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Abstract

One of objectives of the NetSoc project is to consolidate the ICT network research plan with ICT network technology user groups from so-called vertical sectors by expanding the ICT cross ETP approach with substantial discussions between ICT network research stakeholders and representatives from other ICT application sectors, to understand their communications needs. While considering various trends, as is presented in the document, it can be recognised that almost all of them have some interdependences with other identified trends, establishing relations among trends and main industry (non ICT) sectors, which are defined in the document. By analysing the identified selected trends and potential impacts on the future networks and ICT in general, several research and innovation challenges can be identified, which will be extended and further elaborated in discussions with the vertical sectors in the scope of future NetSoc project activities.

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Executive Summary

One of objectives of the NetSoc WP2 "Building ICT network positions" is to consolidate the ICT network research plan with ICT network technology user groups from so-called vertical sectors, addressing various non-ICT domains. Thus, the NetSoc project aims to expand the ICT cross ETP approach by discussions between ICT network research stakeholders and representatives from other ICT application sectors – so-called vertical communities – to understand their communications needs for the long-term future, through document exchanges, as well as joint actions and participations in respective activities.

The final ambition is to consolidate and enhance the ICT network research plan incorporating the requirements of the targeted application sectors, including establishment of a continuous dialogue among the sectors. The dialogue will also include discussions and corresponding updates of the ICT Strategic Research Agendas, provided by Net!Works, ISI, and NEM ETPs as well as further ICT communities (e.g. IoT/EPOSS).

While considering various trends, as is presented in the document, it can be recognised that almost all of them have some interdependences with other identified trends. In order to establish a relation among trends and main industry (non ICT) sectors, the following relation among the trends and the main industry sectors can be established:

- Assisted leaving and health (e-Health) – are clearly affected by the Demographic change and increased health awareness

- Energy – which is already driven by trend in changing the energy concepts

- Transportation and logistics – clearly affected by Increased mobility and New generation of logistics and transportation, but also significantly impacted by Change of energy concepts and Demographic change.

- Evolution of TV production.

By analysing the identified selected trends and potential impacts on the future networks and ICT in general, as further elaborated in the document, the following main related research and innovation challenges can be identified:

- New generation of user's devices and terminals

- New service platforms

- New infrastructures

- Virtual reality

The list of the identified main challenges will be extended and further elaborated in discussions with the vertical sectors, as is planned in the NetSoc project. To do so, the project will distribute this deliverable, togetrher with the SRA documents from the ICT ETPs, to the vertical sectors, in order to launch wide discussions and establish necessary dialogue among ICT and other industry sectors.

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1 INTRODUCTION

One of objectives of the NetSoc WP2 "Building ICT network positions" is to consolidate the ICT network research plan with ICT network technology user groups from so-called vertical sectors in the domains such as Transport, Energy, Health, Content, Security, and potential synergies relating to smart cities by driving cross sector relations. Thus, a dedicated project task (Task 2.1 "Cross sectors interactions") has been included in the project work plan to expand the ICT cross ETP approach by discussions between ICT network research stakeholders and representatives from other ICT application sectors – so-called vertical communities – to understand their communications needs for the long-term future, through document exchanges, as well as joint actions and participations in respective activities. Here, the final ambition is to consolidate and enhance the ICT network research plan incorporating the requirements of the targeted application sectors.

The discussion among the ICT and other sectors will be facilitated by the NetSoc project in two steps:

- First discussions, which will be initiated by the NetSoc project, to bring together both communities to discuss ICT research roadmaps in respect to the needs of the vertical sectors as well as to define a first set of common interests in the research and innovation arena
- Second discussion, which will be used to discuss documents established within the first phase and refine them in accordance with a constant dialogue among the sectors during the NetSoc project life

Both phases of the dialogue will also include discussions and corresponding updates of the ICT Strategic Research Agendas, provided by Net!Works, ISI, and NEM ETPs as well as further ICT communities (e.g. IoT/EPOSS).

