to the brain via brain interfaces that stimulate the interpretation of the original information, but do not replace it.

#### **Evaluation of the recommendations by the experts**

- **Novelty**

Our present research into human brain interfaces focuses on implants. It would be new to develop ideas to transmit sensory information to the brain, without the use of implants.

- **Importance**

This research opens new opportunities for ICT applications, but also for therapeutic innovations and a better understanding of the human sensory system.

It is essential because it improves our ways of naturally accessing IT services and increases the amount of information that can be presented to the brain.

- **Timing**

This is a long-term effort, but in order to realize it in 2050, research should start now. This research is an enabling factor to realize many of the ICT-related visions presented by the citizens

#### **Additional comments from the experts on the recommendation**

Today, the access to ICT services is limited by how the human sensors cope with the vast information flow. Human-machine interfaces can be considered as upgrades of the communication channel to the brain. By using a human brain interface, the brain can collect and analyse more information than it can now. To realize this, there is a need for adequate sensors for pre-processing of the unstructured data (gesture, video, language) by a computer.

Current information transmission by technical means is largely limited to auditory and optical information, since other sensory information cannot be transmitted yet. To allow for a broader perception of sensory information, as proposed in many ICT visions, new interfaces between humans and machines need to be developed. Ideally these interfaces should be connected to the brain, but not implanted. This raises a lot of technical, but also societal and ethical (health and safety) issues to be examined. Human-machine interfaces are intended to stimulate the interpretation of information and greatly increase communication efficiency but will not replace the analytical and interpretative capabilities of the brain. The interface to the brain could happen via wire-based communication in a first stage, but will ultimately be wireless.

**Vision the recommendation was derived from**

Vision 69: Natural access to ICT services everywhere!

## 31. Glossary

### Action research:

"Action research... aims to contribute both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously. Thus, there is a dual commitment in action research to study a system and concurrently to collaborate with members of the system to change it in what is together regarded as a desirable direction. Accomplishing this twin goal requires the active collaboration of both researcher and client, and thus stresses the importance of co-learning, as a primary aspect of the research process." O'Brian, Rory, An Overview of the Methodological Approach of Action Research.

### Best practices:

Methods and techniques that have consistently shown results superior to those achieved with other means, and which are used as benchmarks to strive for. There is, however, no practice that is best for everyone and in every situation, and no best practice will remain the best for very long, since people always keep on finding better ways of doing things. <http://www.businessdictionary.com/definition/best-practice.html>.

### Bioenergy

Energy derived from biofuel or biologically degradable materials, such as plants or waste. It makes the use of energy sustainable.

### Biorefinery

The technology behind a biorefinery is similar to that of an oil/petroleum refinery, but it produces fuel, chemicals, or heat from biomass, e.g. wood or sugar cane. It decreases the volume of waste and makes agriculture and industry sustainable. It also contributes to the replacement of fossil fuel and energy, which are limited/finite.

### Biotechnology

Biotechnology is a subdiscipline of biology, that deals with the modification of living organisms and their derivatives, for specific human purposes or for use by technological applications, e.g. hybrid plants, GMO.

### Buffer (in case of renewable energy)

The produced energy is stored in the system and used only when other energy sources, e.g. wind or sunshine are short. It ensures energy safety for households or for the industry and decreases energy consumption.

### Closed cycles

A closed cycle means that the system is self-sustainable and reuses all or most of the things it produces. In agriculture it refers to the procedure whereby garbage (plants and

animal slurry) is reused in farming, to decrease or eliminate the amount of waste produced, the energy consumption, and the use of pesticides.

#### Corporate governance

Corporate governance is the set of processes, customs, policies, laws, and institutions affecting the way a corporation (or company) is directed, administered, or controlled. Corporate governance also includes the relationships between the many stakeholders involved and the goals for which the corporation is governed. The principal stakeholders are the shareholders, the board of directors, employees, customers, creditors, suppliers, and the community at large.

#### Corporate social responsibility:

“Corporate social responsibility is the continuing commitment of business to behave ethically and contribute to economic development, while improving the quality of life of the workforce, their families, the local community, and society at large.”

