

# Mobile Communications & Technology Platform Final Report



© Siemens AG, CT SM, All Rights Reserved

**Picture <sup>of</sup> the Future**  
**Information and Communication**

## Table of Contents

0.	Introduction.....	3
1.	Research & Development - “eMobility” will be essential for economic growth in Europe... 3	
1.1.	Ensuring leadership in mobile communications.....	3
1.2.	eMobility – a long-term initiative at European level.....	4
1.3.	Seven key areas for collective technology investment (Action Line V).....	4
1.4.	Recommendations.....	4
2.	Interoperability.....	5
2.1.	Mobile services must be interoperable.....	5
2.2.	Interoperability is challenged by complexity.....	5
2.3.	Recommendations.....	5
3.	Content.....	6
3.1.	An appropriate legal framework should support industry efforts to offer mobile content. ....	6
3.2.	Recommendations.....	6
4.	Mobile Payments.....	7
4.1.	Which regulation should apply to mobile payments?.....	7
4.2.	New rules needed for the new mobile payment segment.....	8
4.3.	Recommendations.....	8
5.	Security.....	9
5.1.	Opportunity to establish common customer authentication.....	9
5.2.	Trusted and secure systems can be based on SIM and common standards.....	9
5.3.	Recommendations.....	9
	Annex: Research & Development.....	11
	Annex Content.....	42
	Annex Security.....	49

## **0. Introduction**

As outlined in the Commission's Communication "Connecting Europe at High Speed" (COM(2004) 61 final) the aim for establishing the mobile platform was to identify stakeholder's views on short, medium and long term challenges for the mobile industry.

In its mid term report in January the platform had identified challenges such as network rollout, interoperability, appropriate regulatory environment, research, security, content, m-payment and spectrum management.

The mobile industry believes that those challenges are still there to be overcome. Mobile telecommunications has had a positive impact on all economic and social activities comparable to the effect of the Internet. This evolution is not yet complete. Europe's position is being challenged by developments in Asia and the US. Therefore action needs to be taken to ensure that Europe participates fully in the coming wave of innovation, the associated employment growth and derives maximum economic and social benefits.

A successful European economy in a domain with such fierce global competition can only be developed based on technology leadership. In its new report – reflecting the platform's work from January to May 2004 – the platform therefore focuses on research and development, interoperability, content, m-payment and security.

Members of the Mobile Communications and Technology Platform are: Alcatel, Bertelsmann, Cegetel, Ericsson, Hutchison 3G, Nokia, Orange, Philips, Siemens, ST Microelectronics, Telefónica Móviles, Telecom Italia Mobile, T-Mobile International and the Vodafone Group.

## **1. Research & Development - "eMobility" will be essential for economic growth in Europe**

### **1.1. Ensuring leadership in mobile communications**

Industry in Europe is committed to taking all needed actions to play a leading role in enabling mobility in all communications. To maintain and achieve world leadership, Europe's position in the global mobile and wireless market needs to be further developed. European contributions to global standards must have an even stronger global relevance than in the past. To keep pace with the investments in other regions, China, Korea, Japan and North America - to name just a few - Europe needs to strengthen its investments in R & D and future generation mobile and wireless systems.

At present Europe's mobile communications manufacturers are allocating between 10-20% of turn-over to R & D. Nonetheless, technology leadership does not only depend on the individual organisations alone - it requires concerted efforts from users, service providers, manufacturers and the research community, as well as from regulators and governments in order to provide the environment needed for growth.

## **1.2. eMobility – a long-term initiative at European level**

The challenge of ensuring and improving European leadership needs to be embedded in a long-term program of actions ("an eMobility Initiative"). This program reflects the full cycle of innovation from basic and concept research through trials, which lead to the commercialisation of products, services and applications. Basic research has to lead to the transfer of results into products in a market-oriented manner. Europe must play a leading role in inventing future technologies. To reach this goal, collaboration at European level in the research stage is crucial, given the distribution of the mobile and wireless industry and research community across Europe. Experience from the past shows that collaboration is a valuable way to realise joint progress and a prerequisite for consensus building in order to achieve harmonised solutions, economy of scale and global roaming. Future technology options can be explored in a better manner with improved use of resources leading to the timely formulation and adoption of standards and common specifications.

Five Action Lines provide the strategic framework for the eMobility Initiative and cover Market Development, Regulations, Standardisation, Information Space and Technology.

### **1.3. Seven key areas for collective technology investment (Action Line V)**

- Ambient radio
- Ambient networks
- Security, trust and business infrastructure
- Services and service architectures
- Mobile service creation greatly simplified
- Accompanying measures
- Basic research

### **1.4. Recommendations**

Industry is convinced that "eMobility" will be essential for economic growth in Europe. Industry therefore invites the Commission to take into account the "eMobility Initiative" composed of 5 specific Action Lines, of which the R & D is Action Line V, and is composed of the eMobility Platform and a set of large integrated Projects. The Framework Programme should provide for a contribution to the cooperative R & D on the European level.

Collaboration in research and innovation in current and previous EU Programmes has been very successful and has played a very constructive role in developing global leadership in mobile markets. It is essential to improve a sustained European competitive position in the global wireless and mobile market.

Industry is willing to allocate funds and human resources to the continuation and extension of collaborative R & D on the EU level. Europe's leading mobile and wireless organisations propose a programme of collaborative R & D of 1 Billion Euro private funding matched by 1 Billion Euro public funding covering a period of 4 years. This annual funding of 250 Million Euro annually is proposed in the context of annual investment in R & D by leading European mobile manufacturers of over 12 Billion Euro. Industry invites the Commission to reflect this joint effort between the public and private sectors in the new Framework Programme.

## **2. Interoperability**

### **2.1. Mobile services must be interoperable**

The Mobile Platform strongly believes that end-to-end interoperability of services, content, systems and devices will be key to achieving mass market adoption of innovative mobile services and the associated network effects. Industry is already working in relevant fora to this end.

### **2.2. Interoperability is challenged by complexity**

Delivering end-to-end 3G interoperability at all layers is more complex than the challenges faced in the development of GSM. In addition to the use of the technology, 3G allows for a much wider range of services, applications and interfaces. The industry is in a dynamic phase where services are being introduced in parallel to technology development and it is not viable for any single player in the value chain to implement the entire breadth and depth of all relevant standard specifications. Mismatches in the selection and implementation of sets of features in such a rich standards environment may lead to interoperability emerging slowly or partially.

Industry must continue to identify a set of features for each core functionality, paying attention to both interoperability of that functionality and its availability for other functions.

The Mobile Platform believes that, after elaboration of a standard including the corresponding test specification, there are several interlinked steps required to reach a coherent interoperable feature set:

- selection of the implementation set of features (e.g. GSMA UMTS Essential features) not only for each enabler specification but also with regard to a relevant combination of enabler specifications
- selection and prioritization of features and test requirements in accordance with a common view of commercialization sequence in a given time frame
- generation and validation of a test suite enabling reproducible results (and supporting commercial availability of a test environment on a nondiscriminatory basis)
- development of a certification process

Paying attention to timely execution of this implementation set and the associated test case development is crucial; the former requires a coherent view of commercial requirements and the latter involves a significant amount of development effort usually resulting in delays. Past experience from slow processes suggests that a new industry approach for generating these deliverables is needed. Achievement of rapid processes while meeting high quality of the outcome requires careful attention by industry as a whole.

### **2.3. Recommendations**

The Mobile Platform recommends the following actions:

- GSMA together with manufacturers should continue to work to agree realistic sets of features and specifications. For specifications for which no implementation feature set is yet agreed, work should urgently be taken forward in existing industry bodies, adapted and expanded as needed to address all relevant interfaces. For all players to adopt the

same technology, it is imperative that the technology is an open one, based on a specification generated in an open standards body. The open nature of standards and specifications makes a healthy competitive multivendor market possible.

- A good existing example to build further work on are the GSMA Essential Features and the cooperation between 3GPP and the Global Certification Forum, which has already generated significant results. OMA and GCF should undertake rapid action to progress beyond what is done today for multimedia messaging. Further, testing methods should be reviewed to include end-to-end methodology, testing in a network context in addition to standalone element testing.
- This dialogue must be accelerated by industry action, regarding both the scope and the process. First action is to generate an OMA implementation set of features, development of test cases and practical testing and certification. Further potential for improvement lies in adding an end-to-end testing approach, in developing test cases more rapidly and improving the certification process.
- Review by industry and EU is merited regarding tools available to motivate all actors to consistently support certified conforming solutions. The initiative for action will be taken by the industry. EU support will be most valuable in the area of funding for the development of interoperability test cases, which requires significant resources and investment. With this support allied to the committed collective efforts of industry, it is not currently envisaged that there is any need for the Commission to take any regulatory action to ensure the interoperability and success of 3G services.

### **3. Content**

#### **3.1. An appropriate legal framework should support industry efforts to offer mobile content**

There is a growing demand by consumers for a wide range of mobile content, such as ringtones, video clips, news, TV streaming and music; and mobile use of content will be key for ensuring growth in 3G services. In order to support industry efforts to meet consumer demand, an appropriate regulatory framework is required.

Elements building this environment are open standards and interoperability, together with strong copyright protection and appropriate Digital Rights Management (DRM). Support for market driven solutions for pan-European licensing on the one hand and the forbearance from regulation of mobile content services on the other are needed to create an Internal Market for mobile content.

#### **3.2. Recommendations**

Open standards and interoperability

- Industry is committed to the development of baseline, interoperable standards for interfacing and updating new mobile content applications and of open, baseline codecs.

Strong copyright protection and DRM

- Industry supports the copyright protection provided by the Enforcement Directive and urges the EC to ensure an appropriate implementation into national legislation. The EC and Member States should co-operate and ensure that infringement can be prosecuted effectively across national borders.

- EU should support the implementation of effective, interoperable and preferably open DRM solutions in order to help to develop the market for consumers, while protecting the interests of the right holders.
- EU should take steps to ensure that the levy systems in the Member States are compliant with the principles enshrined in the EU Copyright Directive 2001/29/EC, and that any levies, if applied to digital equipment and media, particularly including mobile handsets and storage devices, take into account proportionality and the application of technological measures to new digital products.
- EU Commission and the Member States should promote educational campaigns to address unauthorized distribution of content and foster the legal use of content.

#### Market-driven solutions to support the internal market

- A One-Stop-Shop system for rights in mobile content which are collectively managed is desirable. This would allow for a Europe-wide clearance at only one national collecting society of choice, increasing competition among collecting societies with regard to administration and reporting services.
- Controversy exists on how access by users to mobile content should be ensured. See details in section 3 of the full report.

#### Development of an appropriate regulatory framework

- To enhance cultural services, reduced VAT rates for such content should be made possible by the EU legislator via its inclusion in Annex H of the 6th VAT Directive.
- To the extent that mobile 'broadcasting' services are point-to-point communications on individual demand by nature, authorities should not apply existing broadcast content regulation to such new on-demand delivery. Such mobile multimedia services are information society services. This would also imply that:
  - Mobile devices should not be subject to mandatory fees levied to finance public broadcasters.
  - The country-of-origin-principle should be reaffirmed for mobile content services.
- The mobile industry is committed to developing self-regulatory tools to achieve public policy objectives e.g. protection of minors.

## 4. Mobile Payments

### 4.1. Which regulation should apply to mobile payments?

There is presently considerable uncertainty regarding the scope of the application of EC rules on e-money and money laundering. The application of the current e-money Directive to mobile pre-paid accounts threatens to destroy the viability of existing digital content service offerings to pre-pay customers. Moreover, the uncertainty concerning the scope of the current rules is resulting in tangible costs and operational consequences for many mobile operators as it delays the launch of new data services.