This document, NetSoc Deliverable D2.4 "Identification of cross-sector interactions" together with first versions of the ICT SRAs mentioned above will be used to initiate discussions among ICT and vertical sectors. Thus, starting from the global trends identified (Chapter 2), particularly targeting the most relevant societal, economic, and environmental trends, this document establish potential relations among the trends and main industry sectors, aiming at identification of the related potential impact on the ICT at large (Chapter 3).

2   GLOBAL TRENDS AND INDUSTRY SECTORS

2.1   Overview of the global trends

In order to identify global trends and their relation to various industry sectors with a potential impact on future networks and ICT at large, the trends defined in the Eurescom Study P2251 "Global trends and their impact on the ICT industry – ICT research and development topics of tomorrow" [1] have been considered. Thus, the global trends can be grouped in four categories, technological (mainly ICT driven), societal, economic, and environmental trends, as is presented in the Table 1 below.

Table 1: Trends overview

Technological driven trends:	Societal trends:
• Sensorisation	• 2Self-expression of users
• Miniaturisation	• Crowdsourcing
• Robotics	• Gamification
• Smart Home	• Urbanisation
• 3D visualisation	• Ageing societies
• Internet of Things	• Migration
• Artificial Intelligence	• Young societies
• Digital preservation of cultural heritage	• Dramatic rise of lifestyle-related chronic diseases
• Virtual reality to become immersive	• Erosion of privacy as we know it
• Improved interfaces	• Rising social networks
• Direct interfacing with the human brain	• Lifelogging on the way to mainstream
• Dominance of video	• Increased mobility
• Big Data	• Increased critical infrastructure protection
• M2M communication	
Economic trends:	**Environmental trends:**
• ICT becoming old economy	• Climate change
• Globalisation	• Natural resources
• Lifelong learning on the rise	• Change of energy concepts
• Changing work organisation	• Enhanced systems for observation and prediction
• Accelerated technology cycles and mass customisation	
• New generation of logistics and transportation	
• Evolution of production in agricultural industry	

Since the main goal of this document is to identify cross-sector interactions, impacting future networks and ICT at large, the technological, mainly ICT driven, trends are not further discussed. Thus, a selection of the identified trends from other three categories have been done in accordance with their relation to particular industry sectors, indicating to have a significant potential impact on ICT, and are evaluated below (Sec. 2.2), based on results from [1].

2.2   Description of selected trends

2.2.1   Societal trends

2.2.1.1   Ageing societies

Ageing societies are one aspect of demographic change. It means that societies in Europe, Japan and other areas are becoming older in average due to lack of young people. The main reason is decreasing birth rates and mortality rates in highly developed countries. A particular problem is the self-increasing effect: the less young people, the less births, the less young people, and so on. William H. Frey, an analyst for the Brookings Institution think tank, predicts the median age in Europe will increase from 37.7 years old in 2003 to 52.3 years old by 2050 while the median age of Americans will rise to only 35.4 years old.

Relevance for the ICT sector:

- Services, applications and devices for elderly people (easy to use, remote maintenance and support, hearing impaired, sight impaired, less able to learn new things)

- eHealth/ambient-assisted living services (including service robots)

2.2.1.2   Dramatic rise of lifestyle-related chronic diseases

By 2020, chronic diseases will account for almost three-quarters of all deaths worldwide, with the largest share in developing countries, according to WHO forecasts (World Health Report 2010, WHO 2010). In developing countries, the relative rise in wealth and the adoption of a Western life style by the more affluent will promote the rise of chronic diseases like obesity, heart diseases, and diabetes, whereas in most developed countries, the trend towards an increase of chronic diseases is strongly related to the ageing of society as well as an unhealthy life style.