Corporate Social Responsibility: Making Good Business Sense

<http://www.wbcsd.org/DocRoot/IunSPdIKvmYH5HjbN4XC/csr2000.pdf>

#### EPTA network:

This is a European network of organizations, which advise parliaments on the possible social, economic and environmental impact of new sciences and technologies.

Technology Assessment (TA) is a scientific, interactive, and communicative process, which aims to contribute to the formation of public and political opinion on societal aspects of science and technology. <http://www.eptanetwork.org/>

#### Euthanasia

Euthanasia is a deliberate intervention undertaken with the express intention of ending of life, to relieve intractable suffering (Wikipedia).

#### Expert systems

An expert system is a computer programme, an application of artificial intelligence. It contains a knowledge base and the rules to work with this knowledge and the incoming data. The aim is to support human experts in solving problems, but the effectiveness depends on the quality of the data and the rules. Expert systems are used, for example, for medical diagnoses, route scheduling for vehicles, and insurance planning.



### Flexicurity:

Flexicurity is “...a degree of job, employment, income, and combination security that facilitates the labour market careers and biographies of workers with a relatively weak position and allows for enduring and high quality labour market participation and social inclusion, while at the same time providing a degree of numerical (both external and internal), functional, and wage flexibility that allows for labour markets’ (and individual companies’) timely and adequate adjustment to changing conditions in order to maintain and enhance competitiveness and productivity” (Wilthagen and Tros, 2004). Employment in Europe, 2006, European Commission.

### Foresight analysis

A foresight analysis is a method to try to describe what might happen in the future by lowering the level of uncertainty. Past and present trends have to be foresight-analysed and not only the big trends, but the seeds of change, the weak signals as well.

### FP7, FP8

The Framework programmes (FP) are the European Union’s most important funding programme/instrument to support research and technological development, with the aim of increasing growth, competitiveness, and employment in Europe. All research-

related actions of the EU are incorporated in the FPs. There are different topics and fields in an FP and both research groups or individual researchers can apply for funding from the budget of an FP. FP7 is designed for the period of 2007 to 2013, while FP8 will cover the following period.

### Joint programming

Joint programming is a rather new instrument in the European Union, designed to develop and strengthen the European research activities. The idea is that some research topics affect the whole community, e.g. aging societies and that some issues are too complex and expensive to investigate on a national level in the Members States. Thus, Member states voluntarily put their research ideas, methods, and results together, so that all partners benefit from the knowledge and experience of the others. Some 3-5 topics are defined for each year, e.g. 2009 was devoted to 1) agriculture, food security, and climate change; 2) a healthy diet for a healthy life; and 3) cultural heritage and global change. Nevertheless, joint programming is a weaker tool, since participation is voluntary and not supported by EU funding.

### Living labs, living lab approach

The living lab approach is a research method to develop new technologies or policies, with the active participation of customers or citizens. It employs working methods to integrate people into the entire development process, as users and co-creators, and recognizes the needs of users and the working conditions of service providers. Mostly, living labs deal with technological development when the new, not yet existing technological solutions or devices are provided to customers and citizens to assess the prospective technological solutions. In this case, the provider or policy-maker and the customers or citizens work together and plan together future developments.

<http://www.lilan.org/en/Living-labs-description/>

### Organic, intelligent and living (self-adapting) network:

In most cases, a self-adapting network is an adaptive system that changes its structure based upon external or internal information that flows through the network during the learning phase. (Wikipedia)

Political culture: the orientation of the citizens of a nation toward politics, and their perceptions of political legitimacy and the traditions of political practice.

### SSH

SSH stands for 'social sciences and humanities' and it constitutes a thematic part of FP7\*. SSH aims at supporting common European research in the field of social sciences and humanities. These research activities are funded by the European Union and some key fields of research are defined in advance, to promote common European solutions for the common challenges. It makes the European research infrastructure less expensive and more efficient, since resources are harmonized and researchers gain common knowledge about the research culture of other Member States.