In addition, there are indications that the initiative for the New Legal Framework for Payments could extend financial regulation to currently unregulated mobile post-pay services, despite the lack of any justification. In order to avoid similar problems to those the

industry currently has with the E-Money Directive, it is crucial that DG INFISO is actively involved at a very early stage in the drafting process.

The proposal for a third Money Laundering Directive will also have a huge effect on mobile operators. It is important to ensure that the risk-based approach contained in the Directive applies also to low risk payments such as the ones provided by mobile operators.

#### **4.2. New rules needed for the new mobile payment segment**

The mobile industry would benefit considerably from an EU recommendation, which allows national regulators to conduct a cost-benefit analysis that takes into account the various elements for a viable solution outlined below. This analysis should also bear in mind the low financial risks posed by existing and anticipated future mobile services for consumers, as well as the overall financial system in the country.

In the longer term industry believes that the E-Money Directive will have to be amended or repealed, to take account of the difference in the way the mobile industry operates to that of the e-money industry for which the Directive was devised. This can be done in a technologically neutral way by acknowledging the category of 'hybrid institutions', which offer core businesses which do not fall under payment regulation and where the payment only constitutes an ancillary function.

#### **4.3. Recommendations**

Below are five crucial elements of a proportionate and technologically neutral solution, which the mobile industry requests DG INFISO to actively pursue with DG MARKT:

- There should be unambiguous recognition that payments made directly to operators for mobile services, including premium rate services, do not and should not fall within the scope of financial regulation.
- There should be no spill-over from financial regulation into other areas outside its scope, i.e. an ex post monitoring mechanism could ensure that only the alleged 'e-money' element of the mobile prepaid float would be regulated.
- Regulators should clearly aim to avoid onerous regulatory obligations where possible. In this context, mobile operators could satisfy the regulators' need to supervise financial flows and financial stability by reporting on 'e-money' floats maintained at an agreed level; this would be more proportionate than requiring operators to establish separate legal entities.
- Redeemability rules must be adapted to the inherent risks to consumers. Hybrid institutions, such as mobile operators, which provide 'e-money' alongside their own communications services, could satisfy these obligations by allowing consumers to use their 'e-money' for communications services instead.
- Current money laundering rules applied to mobile are far from effective or proportionate. In particular, it should be noted that mobile operators do not offer person-to-person payments and this considerably reduces any money laundering risk. Rather than registering and identifying individual prepay consumers, this check could be done with merchants who establish contractual relationships with operators. This would tackle money laundering risks in a more effective way.

## **5. Security**

### **5.1. Opportunity to establish common customer authentication**

As we will be facing a progressive data access integration between various systems in the near future, a common interoperable customer identification and authentication framework is needed across Europe. It will serve both general authentication purposes and upcoming trusted and secure transactions.

Mobile communication based authentication can serve as a basis as GSM networks and terminals are available across Europe. Harmonization is needed with regards to technical and business processes as well as for data structures used by governments and businesses.

Important factors in this process are

- A single European standard for government electronic ID data structures and formats for eGovernment services and interoperable platforms.
- A Europe-wide consistent interoperable technical architecture for end-user devices, networks and service provider back end systems that supports independent implementations by multiple vendors on multiple platforms.
- A trusted architecture to protect ID data exchange.
- Open and neutral authentication service provision business models.
- Neutral and trusted ID provider business models and fee structures to compensate ID providers.
- Single sign on services.

### **5.2. Trusted and secure systems can be based on SIM and common standards**

Reviewing current approaches to identification, authentication, available mobile platforms (SIM/USIM) and terminal devices can be done best in a white paper. Amongst other topics the legal scope and implications should be looked at.

The proposed SIM based approach should be extended to public administrations in order to spread the concept of the SIM/USIM as ID device. At the same time, an inter-operator infrastructure could be promoted for mutual identification and authentication processes amongst their customers.

Governments and businesses in Europe should be encouraged to define their ID issuing and authentication requirements using a coherent set of parameters for which a technical infrastructure, ID and data authentication service business model can be developed, deployed and operated in a unified and interoperable manner.

### **5.3. Recommendations**

There is a necessity of a trusted and secure environment in the wireless context. There should be collective action taken to provide a robust environment for identification and

authorisation. Fostering standardization and standard adoption must go hand in hand with avoiding fragmentation.

Mobile equipment has to assure security for everyone involved. Operators, manufacturers and public administrations must therefore work closely together. The implementation of identification and authentication solutions in 2.5 and 3G networks must be achieved soon. At the same time, it should be synchronized to take into account the diffusion on the market of new networks and handsets supporting also new features.

It is proposed that the recommendations of the Mobile Communications and technology Platform should progress into a development of a white paper.

## A. Annex: Research & Development

# Mobile Communications & Technology Platform Research & Development Group Report

eMobility

- staying ahead -



© Siemens AG, CT SM, All Rights Reserved

**Picture <sup>of</sup> the Future**  
**Information and Communication**

Version published June 9, 2004

Note: This draft represents the status of on-going work. Details will be developed further and become the subject of a revision of this document to be prepared at a later stage.

Abbreviations:

BAN	Body Area Network
E2R	End-to-End Reconfigurability
ETRI	Electronics and Telecommunications Research Institute, Korea
GRID	Global Resource Information Database
GSM	Global System for Mobile communication
HAN	Home Area Network
HSDPA	High Speed Downlink Packet Application
IEEE	Institute of Electrical and Electronic Engineers
IEEE 802.16 / 802.xx	IEEE standards series
IETF	Internet Engineering Task Force
IPv6	Internet Protocol version 6
ISTAG Vision	Information Society Technical Advisory Group Vision
ITU	International Telecommunication Union
ITU-R	International Telecommunication Union-Radio Communication
3GPP	3 <sup>rd</sup> Generation Partnership Project
MBMS	Mobile Broadcast and Multicast Service
OMA	Open Mobile Alliance
PAN	Personal Area Network
RFID	Radio Frequency Identification
SME	Small and medium sized enterprises
SDR	Software Defined Radio
3G	3 <sup>rd</sup> Generation
UMTS	Universal Mobile Telecommunication System
UI	User Interfaces
WAN	Wide Area Network
WLAN	Wireless Local Area Network
WRC	World Radio communication Congress
WSDL	Web Service Description Language
WWRF	Wireless World Research Forum
XML	Extensible Markup Language

# eMobility

## Table of Contents

1.	Executive Summary - “eMobility” will be essential for economic growth in Europe .....	5-14
2.	Introduction and objectives of the report.....	2-16
3.	The strategic and political dimension – a rationale for EU action .....	3-16
3.1.	Economic growth in relation to Mobile Communications .....	3-16
3.2.	Public funding as a competitive factor .....	3-17
3.3.	Technology Leadership is needed to ensure growth in Europe .....	3-18
3.4.	Why is it optimal to address research at European level?.....	3-19
4.	The vision of eMobility and its benefits .....	4-20
5.	EU R & D in the context of overall efforts .....	5-21
5.1.	Innovation cycles of different duration require different support structures .....	5-22
5.2.	EU R & D and the Wireless World Research Forum (WWRF) .....	5-23
5.3.	How R & D relates to spectrum .....	5-24
6.	Objectives of the eMobility initiative.....	6-26
6.1.	Scope of the initiative in the context of related developments.....	6-26
6.2.	Action Line V: Development of the technology base .....	6-28
6.3.	Concerted approach to Action Line V: eMobility R & D Programme .....	6-29
6.4.	Ensuring consistency and efficiency – the eMobility Initiative .....	6-29
6.5.	Outline of the eMobility Initiative.....	6-30
7.	Outlining the R & D Work proposed in Action Line V.....	7-31
7.1.	Ambient radio .....	7-32
7.2.	Ambient wireless networks.....	7-34
7.3.	Security, trust and business infrastructure .....	7-35
7.4.	Services and service architectures.....	7-36
7.5.	Mobile service creation greatly simplified.....	7-37
7.6.	Accompanying measures .....	7-39
7.7.	Basic research.....	7-40
8.	Recommendations.....	8-40
9.	Members of the Mobile Communications Platform R & D group .....	8-40

# **1. Executive Summary - “eMobility” will be essential for economic growth in Europe**

## **Ensuring leadership in mobile communications**

Industry in Europe is committed to taking all needed actions to play a leading role in enabling mobility in all communications. To maintain and achieve world leadership, Europe's position in the global mobile and wireless market needs to be further developed. European contributions to global standards must have an even stronger global relevance than in the past. To keep pace with the investments in other regions, China, Korea, Japan and North America - to name just a few - Europe needs to strengthen its investments in R & D and future generation mobile and wireless systems.

At present Europe's mobile communications manufacturers are allocating between 10-20% of turn-over to R & D. Nonetheless, technology leadership does not only depend on the individual organisations alone - it requires concerted efforts from users, service providers, manufacturers and the research community, as well as from regulators and governments in order to provide the environment needed for growth.

## **eMobility – a long-term initiative at European level**

The challenge of ensuring and improving European leadership needs to be embedded in a long-term program of actions ("an eMobility Initiative"). This program reflects the full cycle of innovation from basic and concept research through trials, which lead to the commercialisation of products, services and applications. Basic research has to lead to the transfer of results into products in a market-oriented manner. Europe must play a leading role in inventing future technologies. To reach this goal, collaboration at European level in the research stage is crucial, given the distribution of the mobile and wireless industry and research community across Europe. Experience from the past shows that collaboration is a valuable way to realise joint progress and a prerequisite for consensus building in order to achieve harmonised solutions, economy of scale and global roaming. Future technology options can be explored in a better manner with improved use of resources leading to the timely formulation and adoption of standards and common specifications.

Five Action Lines provide the strategic framework for the eMobility Initiative and cover Market Development, Regulations, Standardisation, Information Space and Technology.

## **Seven key areas for collective technology investment (Action Line V)**

- Ambient radio
- Ambient networks
- Security, trust and business infrastructure
- Services and service architectures
- Mobile service creation greatly simplified
- Accompanying measures
- Basic research

## **Recommendations**

Industry is convinced that "eMobility" will be essential for economic growth in Europe. Industry therefore invites the Commission to take into account the “eMobility Initiative”

composed of 5 specific Action Lines, of which the R & D is Action Line V, and is composed of the eMobility Platform and a set of large integrated Projects. The Framework Programme should provide for a contribution to the cooperative R & D on the European level.

Collaboration in research and innovation in current and previous EU Programmes has been very successful and has played a very constructive role in developing global leadership in mobile markets. It is essential to improve a sustained European competitive position in the global wireless and mobile market.

Industry is willing to allocate funds and human resources to the continuation and extension of collaborative R & D on the EU level. Europe's leading mobile and wireless organisations propose a programme of collaborative R & D of 1 Billion Euro private funding matched by 1 Billion Euro public funding covering a period of 4 years. This annual funding of 250 Million Euro annually is proposed in the context of annual investment in R & D by leading European mobile manufacturers of over 12 Billion Euro. Industry invites the Commission to reflect this joint effort between the public and private sectors in the new Framework Programme.

## **2. Introduction and objectives of the report**

The mission of the Mobile Communications and Technology Platform Research & Development Group is to position European R & D in order to further increase Europe's lead in mobile and wireless communications. In this context, this report aims to describe, comprehensively, the global context of the R & D related to the 6<sup>th</sup> & 7<sup>th</sup> Framework Programme in the area of mobile and wireless communication. This report summarises the proposals and conclusions of the R & D Working Group. The context of this report relates to mobile and wireless communications ranging from wide-area systems to short-range communications in all its facets.

## **3. The strategic and political dimension – a rationale for EU action**

Communications in general is fundamental to all social and economic activities and while different in nature from resources such as energy, transportation systems and skills, it is as pervasive in its effects on society. Mobility of communications between people, and increasingly machines of all kinds, has further enhanced the impact.