Relevance for the ICT sector:

- The big opportunity is that prevention of nutrition-related, which often means: life-style related, diseases, can help to improve overall health while at the same time saving costs in the healthcare systems. ICT-enabled prevention may be particularly suited in this respect.

2.2.1.3   Increased mobility

Increased mobility describes the fact that people increasingly do things (e.g. work, learn, pleasure) while on the move, and not at fixed, specified places.

The field is huge and includes road-, air-, water-, rail-transport, and from other points of view: passenger transport, freight transport, containerised transport, bulk transport. New visionary ways of transport have to be found (for example pipeline passenger transport). This includes replacing "physical" mobility through "virtual" mobility using ICT.

A lot has already happened as far as people's lives are concerned. They can e.g. use their ICT equipment from many places. However the means are limited and often very

expensive. We might expect much better connection anywhere, anytime at maximum speed and with appropriate features.

Concerning transport here is no real integration of different sectors, nor have there been very visionary ways of transport. In future we might expect much more visionary concepts.

Relevance for the ICT sector:

- Increased demand for efficient control of transport and logistics incl. ICT based toll systems for road transport.

- Increased demand for "virtual" mobility services – as close to natural face-to-face experiences as possible.

2.2.2 Economic trends

2.2.2.1 Accelerated technology cycles

Since the end of the 20th century, there is a widespread perception among experts and citizens that the pace of technological development has been accelerated and continues to accelerate. The strongest proponent of this view has been Ray Kurzweil who postulated an exponential growth of both technological developments as well as of related value for users and consumers. Starting from the confirmation of Moore's law on exponential growth of computer chip capacity, Kurzweil claims that this is representative for technological progress in general [2].

Some scholars see a correlation between global population growth and the speed of technological progress. The logic goes: more people lead to more potential inventors whose increased number of inventions will lead to faster technological growth; this, in turn, will increase the capacity of Earth carry more people which will lead to faster population growth, and so on [3].

Relevance for the ICT sector:

- Increasing pressure for technological innovation, which may exacerbate cost pressure and competition

- Growing potential for increased turnover due to customers getting used to adopting new technologies and services faster than previous generations

2.2.2.2 New generation of logistics and transportation

Transportation and logistics (including warehousing and storage) are among the oldest industries. As a result of globalisation and development in certain ICT sectors they are undergoing a profound transformation. Traditionally, transportation means (road, rail, air, water, pipeline, cable and space) were operated and managed separately with a limited number of handover points. With globalisation, the amount of goods and the number of people being transported grew enormously. This was made possible by the increasing level of ICT support in the logistics.

Relevance for the ICT sector:

- As complexity grows and environmental factors become ever more important, the role of ICT will become even more important in tracking and management, optimising routes, maximising efficiency and keeping costs down, meeting time constraints (just in time delivery), etc.

2.2.2.3   Evolution of production in agricultural industry

A lot has happened since the first domestication of plants and animals more than 10,000 years ago. However, never before did the Earth have to feed more than 7 Bln people, and never before did we use so much bio material for other purposes, such as making fuel. Only modern agricultural methods and the use of fertilisers could solve those problems. On the other hand people become increasingly aware of healthy food and request organically produced products.

There is a clear trend towards more efficient use of fertilisers due to costs, increased environmental awareness and demand for organic food. ICT methods such as soil monitoring can help optimising fertilisation. Also the usage of ever scarce water resources must be optimised. Monitoring the weather and controlling humidity can help here.

So there are two overlaying trends of the upcoming years: mass production and sustainability in agriculture. Those trends are somewhat contradictory and probably need a compromise. However, innovative methods and the use of ICT for controlling and managing can greatly help.

Relevance for the ICT sector:

- Sensor networks for soil monitoring

- Controlling and steering water management

- Automated quality control of healthy and/or organic food

2.2.3   Environmental trends

2.2.3.1   Climate change

Climate change is a variation in long term weather patterns. This variation may be due to natural causes, e.g. oceanic processes, and solar radiation variation; or may be caused by human actions, e.g. human impact on global warming. Both natural and human actions may also have impact on climate changes, not by changing patterns but by reducing normal climate cycle periods, accelerating events, e.g. the thawing of Greenland's ice in July 2012 at the fastest rate in recorded history (http://www.nasa.gov/topics/earth/features/greenland-melt.html).

Telecommunications/ICT can contribute to reduce the impact of other sectors on the climate change, e.g. with smart grids, but the energy consumption in the Telecommunications sector is very significant for the global energy consumption, and consequently for the climate change, even if there are nowadays several initiatives to reduce this consumption.

Relevance for the ICT sector:

- There are several topics to be considered regarding the impact of Telecommunications/ICT on the climate change, and several actions, including research of new technologies, already taking place which may reduce Telecommunication sector's consumptions and climate change factors, and improve climate change awareness [4], e.g.: Methodologies for Environmental Impact Assessment of the ICT Sector; ICTs for Monitoring Climate Change; ICTs for Adapting to the Effects of Climate Change and Environmental Degradation; ICTs for Mitigating the Effects of Climate Change; Energy Efficiency and Low Carbon Economy; Smart Grids and Smart Meters; Energy efficiency in Data Centers and Cloud Computing; Smart Cities and

Smart Buildings; Smart Logistics and E-Procurement; and Electric Vehicles, Mobility, Smart Ways of Working.

2.2.3.2   Shortage of natural resources

Natural resources are materials that can be found in a natural environment, e.g. air, water, energy, etc. They can be separated in renewable resources, those that you can use more than once, e.g. wind, water; and the non-renewable ones, those that can be used only once, at least for a long period of time, e.g. coal, air. Some resources appear everywhere, e.g. air, wind; but most have them appear only in some locations, e.g. water, coal.

The demand for resources is affected by technology and societal needs, and this demand will have an impact on the economy, and sometimes on politics.

Europe has the goal of drawing 20% of its energy from renewable sources by 2020, also as part of its wider strategy for tackling climate change. This strategy aims to make Europe less dependent on imported energy, as well as boosting innovation and employment. But Industry must be boosted by European policies in order to bring competitiveness to the prices of investments in renewable energy sources comparing with the costs of fossil fuels.

Europe also set up plans for cutting emissions by over 80% without disrupting energy supplies and competitiveness, and committed to reducing greenhouse gas emissions to 80-95% below 1990 levels by 2050 by exploring the challenges of decarbonisation. The envisaged roadmap includes decarbonisation, energy efficiency, renewable energies, smart infrastructures, and a common energy market.

The ocean covers more than two-thirds of the world's surface, and its coastlines and beaches are being destroyed, its waters are polluted, acidity is increasing, water is warming, food webs are fraying, and key species and populations are vanishing. Oceans preservation is urgent, together with many other earth ecosystems that have been threatened for long but still can be saved with society awareness and protective policies.

Relevance for the ICT sector:

- The role of the ICT sector on the smart grids and energy efficiency management systems is crucial. The development and increased use of media technologies can also play an important role in natural resources preservation, e.g. video conferencing systems can reduce the need for travelling; online distributed information can create awareness for biodiversity and natural ecosystems.

2.2.3.3   Change of energy concepts

Reduction of CO_2 emission in the energy sector can be achieved by optimisation of energy production and distribution at large as well as by increasing usage of decentralised and renewable energy sources and means of energy production. .

In order to achieve savings in electrical energy consumptions or its optimization within homes, as an example which can be generalised to cover similar use cases for buildings, factories, areas, etc., operation of typical home appliances, such as white goods, lighting, heating/air condition, standard ICT equipment, construction elements (e.g. darkening), etc., should be controlled in accordance with real needs of the customers and current availability of the electrical energy and corresponding energy price. The same principle can be applied to optimization of the consumption in respect to other energy sources, such as gas, and by taking in consideration possibility of the users to produce and inject energy in overall energy network by using alternative energy sources, such as solar and wind.