It has been instrumental in the optimisation of economic processes on a global scale ("globalisation") but is also behind a considerable advance in productivity in general.

Mobile and wireless telecommunications has become one of the most important global industries. It has had a profound effect on all economic and social activities with an impact much bigger than that of the Internet. This development is far from complete and is progressively extending from voice to data and multimedia services of all kinds. It will provide mobile and flexible access to electronic media, equipment and infrastructures, made up of a range of existing and future wireless technologies, in a seamless and transparent manner. "eMobility" stands for this vision.

The GSM system, for which European companies are global market leaders, is estimated to have generated over 3 Million jobs worldwide. The mobile and wireless business, as a whole, has created 4 Million jobs. This industry is expected to employ 10 Million people by 2010.

However, Europe's position is being challenged by increased global competition with respect to innovation strength, know how and cost factors. Action needs to be taken to ensure that Europe benefits fully from the coming wave of innovation and its associated employment growth and to ensure that Europe derives maximum economic and social benefits from this growth.

### **3.1. Economic growth in relation to Mobile Communications**

Mobile communications is becoming one of the most important industries in the world:

- Deutsche Bank estimates that in 2003, mobile telecom services will have directly generated over \$426bn in revenues. The revenues attributable to GSM systems were \$277bn in 2003 and are expected to increase to \$500bn by 2005.
- In 2004, the number of mobile subscribers will exceed 1.5 Billion. In 2010, 2.3 Billion subscribers are expected.
- Mobile services account for about 1% of GDP on a global basis and about 3% of European GDP.

- It is anticipated that job creation in the sector will have the result that the mobile industry will, by 2010, employ 10 Million people<sup>1</sup>. Jobs are created not only directly in the mobile and wireless manufacturers and operators, but also in related areas such as content provision and applications and usage of mobile technology, further increasing the impact on the economy of growth in the mobile sector.
- Mobile and wireless communications have the potential to bridge the digital divide between the developed and the developing world. At present, there are more phones in Manhattan than in Africa and there is a large growth potential in the developing world.

Growing competitive pressure is accompanied by reduced growth in the EU member states compared to other regions<sup>2</sup>: (EU 15 member states since 1995: 2.2% per year, US: 3.6% per year, Global average: 3.2% per year).

In addition, there is a significant gap in Europe in R & D budget as percentage of GDP: Europe devotes only 2% of GDP to research. By comparison, the US invests 2.7% of GDP while Japan invests more than 3%.

The global context and the gap in research effort compared to other regions requires increased effort in Europe in order to meet the challenges of the new technology and applications as well as to compensate for the increased competition via public support of Europe's competitors.

A further trend evident in recent years is the rapid development of (in the framework of IEEE WLAN-type systems) fixed wireless access systems and cellular based systems to be directly connected to the public Internet. This trend is largely driven by the IT industry. Today, the IT industry is dominated by US companies.

Europe achieved global technology leadership, in particular in mobile communications, mainly Through the development of cellular based systems, such as GSM, and the development of third generation mobile communication systems. Industrialised, developed countries such as the EU member states have to face strong competition from other regions. Therefore, Europe has to be prepared for increasing global competition in order to ensure the realisation of Lisbon goal of Europe becoming the world's most competitive market by 2010.

### 3.2. Public funding as a competitive factor

This evolution of mobility related technologies and markets is continuing at a rapid pace reflected in the massive efforts of the traditional technology leaders, such as the **USA** and **Japan**. In addition, countries such as **China** and **India** have invested heavily in recent years in research and development in order to improve their industrial capabilities in mobile and wireless communications.

**China, Japan and Korea**, have already launched, in the year 2000, large scale research activities on systems Beyond 3G. China is investing mainly in a state funded programme, with technology development being conducted at universities. In Japan, funding by operators

---

<sup>1</sup> GSM White Paper "Brilliant past, bright future". Published by Deutsche Bank (Global Equity Research), 18 February, 2004

<sup>2</sup> Communication from the Commission to the Council and the European Parliament, "Building our Common Future – Policy Challenges and Budgetary Means of the Enlarged Union 2007 – 2013", Brussels, 10 February, 2004

complements state funding. In Korea, state funding to ETRI complements industry funded research.

On a governmental level, cooperation between China, Japan and Korea is under preparation. In particular China, Japan and Korea are at the forefront of research with the objective of dominating the future mobile and wireless global industry. These countries provide a substantial amount of state funding for research.

The **USA** is using defence spending (e.g. in the framework of the Homeland Security Program) to support mobility related R & D. In addition, activities are underway in the major manufacturers, in small and medium sized enterprises and in academia, funded through venture capital. This considerable level of investment is bound to have an effect on global markets.

De facto, these measures increase the global competition which European industry faces.

### **3.3. Technology Leadership is needed to ensure growth in Europe**

A successful European economy in areas of global competition requires technology leadership.

Technology leadership can only be maintained and improved by continuing and increasing research efforts to shorten time-to-market for competitive products.

Due to the complexity of future systems and the need for global standards, early cooperation between major players, beginning already in the research phase, is a prerequisite to achieving consensus on common global standards and avoiding unreasonably high licensing fees for Intellectual Property Rights. In research, the entire value chain has to be addressed, from technology (radio, networking, system architecture, reconfigurability etc.) to services and applications as well as content. Therefore, collaborative research projects in big initiatives with the major players are the most suitable instrument for research in Europe, given the global competition.

De facto, public investment on a large scale in competing regions (USA, Japan, Korea but now also China and India) increases global competition and Europe must react appropriately.

The European community has to invest sufficient budget in the mobile and wireless domain in order to enable the European industry to maintain and improve technology leadership. Industry in this report is used as a term to include both manufacturers and service providers. Leadership is needed both in future wide-area systems and in related systems such as fixed wireless access, WLANs (Wireless Local Area Networks) and short-range systems for PANs (Personal Area Networks) and BANs (Body Area Networks). They must be integrated into large scale application contexts, on a common packet-based platform, for systems Beyond 3G to be competitive on the global market.

The example of GSM has shown that a common concerted effort can create a successful and competitive industry for the global market. With respect to the growth figures achieved in communications sector in the nineties, mobile communications dominated business growth in the telecommunications industry. In order to stay ahead, in this strategic industry sector, concentrated action is needed to secure leadership in technology and advanced applications deployed in Europe. These early uptake applications will in turn contribute to the competitiveness of many other European service industries such as logistics, healthcare, content distribution, government and many others.

Reference is made to the “Lisbon Goals” and the “eEurope Action Plan”, which develop the case for EU-level action in some detail.

### 3.4. Why is it optimal to address research at European level?

While Europe’s industry is fully committed to the objective of technology leadership, success will depend on the concerted effort of users, service providers, manufacturers, the research community and others as well as regulators and governments. In this spectrum of partially sequential and partially concurrent efforts, R & D plays a major role.

At present Europe’s mobile communications manufacturers are allocating between 10-20% of turn-over to R & D. This includes competitive investments as well as collaborative efforts, notably the long-standing and successful participation in EU R & D Programmes in the pre-competitive domain, as a prerequisite for consensus building to ease future standardisation.

Collaborative R & D on the EU level is addressing a part of the R & D spectrum in which the sharing of work and results is in the common interest of the sector actors and outweighs the advantages of competition. The mobile and wireless industry and the research community are distributed across Europe. This means that R & D needs to be performed at a European level in order to gain synergies between the different research efforts. The cooperation of the decision making organisations of the European industry is needed at the research stage in order to provide a basis for consensus building at a later stage when harmonised solutions, economy of scale and global roaming between systems will be required. In this context, National programs could lead to further fragmentation of solutions and to markets, which are too small to provide critical mass and eventually to solutions which would not satisfy the needs of customers and the global economy. However, national programs can complement EU programs for technology development.

Past experience shows that the “value-added of EU-level collaboration” can be realised by:

- Jointly exploring future technology options
  - **Issue:** A choice in technology investment should be based on the best possible understanding of their potential. This is a task going beyond the means of any one company and needs to draw on diversified and interdisciplinary resources.
- Collaborative R & D which aims to formulate or establish the feasibility of standards and common specifications
  - **Issue:** Standards and specifications embed technology and are based on extensive R & D. Collaboration greatly facilitates and accelerates the formulation of standards and their timely adoption.
- Collaboration in the validation of technology options by service providers and leading-edge users
  - **Issue:** The success of technological advances is ultimately dependent on meeting user requirements. This can often only be established through validation with service providers and leading-edge users. EU-level collaboration has the advantage of diversity as well as scale.
- Sharing of scarce human resources and costly facilities
  - **Issue:** Technological progress remains fast and innovation cycles are becoming ever shorter. This means that the availability of human resources as well as some

key facilities are a severe constraint. Sharing on an EU-level helps to overcome these constraints.

- Sharing of technology to achieve timely, techno-economically viable solutions
  - **Issue:** Economies of scale as well as timely innovation are key to success of this industry. The example of GSM has demonstrated that a joint effort and selective sharing of technology enables market development and strengthens international competitiveness.

In line with the scale and scope of the implied R & D efforts, it is proposed to create an eMobility platform, which ensures optimal management of the collective R & D efforts in Europe.

#### **4. The vision of eMobility and its benefits**

The evolution of mobile communications and wireless techniques is far from complete and is progressively extending from voice to data and multimedia services of all kinds. It will provide mobile and flexible access to electronic media, equipment and infrastructures in a seamless and transparent manner. "eMobility" stands for this vision.

While industry clearly has its own objectives, they coincide, in the area of eMobility, with the economic and social objectives of the EU. A leading position in the evolution of eMobility will provide opportunities for the industry but at the same time it will enhance and invigorate other sectors and play a key role in creating employment. As such, it is an instrument of economic policy and a legitimate public investment.

It also closely related to future social and public services as reflected, for example, in the initiatives on eHealth and eGovernment.

Currently ongoing changes will result in fundamentally new services and usage patterns:

- All business and governmental processes will be supported by wireless communication in order to improve significantly the efficiency and competitiveness of the European economy,
- Services will be operated in heterogeneous network environments in a manner that hides the complexity from the user through service level interoperability between different access systems,
- Mobility is becoming multi-layered: communication and computing devices move; users move and change their devices; (sub)networks in cars, trains and aeroplanes move; software moves from one execution environment to another,
- Peer-to-peer communities are emerging to empower people to seamlessly create ad-hoc or persistent communities collaborating on joint topics and data,
- Opportunities for social applications are expanded through mobile devices with ubiquitous access and always-with-you quality.

The expected benefits of the eMobility initiative include:

- Providing seamless interworking (anywhere, anytime), in which users are not restrained by the underlying complexity of mobile and wireless systems.

- Enabling users through the provision of easy-to-use business, entertainment and administrative services and applications in order to improve their quality of life. The Ambient intelligence vision<sup>3</sup> will become reality with communication and computing devices enabling mass market scale ubiquitous services and applications.
- Providing a variety of features in mobile service environments including adaptivity, location, context-awareness, and personalization. Content, especially personal content, will become an important driver for mobile usage.
- Extending services and service architectures to cover proximity, peer-to-peer networks, and to the use of GRID technologies. Services will also provide for flexible distribution of functionality in different network nodes and terminals enabling identity and authentication systems, as well as e-payment systems, to be established at any location, irrespective of the availability of a fixed network connection. Terminals will feature extended memory and processor capacity, new display technologies, and multimodality data input capabilities to support multimedia services.
- Improving environmental conditions through providing workers with nomadic offices, reducing their requirements to physically travel to an office. Vehicular traffic conditions will be improved by enabling mobile and wireless supported automated traffic management systems.
- Enabling new business models, breaking the links between a business and a specific location, supporting the establishment of both global and remote business operations.
- Meeting the demand for social services to be more responsive to the needs of the user and more cost effective. This includes, for example, improvements to emergency services, healthcare, educational services and public administrative services.