Numerous on-going research activities world-wide are considering and implementing various solutions to for establishment of so-called Smart Energy Grids, aiming to incorporate different types of energy sources and production, which includes centralised and decentralised energy production sites as well as a continuously increasing number of alternative/renewable sources, within a flexible and modern energy distribution infrastructure.

Relevance for the ICT sector:

- Smart Energy Grids: ensuring timely support of the energy demand and pursuing maximum exploitation of green energy sources.

- Energy distribution in provision of necessary communications infrastructure, including integration of decentralised and renewable sources, and energy consumption optimisation at homes, buildings, factories, areas, etc.

- Controlling home appliances (e.g. lights, refrigerators) according to consumer patters in a most efficient way.

2.3 Identification of relations among trends and main industry sectors

While considering various trends, it can be recognised that almost all of them have some interdependences with other identified trends. Thus, some of them are clearly related to each other, such as Accelerated technology cycles and Evolution of production in agriculture. On the other hand, some of the trends are affecting many other trends, such as Climate change and Shortage of natural resources, and cannot be easily assigned to only one industry sector. Therefore, in order to establish a relation among trends and main industry (non ICT) sectors, the following trend clustering is proposed, where the two production-related trends are merged and the two general environmental trends are considered along all listed trends:

- Demographic change (Ageing societies)

- Increased health awareness

- Increased mobility

- Change of energy concepts

- New generation of logistics and transportation

- Evolution of TV production as a particular trend concerning the area of media and digital content

Based on the trend list provided above, the following relation among the trends and the main industry sectors can be established:

- Assisted leaving and health (e-Health) – are clearly affected by the Demographic change and increased health awareness

- Energy – which is already driven by trend in changing the energy concepts

- Transportation and logistics – clearly affected by Increased mobility and New generation of logistics and transportation, but also significantly impacted by Change of energy concepts and Demographic change.

- Evolution of TV production.

The identified sectorial trends and their potential impact on future networks and ICT are discussed in the next chapter (Chapter 3), whereas concrete interactions among ICT sector and the identified non-ICT sectors are presented in Chapter **Error! Reference source not found.**.

3 POTENTIAL IMPACT OF THE SECTORIAL TRENDS ON THE ICT

3.1 Demographic change

In most of the world regions with high per capita income (such as), the population is becoming older and entire societies have to adapt to this situation affecting various areas of life; change of working environments making possible professional engagement of older people, living styles enabling active participation for older generation, and education systems allowing continuous learning processes.

Ageing is already causing significant problems in financing social security models in the affected world regions, where older generation will have to continue to work a longer period before achieving retirement phase. Thus, it will be necessary to ensure possibility to work in various areas for older people, which will probably increase costs related to establishment of such working environments.

Besides increase of the retirement age, it will be necessary to establish required policies and laws to ensure that older people can participate and contribute in and to the various societal areas, supporting and motivating economy to move in this direction.

Impact on future networks and ICT at large:

- Need for easy to use interfaces, devices and services, suitable for older generation with possible particular needs (e.g. hearing or sight impaired), including remote maintenance and support.

- Services enabling older people to participate and remain socially active as well as to communicate in almost real living environments – provision of virtual reality type of services

- Increased number of devices including robots, helping the older people, which might be connected via networks to particular service points

- Adaptable and scalable logistics and transportation services for elderly people, the efficiency of which could be increased by ICT and interconnection

3.2 Increased health awareness

Health awareness has been recently increased and people are trying to do more to improve their health situation, to prevent illness, to live healthier including supporting sports activities and using healthy food, etc. With this positive trend people are setting new and challenges requirements on the whole societies to establish appropriate health systems and environments.

In order to meet the requirements on the health in general, the health systems are becoming more and more expensive. Due to impact of aging societies, mentioned above, the health systems are becoming not affordable even in countries with high living standard. On the other hand, people are ready to invest a larger part of their income in support for their health as well as related products and services.

There are real limits in ensuring financial resources for modern health systems, as they are required nowadays and will be needed in the future. Therefore, future related policies and

lows will have to limit public costs of the health systems, but will also have to support solutions to increase efficiency of the health systems. From this point, a larger and more intensive participation of individuals in the overall health system will necessarily increase.

Impact on future networks and ICT at large: Remote diagnosis and care services by using interconnected smart devices and health centres, including professional online consultation and coordination system for doctors, patients, and other actors in the area, will be increasingly needed in the future. Teleservices for professional medical services (e.g. teams at remote destinations, remote experts participating in diagnosis and surgeries) will be needed, which could be considered as part of general future and enhanced services, such as virtual reality.

3.3 Increased mobility

Mobility of people on daily, weekly, etc. bases is significantly increasing, including movement of working and private environments within Europe and around the globe. People are moving to cities and metropolitan areas with significant concentration of population and, on the other hand, the rural areas are more and more left without population.

Costs of living in metropolitan areas are significantly increasing, where housing prices are becoming very high, so that families have to reduce spending in other areas. Furthermore, the transport costs, which are also increasing because of energy constrains (more evaluated below), are also taking significant part of people's income. On the other hand, value of assets in rural areas is reducing, where housing prices are decreasing, but cannot compensate the increasing transport costs.

It has to be reacted on the policy level to the population concentration in urban areas, to respond to necessity of optimal usage of various resources in the cities. On the other hand, the rural areas will have to be supported, to ensure societal and economic existence of such areas.

Impact on future networks and ICT at large:

- Frequency shortage in urban areas

- Need for shared infrastructures in urban areas (but not limited to) and/or establishment of a "federated" service offer, where operators can rather work together with alternatives that to compete with them

- Need for efficient establishment and maintenance of infrastructures and services in less populated (rural) areas

- Increased demand for "virtual" mobility services – as close to natural face-to-face experiences as possible to be used in professional and private life, reducing need for traveling.

- Wide (at least European) service and offering interoperability - enabler to use "domestic" services everywhere without limitations - more dedicated to future services and based on well-known globally used applications, also tackling roaming issues

3.4   Change of energy concepts

People in their working and private environments will have to adapt to various measures related to the new energy concepts, including usage of particular service platforms and devices, which will have to be supported by respective awareness building measures.

Costs for energy delivery will increase, in order to enable more efficient energy concepts, which will affect both business and private activities, leaving smaller space for investments and spending in other areas.

Since neither industry nor the private individuals will not voluntarily introduce and use new and, of course, more expensive energy delivery concepts, regulation at various levels will have to be establish, in order to support and motivate society to perform the change of energy concept.

Impact on future networks and ICT at large:

- Management of home (building, etc.) appliances and necessary sensor interconnections enabling Smart Homes - within concept of home automatisation, communications, and media provision

- Smart Grid connectivity at large and provision of related service platforms as well as management of extremely large and decentralised data, including customer care at various levels.

- Awareness building platforms, interfaces, and support systems

3.5   New generation of logistics and transportation

Necessary measures for CO_2 reduction and limited energy resources will force more efficient logistics and transportation systems, which will probably be more complex from organisational point of view and will have to be adopted by consumers.

Because of increasing energy prices and costs of the improved logistics and transportation systems, related services will remain expensive.

Regulation of logistics and transportation at various levels will have to be established, in order to support and motivate society and industry to establish new generation of services in this area.