## 5. EU R & D in the context of overall efforts

R & D is an essential part of the product and service development cycle and is performed in sequential and concurrent phases, interacting with factors influencing the market. These factors include customer requirements, regulatory conditions, standards etc. Inversely, technology options arising from the R & D change the market, as well as its environment. This is schematically shown in the Figure 1.

These interdependencies, the importance of timing, as well as the importance of a good understanding of the impact of new technology, influence priorities.

EU-level cooperation plays a key role, when progress depends on consensus and a common appreciation of the requirements and options. It is important to keep in mind that cooperative R & D, while being very effective and useful, especially in areas in which a wider consensus is needed, represents only a small fraction of the total R & D effort of the private sector, which typically invests of the order of 10-20% of turn-over, annually, in R & D.

Figure 1 shows an exemplary value chain. Research results are exploited via international harmonisation activities and standardisation, as the system development of competitive products for the global market. Early research and international cooperation are the prerequisites for the technology leadership and consensus building needed to achieve

---

<sup>3</sup> See the ISTAG report "Ambient Intelligence: from vision to reality", September 2003 available at <http://www.cordis.lu/ist/istag.htm>

Europe's economic objectives. Similar value chains exist for areas such as services and applications.

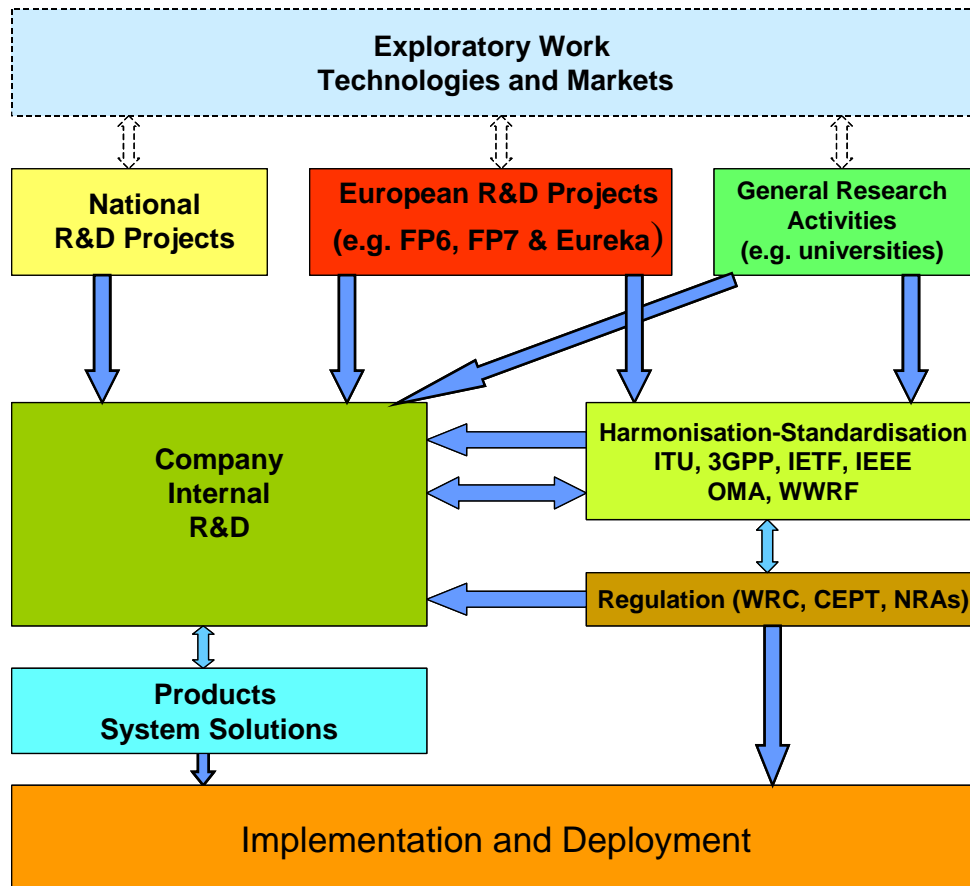


Figure 1: Value chain to exploit research results in competitive products for the global market.

These activities need to be accompanied by an improved approach towards venture capital to enable small and medium sized enterprises to more easily enter the market with innovative ideas. The example of the US shows that new ideas can be exploited quickly using suitable financing means, such as venture capital. Europe has to implement similar schemes to increase the innovation strength and to improve time-to-market.

### 5.1. Innovation cycles of different duration require different support structures

Figure 2 shows the relationship between technical research areas (services, networks and radio) and the length of the innovation cycles in these areas. Services and applications often evolve in cycles of less than a year and fast reaction to follow evolving market trends is needed if research money is to be effectively spent on service and application development. Cycles of several years are common for network related innovations while cycles of up to ten years are required for radio systems, if the allocation of newly required spectrum is required. In contrast, some new radio technologies, such as IEEE 802.16, require an innovation cycle of only two or three years as long as already allocated spectrum is available. When new radio systems need new spectrum, they also have to wait for the identification of spectrum by WRC (World Radio Council) and the allocation of the identified spectrum by national or regional administrations.

In order to effectively support the range of durations of innovation cycles, a corresponding range of funding mechanisms and project structures is required. Projects need the ability to react fast and autonomously to changing conditions in the environment and to adapt to emerging market needs. The impact of projects having such ability, would be that European industry would be able to pick-up and exploit new ideas and concepts more quickly.

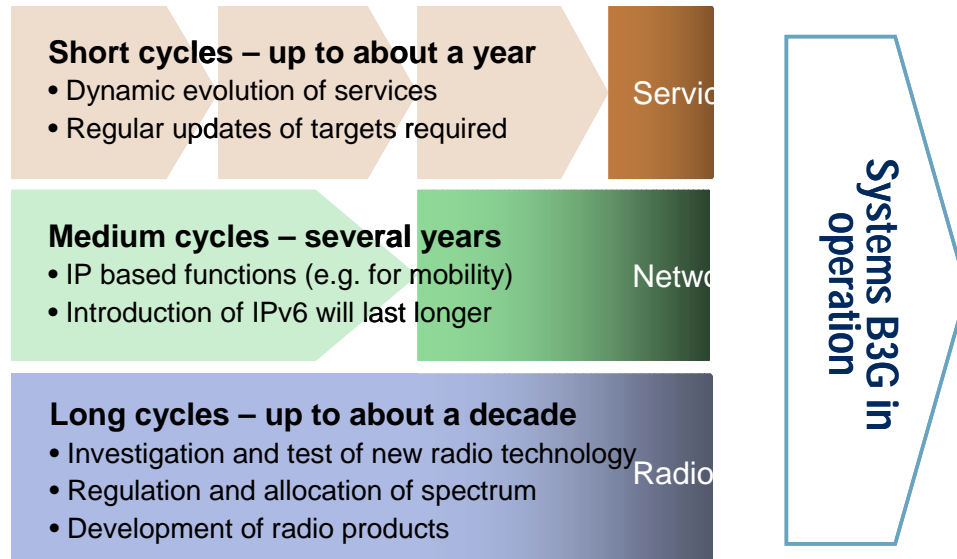


Figure 2: The duration of innovation cycles in different research domains

## 5.2. EU R & D and the Wireless World Research Forum (WWRF)

There is a stream of technologies emerging from R & D with different time horizons. Some find use immediately in present systems and applications, while others can only be implemented after other technological breakthroughs or changes in demand, regulations or standardisation occur. Standardisation and regulation tend to be set at a given time ahead of market introduction and then remain relatively stable before they are adjusted to an accumulated pressure of change as products mature and require new functionality.

This leads to several concurrent streams of activities, which interact with each other. While not always apparent, regulations may shift the priority for R & D and the setting of standards may make promising technology options irrelevant for some time to come. Inversely, standards can become irrelevant when R & D opens up new options, resulting in de facto standards driven by demand.

Industry has been working together, for example, on third generation systems, which are now entering the market. Research and development of these systems took place in the decade between 1991 (the time when the first GSM systems were launched) and 2003 (the time when 3<sup>rd</sup> Generation systems were launched in Europe). Research on enhancements to 3<sup>rd</sup> Generation systems is already very advanced in 2004 and is entering the stage of handover from research to product development.

Industry is committed to continuing R & D cooperation in the pre-competitive domain. Therefore, the WWRF (Wireless World Research Forum) was launched in 2001 on a global basis. The objective of WWRF is to formulate visions on strategic future research directions in the mobile and wireless field, among industry and academia, and to generate, identify, and promote research areas and technical trends for mobile and wireless system technologies. It is intended to constructively contribute to the work done within other bodies regarding commercial and standardisation issues derived from the research work. The forum

is open to all interested parties. The Book of visions of the WWRF provides an overview of the research issues that need to be investigated to develop the Wireless World<sup>4</sup>. Figure 3 is an illustration of this context.

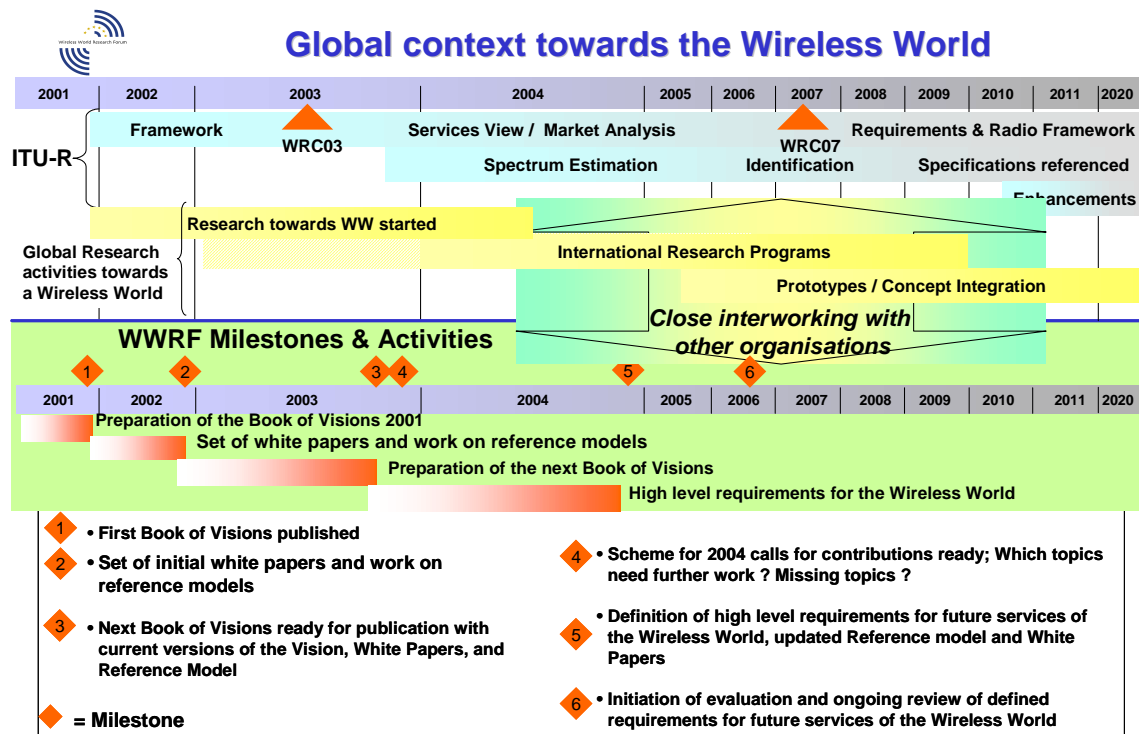


Figure 3: Timeline of the Wireless World Research Forum

There is already a range of research projects on concepts and prototypes for Systems Beyond 3G under development, both in the context of private investment and in the context of the 6<sup>th</sup> Framework Programme. This research will lead to exploitation and initial products in the market in the period 2007 to 2012. A review of the outcome of the 5<sup>th</sup> Framework Programme can be found on the IST Programme web site<sup>5</sup>.

### 5.3. How R & D relates to spectrum

Available frequency bands are the "real-estate" of mobile and wireless communications for the deployment of new systems and the establishment of new business areas. A sufficient amount of frequency spectrum for certain applications is a prerequisite for the economic success of new services in order to provide sufficient system capacity, Quality of Service to the users at a reasonable cost and to enable competition between providers. In addition, global harmonisation of the use of spectrum is motivated by a strong desire to achieve:

- Global terminal mobility and roaming,
- Economy of scale of devices and infrastructure equipment, and
- Reduced implementation complexity.

<sup>4</sup> WWRF Book of Visions 2004. To be published by IEEE Press during 2004.

<sup>5</sup> Integrated Programme Portfolio Analysis (IPPA) Reports, available at <http://www.cordis.lu/ist/cpt/ippa.htm>

Global harmonisation of spectrum usage is needed to establish new business areas and to improve the overall business case of new concepts. Research activities have a close link to the identification, allocation and implementation of new frequency spectrum.

Future systems for mobile and wireless applications in the Wireless World will be comprised of a variety of different, co-operating radio systems in an heterogeneous environment. Such radio systems are already becoming available, or will shortly be developed for different application areas. They include BANs (Body Area Networks), PANs (Personal Area Networks), systems for short-range communication and WLAN (Wireless Local Area Network) applications in hot spots for low mobility applications, fixed wireless access with low mobility for the interconnection of hot spots and new wideband wide-area systems for high mobility.

All these systems have different requirements on the propagation conditions and the impact on mobility. Therefore, having different frequency ranges for the different application areas may be appropriate. This would allow the allocation of the entire traffic to different frequency ranges and the most efficient use of the frequency spectrum.

New concepts, such as the new radio systems for systems Beyond 3G, will require larger carrier and system bandwidth than today's systems, in order to provide significantly higher throughput for the requested Quality of Service. Therefore, new spectrum will be needed. The justification for new spectrum requires work on new methods for spectrum usage, the improvement of the efficiency of radio systems, improved network planning and operation methods, services and applications, traffic engineering models and the derivation of technical requirements based on services and applications requirements. In addition, research is needed on radio propagation for candidate frequency bands for new spectrum.

Following initial research on new concepts for frequency usage, regulators in different regions are working on new methods of flexible frequency usage and frequency sharing methods through adaptive mechanisms and on technology independent licensing and spectrum allocation schemes. Frequency trading is also on the agenda. There is a trend towards non-dedicated frequency allocations. Such methods could improve the overall frequency usage significantly, if appropriately implemented. Cognitive radio and software defined radio concepts will play an important role in supporting such new regulatory schemes. Research is needed on the impact of new methods of spectrum usage, its impact on the system design and on coexistence issues between different technologies, to guarantee the friendly cooperation of these different radio technologies, when they are allocated to adjacent bands or operate in frequency sharing mode.

With respect to the 3rd Generation licensing process in different countries, concerns are being raised in the community concerning the early identification of new frequency spectrum at WRC 2007 (World Radio communication Conference), the expected licensing process and potentially related high spectrum cost for systems Beyond 3G. This may prevent or hinder innovation in Europe compared to other regions. Asia is already very active in research on systems Beyond 3G and North America is developing a series of standards in IEEE 802.xx for different application areas. In order to maintain and to improve Europe's role in mobile and wireless applications, clarity on the future licensing and spectrum allocation scheme in the member states would be desirable to remove barriers for investment in research and innovation.

According to the current ITU-R time schedule new spectrum for systems Beyond 3G is intended to be identified on WRC 2007 and should be implemented in the time frame up to and beyond the year 2012. The 7<sup>th</sup> Framework Programme will be in a good position to

contribute technical results regarding the different aspects of the implementation and most efficient use of the frequency spectrum for systems Beyond 3G.

## 6. Objectives of the eMobility initiative

In the context of the vision and rationale developed in the previous sections the objectives of the eMobility Initiative can be summarised as follows:

- Increase Europe's lead in mobile and wireless systems and their applications,
- Ensure that Europe gains maximum economic and social benefit from the coming "wireless everything" revolution in the decade 2010 to 2020,
- Make wireless the motor of growth of the European economy and the main contributor to employment growth in the economy by providing a framework that supports the full cycle of innovation from basic and concept research in order to enable the commercialisation of products, services and applications,
- Provide a stimulating and vibrant environment for wireless R & D in Europe in order to prepare the future development of the European economy.

### 6.1. Scope of the initiative in the context of related developments

eMobility stands for an integrated concept and framework for concerted action with a common long-term objective. It provides the context in which many actors and numerous disciplines can work together, based on a common understanding of the context in which individual efforts can benefit, and contribute to a synergetic relationship.

This has the benefit of optimising the use of scarce resources and time while being flexible enough to provide diversified organisations with approaches which complement each other without creating rigid relations and the inevitable overhead of centralised management.

In principle, the concept is to create a common workplan to meet the objectives of eMobility, addressing all essential elements and then identify the parties, which, within their own remit, can undertake the work needed. This has to include a range of concurrent efforts on market stimulation, regulations, as well as standardisation and R & D.

The reasons for concurrent work on the five essential Action Lines can be summarised as follows:

- I. **Market development** (How to meet the demand of the world markets?)  
Success will depend on a timely understanding of the evolving user requirements in the expanded European Union of 25 member countries as well as globally. Leading-edge applications (e.g. in eHealth, eGovernment, entertainment, etc.) should be seen as opportunities to establish scale and scope to meet global competition. The means to accomplish this include various forms of active and structured dialogue between the sector actors. Risk capital finance will play an important part in this process.
- II. **Regulations for growth of eMobility** (How to draw on the internal European market?)  
Regulatory certainty will play a key role in unlocking investment and stimulating the growth of new applications and usage. As mobility is central to economic and social concerns, these need to be defined and agreed for the Internal Market in the European Union of member states to be effective. This process should be undertaken well ahead of investment decisions. The technology and service options

can be qualified well ahead of deployment. It is proposed that the platform assists in initiating this process by providing scenarios of eMobility to facilitate the timely engagement of regulatory consultations.

III. **Standardisation, specification** (How to create a “seamless” eMobility?) eMobility will depend on a range of standards and common specifications covering the whole chain of use, content, service, delivery, storage, transmission and acquisition. Increasingly, they will relate to distributed and temporal processes. They will, in themselves, be the result of the considerable, collective R & D required to establish their functionality and quality. While some of the related R & D will be carried out under Action Line V of the eMobility Initiative, the additional work involves interaction with the standardisation organisations and other frameworks set-up for similar purposes.

IV. **Development of the Infospace and Services Infrastructure** (How to establish the capabilities required?) eMobility will entail the extensive use of the Information Space (Infospace) well beyond the person-to-person interactions, which make up the bulk of today’s communications. In principle, all locations, facilities and processes will increasingly be part of the Infospace and relate to mobility. The key to enabling this evolution will be to develop the use of and access to the Infospace. This is primarily a matter of the development of information resources and information business. While some of the enabling technologies are being covered under Action Line V, this issue will need to be addressed from the point of view of usage and not technology.

V. **Development of the technology base** (How to get the techno-economics right?) New technology is a major factor of change and growth and, as such, often the driving market force. It is partly driven by perceived market opportunities, partly driven by economic improvements and partly by visions. However, the way technology is developed is often very much affected by policies and regulations as well as by standards. This close interdependence makes the direction of R & D investment much more complex than it would appear. For this reason, Action Line V includes several appropriate and complementary approaches:

- The use of the eMobility Platform to deal with these strategic planning dimensions,
- R & D Projects following the model of successive pre-competitive R & D collaboration, and
- Horizontal Actions which include the support of the Action Lines I - IV as far as technological issues are concerned.

Each Action Line will need to use its own approach and involve different actors. However, the success of the eMobility initiative will depend on a joint and several responsibility and a concentration close enough to maintain a common purpose but loose enough to provide for initiative and flexibility to find the optimal solutions.

This report is concerned with the Action Line V. The need for concurrent related efforts is indicated and taken into account without being the primary purpose of this document. The Commission Services are invited to reflect on the appropriate approach to addressing the issues raised in Action Lines I - IV.

## 6.2. Action Line V: Development of the technology base

The technology base is made up of several complementary efforts

- The R & D investment of industry (with academic work exploring some of the longer term options), and
- The R & D collaboration of industry in the EU framework programme (as well as a number of other collaboration programs, e.g. on the national level).

Closely related are the:

- Accumulation or acquisition of “intellectual property”,
- Contribution to formal or de facto standardisation, and
- Experimentation and validation with leading-edge users.

Figure 4 shows the different concurrent activities required to provide the environment, needed to support the whole life cycle from R & D to commercialisation of products and services. R & D provides the technology base for the development of standards and competitive products. Service development based on the available technology is a continuous process with short development cycles. Service providers have to stay at the forefront of the development to maintain competitiveness. National and regional regulatory bodies have to set the right environment that new businesses can be established in an economic way by ensuring fair access to the market, competition and avoiding unnecessary high entry cost.

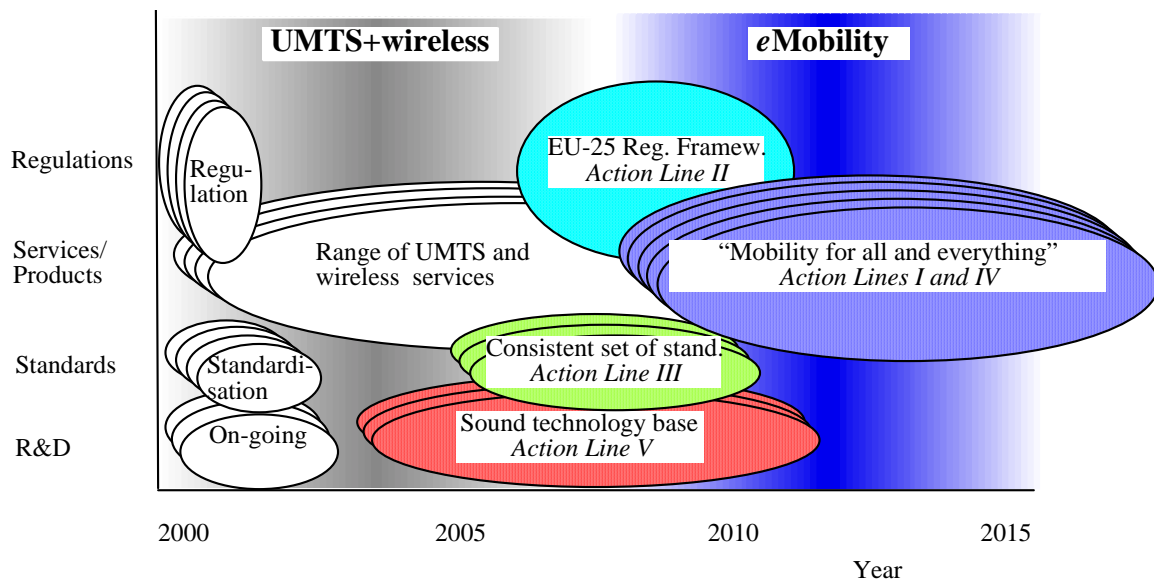


Figure 4: Moving from the present to eMobility

In Figure 4, a time clustering of regulatory and standardisation work is shown, reflecting the point that key decision are taken at a point in time, though the work on these issues is continuous over time.