Impact on future networks and ICT at large:

- Realisation of Localization and Tracking functions, Traffic monitoring and routing, including management of electro-charging

- Ubiquitous access, including ad hoc and specific types of communications (M2M, V2V, V2M, V2I, etc.), interconnections among extra-large number of different devices (communication equipment, service platforms, appliances, sensors)

3.6   Evolution of TV production

Europe should have an interest in remaining among the top players in the networking domain, considering the magnitude of this economic sector. Networks are now a critical infrastructure, and Europe must not become fully dependent on external suppliers, for the infrastructure. Even in time of crisis and with moderate growth, the revenues from communication services are quite significant, at about 300 Bn€ in Europe (about 1600 Bn

€ at world level), i.e; about 3% of EU GDP. If growth is moderate in Europe, it will however be significant in Asia. The opportunity is that most of the growth is based on mobile services growth, a domain of excellence of EU industry from the infrastructure point of view [6].

According to a report on the new forms of television, published by institute Idate [7] in July 2012, some major trends appear as follows:

- (1) The world television market is estimated at €340 billion in 2012 and expected to experience a steady decline in growth up to 2016. Nevertheless, the most structuring element is evidenced by the success of OTT video offerings in the United States, either with Netflix streaming 22 million subscribers in Q1 2012 (+9% compared to Q4 2011, for an income of more than 500 M$ in the quarter) or Hulu, which periodically saves more than 1.5 billion ad views streaming video per month, Hulu Plus reaching 2 million subscribers in Q1 2012 (+33% compared to Q4 2011)10. Europe has no similar case for the moment. For example the beginning of CanalPlay Infinity appears mixed in France with 25,000 subscribers in Q1 2012, the weight of the USA strengthens its global market for OTT (Over-The-Top) video, and therefore on the Connected TV issues.

- (2) In 2020, the Connected TV market is expected to represent a significant part with 63% of the new services for the OTT market, the PC becoming then a minority.

3.7 Identification of general challenges on ICT

By analysing the identified selected trends and potential impacts on the future networks and ICT in general, the following main related challenges can be identified:

A) New generation of user's devices and terminals

- Easy to use (including novel interfaces), remote maintenance, wide interoperability within same and previous generations

- Every days' appliances, sensors/things, robots, devices for awareness building, and of course communications equipment

- Enabling M2M, V2V, V2I, I2H, etc. types of seamless communications

B) New service platforms

- Supporting mentioned economic sectors, taking into account related specific, and expanding classical operators' business accordingly

- Management of large amount of decentralised data and customers of different size and types

- Provision of scalable and federated/shared services and applications

C) New infrastructures

- Overcoming frequency shortage and enabling fast network coverage/deployment including effective remote maintenance of the infrastructure

- Shared and federated infrastructures, including open communication for variety of devices and interfaces

D) Virtual reality

- Near to real content and media experience, including high level of interactivity

- Supporting challenged economic sectors mentioned in Sec. 2.3

- Enabling integration with "standard" ICT and other coexisting services

4 CONCLUSIONS

While considering various trends, it can be recognised that almost all of them have some interdependences with other identified trends. Thus, some of the trends are affecting many other trends, such as Climate change and Shortage of natural resources, and cannot be easily assigned to only one industry sector. Therefore, in order to establish a relation among trends and main industry (non ICT) sectors, the following relation among the trends and the main industry sectors can be established:

- Assisted leaving and health (e-Health) – are clearly affected by the Demographic change and increased health awareness

- Energy – which is already driven by trend in changing the energy concepts

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- Evolution of TV production.

By analysing the identified selected trends and potential impacts on the future networks and ICT in general, the following main related challenges can be identified:

- New generation of user's devices and terminals

- New service platforms

- New infrastructures

- Virtual reality

Of course, the list of the identified main challenges is not yet complete and will be extended and further elaborated in discussions with the vertical sectors, as is planned in the NetSoc project. To do so, the project will distribute this deliverable to the vertical sectors, in order to launch wide discussions and establish necessary dialogue among ICT and other industry sectors. Furthermore, as mentioned in Chapter 1, the SRA documents created by the ICT ETPs (Net!Works, ISI, and NEM) will also be a subject of the discussions among the sectors.

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