### **6.3. Concerted approach to Action Line V: eMobility R & D Programme**

The eMobility R & D Programme requires the strategic orientation of the collective R & D efforts in Europe, taking into account private sector investments, the regulatory environment, market evolution, standardisation and other related activities including the:

- development of synergies with application sectors (such as healthcare, automotive & transport, environment, business and governmental processes etc),
- different durations of innovation lifecycles for applications, services, networks and radio interfaces,
- establishment of closer links to relevant topics in basic research to support rapid exploitation of key results, and
- development of critical mass with large scale projects, complemented by the instruments of FP 6. A new instrument is needed to support large scale initiatives and entities needed to create global impact. The new instrument must also reflect flexibility in order to justify the large scale investment required by both the private and the public sectors.

### **6.4. Ensuring consistency and efficiency – the eMobility Initiative**

In the consultation preceding the 6<sup>th</sup> Framework Programme, it was recognised that the approach to collaborative R & D has to evolve to match the challenge of the objectives addressed. Specifically measures to ensure strategic orientation, effectiveness and accountability for the joint private/public investment are needed.

The proposed instrument proposed to realise the ambitions for the 7<sup>th</sup> Framework Programme is the eMobility Initiative and associated Platform.

The platform will have the following central tasks:

- Draft the technical description of eMobility workplan reflecting the perception of the sector actors based on the state-of-the-art and shared vision of the future developments,
- Consult the sector actors concerned and establish a shared perception,
- Identify requirements and opportunities for EU R & D collaborative efforts taking into account commercial developments and work within other frameworks,
- Assist the Commission in the identification of requirements, options and priorities for collaborative R & D funding (related parts of the workplan on which the Commission bases its Call for Proposals),
- Establish inter-working relations between the projects following the contracting,
- Provide the monitoring of progress of the projects and carry out a strategic review of the R & D work in the context of evolving conditions,
- Monitor and advise on the on-going work taking into account the evolution in the understanding of requirements and options,
- Report to the Commission and sector actors, on the progress and re-orientation (when indicated) of the workplan,
- Support rapid uptake of technology developments by application industries,
- Provide a general communications plan and publicity for the eMobility framework,

- Conduct a continuous dialogue with regulators especially on spectrum access conditions.

The mission of the eMobility Initiative is to ensure consistency of all concurrent activities with the cooperative EU R & D and of other activities outside the eMobility Initiative (Figure 5). This initiative will contribute to the standardisation and to the regulatory process and will consider the R & D results from other activities. This joint effort in the pre-competitive phase enables sharing of risks, cost and preparing the needed environment.

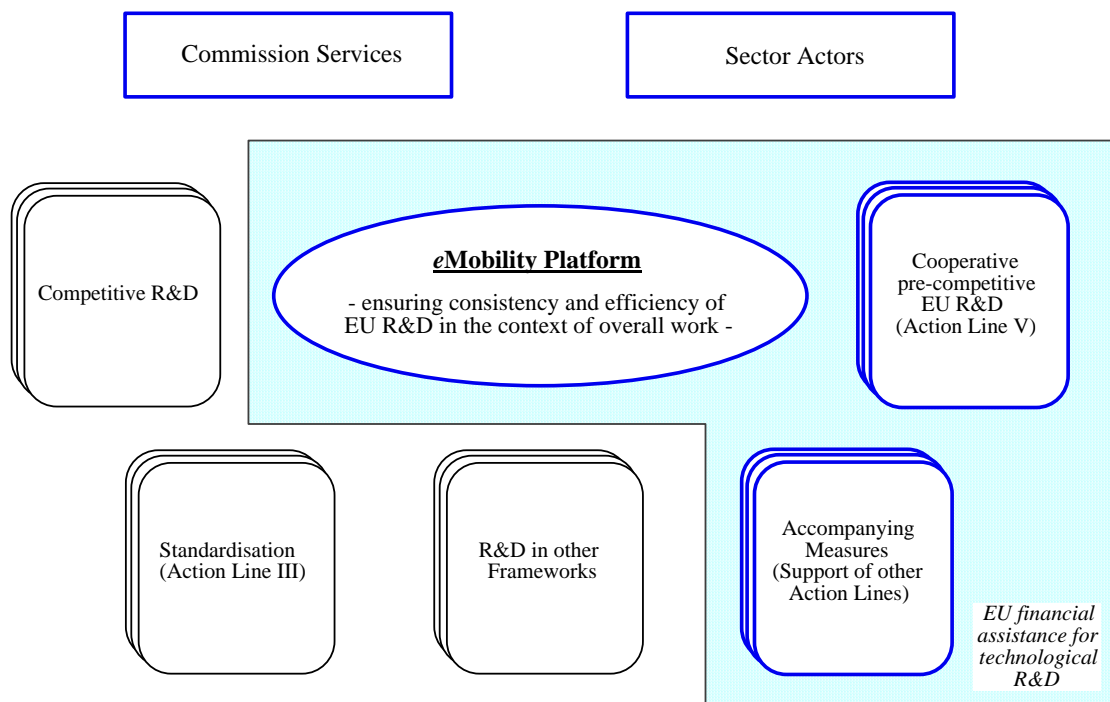


Figure 5: The mission of the eMobility Platform

This includes also the collaboration with other platform working in related domains.

## 6.5. Outline of the eMobility Initiative

The European mobile and wireless industry is investing over 12 Billion Euro of private funding in R & D annually. Public funding plays a minor role compared to the entire R & D investment. However, collaborative R & D enables cooperation in order to facilitate consensus building at an early stage of the development.

It is proposed that a collaborative R & D effort with the following characteristics be adopted, which is appropriate in scale to the challenge and objectives to be addressed:

- 1 Billion Euro private and 1 Billion Euro public EU funding for R & D over 4 years
- Having a focus within the IST programme on big projects with 50 - 100 Million Euro funding

Establishment the new instrument of “platform” will ensure that the strategic orientation of the collective investments and the coordination with related activities in standardisation, basic research, applied research and related activities takes place.

## 7. Outlining the R & D Work proposed in Action Line V

Realising eMobility calls for an unprecedented effort in system engineering giving mobility to information resources, for personal communications as well as the communications of machines supporting human activities. This promises a new wave of enhancement of personal productivity. It will also permit considerable productivity improvements for the operation of production plants, transport and logistics. These examples show also the potential for reducing energy consumption as well as the impact on the environment while improving the safety of operation<sup>6</sup>. Examples are given in Figure 6.

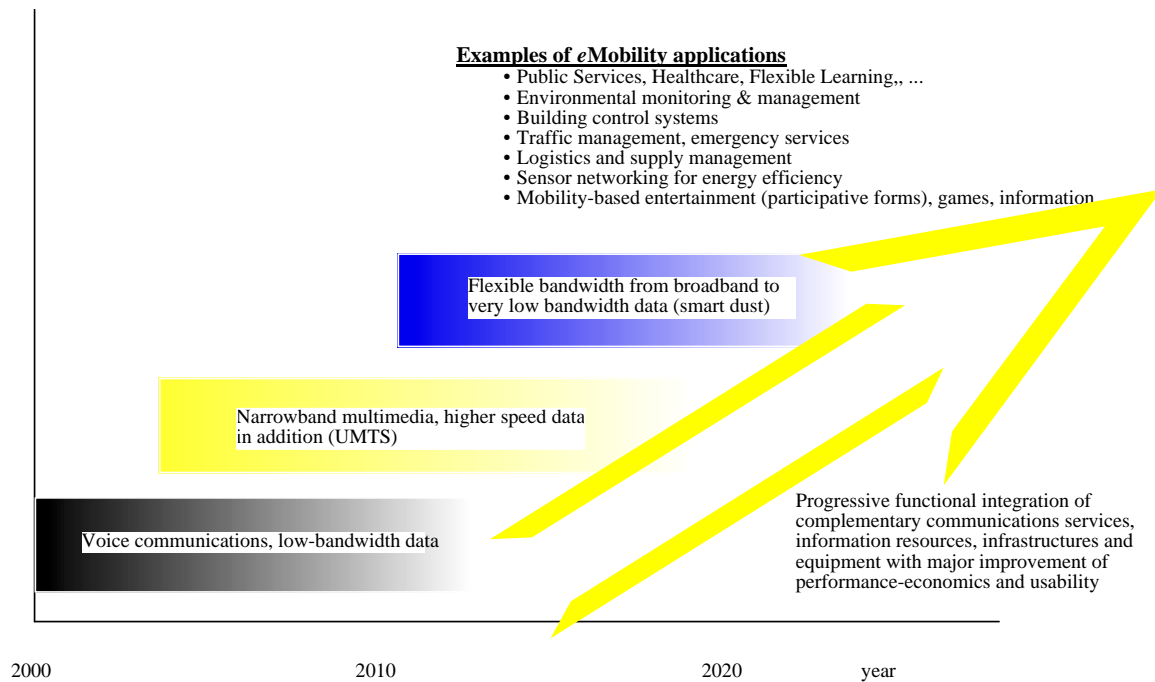


Figure 6: Examples of eMobility applications

The main emphasis has to be towards modular standardisation and establishing functional integration, providing an evolutionary but predictable basis for investment in applications, information resources, services and infrastructures. The underlying technology, systems, subsystems and service modules can evolve at their own speed if this objective is reached. Further information on technology road-maps can be found in the WWRI (Wireless World Research Initiative) public deliverables<sup>7</sup>.

Around the year 2007, it is expected that research on novel communication networks concepts and radio technologies will have matured. Progress can be expected particularly in the areas of:

- Dynamic network compositions,
- Reconfigurable radio systems,
- Mobility management across multiple access technologies,

<sup>6</sup> Business Week-Online, APRIL 26, 2004 Special Report "Wireless Wonders".

<sup>7</sup> Deliverable 2, WWRI, "Areas for collaborative Research", February 2003, and Deliverable 3, WWRI, IST-2001-37680, "Research Topics enabling the Work Package 1 Scenarios", June 2003.

- Support for moving networks,
- Network sensitive media delivery,
- Extended network support for context aware service design, and
- PANs that seamlessly integrate into public access networks.

Prototypes evolved from the different areas will exist by 2007. Built as concept studies and based on different platforms these prototypes will not have yet been integrated into a coherent system design. The likely high system complexity is expected to become a concern. A radical simplification of mobile service creation and lifecycle management is seen as a challenge facing us in order to enable growth in the European data service business.

In the 2007 timeframe, 3rd Generation evolution in the form of HSDPA (High Speed Downlink Packet Application) products will be widely available, offering 10 Mbps over the air downlink capacity. HSDPA up-link enhancements will be in production. MBMS (Mobile Broadband and Multicast System) will have reached the status of large field trials. Early products should be on the market by then.

The eMobility Programme outlined in this document therefore focuses on research to be conducted between 2007 and 2011, corresponding to the lifetime of the 7<sup>th</sup> Framework Programme. Research and development in the eMobility Programme will address challenges that:

- Were not resolved during FP6,
- Must be addressed in order to transfer early results from FP6 research to pre-commercial system prototypes,
- Prepare the foundation for cost efficient and competitive system designs,
- Provide tools and solutions for rapid mobile service creation, shortened time-to-market cycles, support for small and innovative businesses to grow,
- and thereby sustain the European leadership in mobile networks and services

eMobility research will include technology deployed as user field trials. It will expand and deepen the relationship between mobile technologies and segment-specific applications, such as eHealth, eGovernment or eMedia and 3<sup>rd</sup> party application developers. Open service creation environments will allow new ideas to grow rapidly from test cases to commercial offerings and will stimulate service designers and entrepreneurs to take advantage of the eMobility platform.

To achieve its ambitious goals, the eMobility Initiative requires joint and multidisciplinary research in key areas such as ambient wireless access networks, simplified and flexible network designs, open mobile service creation environments and trust and security infrastructure solutions.

## **7.1. Ambient radio**

The vision of future mobile and wireless communication comprises the integration and interworking of cooperating radio interfaces such as BANs (Body Area Networks), PANs (Personal Area Networks), systems for short-range communication and WLAN (Wireless LAN) applications in hot spots for low mobility applications, fixed wireless access with low mobility for the interconnection of hot spots and new wideband wide-area systems for high mobility in an heterogeneous environment. In addition, peer-to-peer communication has to be supported. These radio interfaces will be optimised to the application area in terms of

flexibility, peak data rates and granularity of data rate allocation, power consumption and frequency range. As far as possible the different access systems should be based on a common platform in order to ease the implementation of multi mode devices. New spectrum efficient access technologies, signal processing methods, the implementation of complex algorithms in potentially new frequency bands are needed.

Figure 2, as outlined earlier, shows the life cycle of systems Beyond 3G based on the activities in the 6<sup>th</sup> Framework Programme on the development of new radio access system concepts according to the requirements in ITU-R and related areas. The international standardisation after WRC 2007 has to be supported by detailed link and system level simulations and larger scale trials. After the identification of new spectrum the detailed international standardisation has to be supported by detailed simulations studies and larger-scale trials. The scope of work should be on the design of the different required radio interface systems using complex signal processing algorithms including advanced antenna solutions, their commonalities in order to ease interworking, and implementation issues for the development of larger-scale real-time trial systems. In addition, the impact of new frequency ranges after WRC 2007 needs to be investigated. New methods of flexible and adaptable frequency usage and sharing methods as well as the impact on the system design and implementation need to be considered.

Bringing the new radio access concept closer to market introduction is in the focus of this research area. Nevertheless, also the evolution of the concept needs to be prepared by pursuing basic research of promising techniques.

This results in the major objectives:

- Detailed design of the different radio interface systems with maximum commonality,
- New methods of frequency usage and sharing methods in order to use the frequency spectrum as efficiently as possible,
- Investigation of the impact of radio propagation after the identification of new frequency bands after WRC 2007,
- Implementation issues for reconfigurability and cognitive radios for new frequency usage and sharing methods in a heterogeneous environment,
- Coexistence aspects between different radio technologies with respect to new frequency allocation and licensing schemes,
- Systems trials application integrations,
- Contributions to the international standardisation process,
- Preparation of evolutionary radio access concepts,
- Development of larger-scale prototypes of:
  - wide-area networks with full mobility,
  - hotspot system prototypes for multi-user environments, such as airports, stations, etc.,
  - prototypes for end-user terminals,

- prototypes of short-range networks (PANs, BANs, HANs) providing a range of characteristics tailored to different applications,
- integration of broadcast type systems in the entire platform,
- feeder systems for the interconnection of hotspots, and
- new networking concepts such as relaying and multi-hop systems to improve coverage for higher throughput at higher carrier frequencies following the potential identification of new spectrum at WRC 2007.

Corresponding prototypes have to support the needs of developed country markets and of developing country markets in order to provide technologies for the next growth markets for mobile and wireless communication. The outcome of the research should result in a consolidated global consensus approach regarding the defined access technologies.

## **7.2. Ambient wireless networks**

Today's trend is that large, feature-rich systems tend to become complicated to specify and even more complicated to build and to operate. Research in the 6<sup>th</sup> Framework Programme is already tackling this problem to some extent, in projects such as Ambient Networks and E2R.

Within the eMobility Initiative, a large step ahead towards simple and flexible eMobile network design is needed, whereby the main focus is put on simplicity and flexibility for operators, service designers, providers and users. Flexible growth from small up to European wide eMobility systems and services needs to be supported, enabling a great variety of man-to-man, machine-to-man and machine-to-machine solutions for all the various application areas. System support is needed to make it simple for service designers to test their ideas in real environments. The spirit of entrepreneurs must be enlivened to encourage the start of new business and to let them grow to global scale businesses.

An eMobility system inherently fulfilling these requirements will use technology as developed in the 6<sup>th</sup> Framework Programme, but requires further research on the:

- Scalability and security of network and service control technology which can deal with all scales of network from small ad-hoc networks up to large scale corporate and public networks employing a common networking concept,
- Robustness to sustain attacks and use embedded self-healing configuration mechanisms,
- Integration of sensor networks which efficiently use the resources of larger networks (from PANs to WANs) for communication,
- Ability to cope with a wide range of radio technology as well as application middleware to support applications of all kind,
- Layered mobility support which enables ad-hoc cluster mobility as well as user mobility across networks,
- Delivery of information and media flows to users adapted to their current access situation, location dependent interests and preferences,
- Auto-configuration and self-management mechanisms which are able to autonomously deal with dynamic configuration changes,

- Integration and support of existing and future mobile and fixed access solutions,
- Extended capabilities of mobile and fixed transmission infrastructure regarding low-cost support of all types of traffic,
- Support for Billions of terminals of different kind including reconfigurability of devices and services,
- Support of thousands of 3<sup>rd</sup> party service developers with rather limited telecommunications background.

eMobility will enable a level of networking as pervasive as microprocessors are today, fundamentally changing the way we live and work. Elementary location sensing is becoming universally available for mobile users, and devices will scan the surroundings of mobile users, or sense the physical situation of the users themselves extending their capabilities. The user's personal space will be interconnected with the surrounding environment through the wireless world using sensors, actuators, multi-modal interfaces and new management and control systems.

The 6<sup>th</sup> Framework Programme has laid the foundation for this work with new concepts for structuring the networking domain. The main emphasis of FP7 should now be on implementation and trials, integrating concepts and extending the capabilities mentioned above.

The major objectives are therefore to:

- Integrate Ambient Wireless Networks technology with innovations in the applications field to provide new types of e.g. home networks, office networks, body networks, campus networks, vehicle networks, and production networks,
- Validate the new network structures developed in the 6<sup>th</sup> Framework Programme by incorporating new radio and services middleware in trials,
- Include flexibility between ad-hoc and structured network approaches,
- Evolve context awareness of networks towards cognitive networks,
- Research auto-configuration and self-management in embedded networks environments with small footprint networking technology.

### **7.3. Security, trust and business infrastructure**

The vision for eMobility assumes that Europe puts an emphasis on building upon its strong leadership in wireless access and network technologies, to create a business environment that gives small, medium and large enterprises a competitive advantage in their businesses. This will enable all parties in their respective value systems to propagate successful business models beyond European borders for the benefit of customers.

Establishing a converged fixed and mobile business environment for supporting different value systems requires putting more focus on R & D activities within the service layer and its external interfaces. Key ingredients of this service infrastructure are realized using open or de-facto standards for establishing trust relationships between service and network provider (and their partners), offering means for authentication, authorization and accounting to service providers, guaranteeing security and privacy, assuring the service delivery chain and its payment, or for hosting, operating and maintaining services on behalf of others.

The research programme should therefore focus on flexible architectures and service platforms, which support fast service development, key enablers such as security, trust and privacy, and possess flexibility to take into account demands from heterogeneous and constantly evolving network environments.

Managing Security - Trust – Privacy at all levels (hardware, operating system, protocols, middleware, and applications) is a key for the success of the future converged Internet. Solutions are needed for establishing trust infrastructures and value alliances, for protecting systems and services against unauthorized modifications, for program verification, efficient sharing of pieces of information in a controlled manner, key and certificate management, and implications of ad-hoc communities (which can be done without trusted servers).

Ultimately, it is the user experience that drives the adoption of new services. Thus, service platforms and enablers need to match with the growing needs of the users, which originate from a wide variety of different sectors, covering both enterprises and the consumers. It is therefore proposed to put the research and development focus on device and user-centric elements, thereby increasing the business potentials of a most flexible end-to-end environment:

- Context-awareness is fundamental for future mobile applications and systems to provide rich and consistent user experience. The research and development challenge is to create a flexible context-modelling framework with efficient means of presenting, maintaining, sharing, protecting, reasoning, and querying device, user and network context information.
- Reconfigurability is required in order to be able to construct end-user systems and ad-hoc communities according to user preferences. Systems are required to have a conceptual model of their current state and configuration as well as the ability to manage preferences of hundreds of millions of users.
- Detection mechanisms for devices that have departed or changed their state are also mandatory enablers of reconfigurability. In addition, notification delivery is required with filtering and using proper automatic decision rules.
- User interfaces (UI) and usability are critical factors determining the success of any service. In multi-modal UIs, interaction modalities depend on the context in which the device is used. Interplay between contextual and interaction modality is critical to facilitate seamless use of the device irrespective of the situation. Tangible UI technologies for mobile provide opportunities to meet the needs of the mobile user, e.g. using of RFID (Radio Frequency Identification) to support shopping, secure access, file transfer, etc.

A successful implementation of the eMobile Initiative calls for a multidisciplinary approach involving an approach and expertise covering a wide scale of technologies, application areas, and industry sectors. Agility builds a key feature in implementing the program: fast time-to-market needs to be emphasized as well as rapid reaction to the constant changes in the environment. Thus market introduction and user trials shall take place continuously throughout the program.

#### **7.4. Services and service architectures**

Due to increasing complexity in overall service creation environments, emphasis needs to be put on defining a well structured overall logical mobile platform architecture, that clearly defines the network domains, the enabling software layer domain, and application layer domains and their interfaces. Alternative ways to structure internal interfaces need to be

investigated and reference implementations developed to evaluate the architectural designs. Well-defined and evaluated contributions need to be made to relevant standards bodies, to ensure global acceptance of proposed architectures and interfaces. Without such efforts the increasing application and service specific system integration efforts will become a fundamental barrier to timely introduction of any new service. Furthermore an industry wide accepted common architecture offers an open marketplace for multiple vendors as opposed to favouring strong single player control points.

A well-defined mobile service architecture will also form a basis for developing interoperability requirements and enable systematic development of conformance test suites. A fundamental requirement to all eMobility initiative should be the development of corresponding interoperability and conformance test suites. Without these, market acceptance of any effort will be delayed and will lead to increasing fragmentation and cost barriers for introducing new services.

### **7.5. Mobile service creation greatly simplified**

The vision for eMobility assumes that wireless technology will be part of all things coming to the market, no longer confined to special networking equipment. This will put totally new requirements on network configuration technologies as well as on mobile service creation and deployment methodologies.

In contrast to the radio and network technology evolution, with innovation cycles of up to one decade, the design phases and innovation expectations on mobile services are much shorter (see Figure 2, Innovation Cycles). Upgrades every few months and major service launches every couple of quarters are commonly expressed expectations already today. Standards in this area are developed iteratively by partner alliances and active involvements of the open-source software developer community. Introducing systems and methods that permit the maintenance of this pace of constant mobile service innovation and rapid time-to-market will lead to a sustainable competitive advantage for the mobile industry. Making novel mobile service creation environments inherently aware of the underlying communication network characteristics and the users' mobile device capabilities will lead to a competitive edge for the European mobile service and network business.

A drastically simplified service creation-, testing- and deployment process, in a merged information technology and telecommunications world, will present one of the biggest challenges required to make eMobility pervasive and the vision of Ambient Intelligence a reality.

In contrast to current information technology style service creation tools and processes, a mobile service creation environment demands, in most cases, online testing facilities, utilizing network resources from different operators and data sources from multiple content providers. Today, no systems or methods are in place that permit the thousands of software developers, with a background in information technology, to participate in the mobile service creation process. This innovation and business potential is largely untapped as yet. The initial efforts made in the 6<sup>th</sup> Framework Programme need to be substantially expanded during the 7<sup>th</sup> Framework Programme to rapidly change this situation.

In order to foster the mobile service creation and deployment business, essential research challenges need to be addressed:

- Research and develop open mobile service creation and deployment concepts and environments that do not depend on a specific execution platform that could become unfavourably dominated by a single organisation,

- Investigate how long lasting standardisation processes can be shortened to meet the time-to-market demands of the service innovation life cycles,
- Study the potential of overlay network technologies for bridging different platforms from different vendors while still permitting independent system evolutions,
- Examine how mobile service creation environments could be designed to leverage wide-spread information technology style development tools, while taking the mobile network specific characteristics and the multitude of mobile terminal capabilities and design factors into account,
- Research mobile service creation methods that avoid the parallel development of service instances for all types of devices and all types of data transports,
- Investigate and prototype network support functions that permit the creation of situation aware services, while still keeping the mobile service logic slim and suitable for mobile devices with their limited processing capabilities,
- Explore how Web Services technologies, automated code generation tools, XML based data-, interface- and interaction description-languages can be enhanced to permit on-the-fly integration of platform features, services, access networks and devices,
- Research generalized user-interface descriptions methods and languages for fixed/mobile services that permit an automated and on-the-fly generation of mobile device specific clients (like WSDL for service invocations today). This would greatly speed the mobile devices and services innovation cycles. Personalized and device specific use interfaces could be automatically generated once newly designed mobile terminals are introduced into the network and a first service invocation takes place,
- Study techniques for semi-automated composition of services, based on pre-existing sub-services and network support functions.

Assuming that thousands of skilled software developers start creating mobile services for all types of devices and networks, questions such as the following will be asked:

- How can large numbers of developers be provided with online testing facilities in multi-operator environments?
- What business and security measures have to be put in place to permit this mass service-creation to emerge?
- How can successfully tested new services be rapidly deployed to investigate their usefulness and business potential?
- How can plug-and-play deployments of new services be supported from a system design perspective?
- How can mobile services entrepreneurs be supported by automated value-sharing relationships?

Assuming that hundreds or thousands of system functions and supplementary services exist and are widely spread across a multitude of business domains and assuming that more complex services can be composed based on elementary functions, network enablers and other useful services:

- How can (in such a distributed execution environment, with so many functional- and business relationships) a defined service quality be provided to the end-users or the enterprise customers?
- Can this service quality level be maintained even in situations where parts of the underlying system infrastructure no longer function?
- What type of recovery or ad-hoc replacement methods (redundancy concepts) would be required to still achieve a reliable system and service behaviour?

And finally answers to a number of cross-issues need to be found:

- What types of protection mechanisms need to be put in place to prevent abuse of a drastically simple and flexible service creation and deployment environment? What new types of business models and relationships could emerge?
- How can such a simplified mobile service creation and deployment environment be used to gain a knowledge step for the European society?
- Based on this knowledge step what measures need to be put in place to sustainably strengthen the competitiveness and the European leadership in the mobility enabled IS/IT domain?

This section gives just a flavour of the essential challenges that need to be addressed to translate inspiring visions, such as those expressed in the ISTAG Vision, the Wireless World Initiative scenarios or the European Service-GRID, into tangible business value.

## **7.6. Accompanying measures**

The eMobility Initiative includes several Action Lines (outlined in Chapter 6) which need to advance concurrently and which interact in numerous ways. The perception of demand and socio-political priorities will shape the evolution of regulations and policies providing the context in which technology is being developed. Inversely new technology options will require regulations and policies to be reviewed and adjusted. The same applies to the other Action Lines. A strategy and measures to provide an active exchange will play a large part in reaching consensus and developing a common regulatory framework for EU-25 and reaching agreement on a consistent set of standards, both of which play a crucial role in stimulating the information markets, services and investments.

This part of the R & D Programme aims at developing the scenarios and transition strategies as a contribution to the work on the Action Lines I-IV.

Specifically this will entail:

- The development of a socio-economic scenario and the related road map describing the scope, scale and benefit of eMobility as it affects the socio-political and economic objectives of the EU-25.
- The development of a road map for regulations reflecting the requirements of a deployment of the new technologies in a framework ensuring a fair balance of private and political interests.
- The identification and description of requirements for standardisation or common functional specifications permitting the migration towards eMobility.

- The reflection on the adaptation and mobilisation of information resources towards the creation of the Infospace essential for the innovative uses of eMobility in all spheres of life. This is to include studies on the potential of eMobility to address key socio-economic needs such as protection of the environment, reduction of energy consumption, etc.

In the format of an annual “**eMobility-Conference**” the state-of-understanding will be presented and an opportunity provided for the active participation of interested parties.

## 7.7. Basic research

The focus of the eMobility Initiative is not basic research. However, in this domain some basic research can have a very profound impact and inversely problems do arise which may need additional basic research.

For this reason reference is made to Basic Research relating to eMobility. If this will be incorporated into the eMobility R & D Programme or not is a matter to be reflected at a later stage. The eMobility Platform will in any case have to relate to this kind of work.

## 8. Recommendations

This reflection leads to the following recommendations:

- Industry is convinced that "eMobility" will be essential for economic growth in Europe. Industry therefore invites the Commission to take into account the “eMobility Initiative” composed of 5 specific Action Lines, of which the R & D is Action Line V, and is composed of the eMobility Platform and a set of large integrated Projects. The Framework Programme should provide for a contribution to the cooperative R & D on the European level.
- Collaboration in research and innovation in current and previous EU Programmes has been very successful and has played a very constructive role in developing global leadership in mobile markets. It is essential to improve a sustained European competitive position in the global wireless and mobile market.
- Industry is willing to allocate funds and human resources to the continuation and extension of collaborative R & D on the EU level. Europe's leading mobile and wireless organisations propose a programme of collaborative R & D of 1 Billion Euro private funding matched by 1 Billion Euro public funding covering a period of 4 years. This annual funding of 250 Million Euro annually is proposed in the context of annual investment in R & D by leading European mobile manufacturers of over 12 Billion Euro. Industry invites the Commission to reflect this joint effort between the public and private sectors in the new Framework Programme.

## Members of the Mobile Communications Platform R & D group

Jacques Magen	Alcatel	<a href="mailto:jacques.magen@alcatel.fr">jacques.magen@alcatel.fr</a>
Vinod Kumar	Alcatel	<a href="mailto:vinod.kumar@alcatel.fr">vinod.kumar@alcatel.fr</a>
Fiona Williams	Ericsson	<a href="mailto:fiona.williams@ericsson.com">fiona.williams@ericsson.com</a>
Magnus Madfors (Chair)	Ericsson	<a href="mailto:magnus.madfors@ericsson.com">magnus.madfors@ericsson.com</a>
Juha Ylä-Jääski	Nokia	<a href="mailto:juha.yla-jaaski@nokia.com">juha.yla-jaaski@nokia.com</a>
Giuseppe Coppola	Philips	<a href="mailto:giuseppe.coppola@philips.com">giuseppe.coppola@philips.com</a>
Margit Brandl	Siemens	<a href="mailto:margit.brandl@siemens.com">margit.brandl@siemens.com</a>

Werner Mohr	Siemens	<a href="mailto:werner-mohr@siemens.com">werner-mohr@siemens.com</a>
Nadia Serina	STMicroelectronics	<a href="mailto:nadia.serina@st.com">nadia.serina@st.com</a>
Blazquez Juan Vicente	Telefonica	<a href="mailto:blazquez_jv@tsm.es">blazquez_jv@tsm.es</a>
Romero Luis Jorge	Telefonica	<a href="mailto:romero_lj@tsm.es">romero_lj@tsm.es</a>
De Peppe Raffaele	TIM	<a href="mailto:rdepeppe@mail.tim.it">rdepeppe@mail.tim.it</a>
Proietti Agostino	TIM	<a href="mailto:aproietti@mail.tim.it">aproietti@mail.tim.it</a>
Scoca Lucia	TIM	<a href="mailto:lscoca@mail.tim.it">lscoca@mail.tim.it</a>
Karl-Heinz Laudan	T-Mobil	<a href="mailto:karl-heinz.laudan@t-mobile.net">karl-heinz.laudan@t-mobile.net</a>
Yannis Markoulidakis	Vodafone	<a href="mailto:yannis.markoulidakis@vodafone.com">yannis.markoulidakis@vodafone.com</a>
Nigel Jefferies	Vodafone	<a href="mailto:nigel.jefferies@vodafone.com">nigel.jefferies@vodafone.com</a>

### **Editorial team members**

Vinod Kumar	Alcatel
Fiona Williams	Ericsson (Chair)
Juha Ylä-Jääski	Nokia
Werner Mohr	Siemens
Raffaele de Peppe	TIM
Karl-Heinz Laudan	T-Mobile
Yannis Markoulidakis	Vodafone

## Annex Content

# Mobile Communications and Technology Platform Recommendations for Widespread Mobile Content

### Table of Contents

Annex Content.....	41
1. Introduction.....	42
2. Open Standards and Interoperability.....	42
3. Strong Copyright Protection and Digital Rights Management (DRM).....	43
4. Support for Market Driven Solutions for Pan-European Licensing and Creation of an Internal Market for Content and Services.....	45
5. Forbearance from regulation of Mobile Content Services.....	46

## 1. Introduction

There is a growing demand by consumers for a wide range of mobile content, such as ringtones, music and video clips, mobile publishing or mobile TV applications. Mobile use of content is therefore a key area for ensuring growth in the media and communications sector. Especially with regard to 3rd generation (UMTS) services, the creation of and investment in new products and services is needed.

In order to support industry efforts to meet consumer demands, an appropriate regulatory framework is required which ensures the protection of intellectual property in mobile communications, a prosperous provision and consumption of mobile content, and the promotion of the further development of advertising or subscription based trade in mobile content.

These objectives can only be achieved through co-operation between the legitimate interests of all relevant actors: creators and editors of content, brokers, mobile equipment manufacturers and mobile operators, taking into account the interests of consumers.

Currently, uncertainties regarding security of distribution, a lack of clear incentives for investors and the question of how to best protect intellectual property, are hampering the mobile sector from developing its full potential.

In order to create an appropriate framework for a vital trade in mobile content services, the EU Mobile Communications & Technology Platform recommends that the EU, its Member States and industry itself focus in their joint efforts on the following issues:

- Open Standards and Interoperability.
- Strong copyright protection and Digital Rights Management (DRM).
- Support for market driven solutions for pan-European licensing and creation of an Internal Market for content and services.
- Forbearance from regulation of mobile content services.

## 2. Open Standards and Interoperability

The development and uptake of interoperable standards and the establishment of secure DRM mechanisms is crucial for new content services.

In the view of the EU Mobile Communications & Technology Platform, the following measures are required:

- Early adoption of open standard default music and video codecs

In the content distribution chain, the content presentation format (specified in the codec) is a key element. The industry should continue to work to ensure the equipment of mobile devices with industry-agreed open baseline codecs that ensure a minimum baseline default. This will reduce the fragmentation of markets and can also provide a de facto default standard to the world market. These codecs should be available on fair, reasonable and non-discriminatory terms to all parties involved.

At the same time, it has to be ensured that these baseline codecs in no way restrict operators and manufacturers in further customising or differentiating their services using additional specific optional codecs.

- Promote a baseline, interoperable standard for interfacing and updating new mobile content applications

Content providers and mobile operators both struggle to work well in the mobile communications domain: content placement on line takes months instead of weeks because of standards fragmentation, broken operator processes, and content royalties agreements. As an example, some content is edited in seven mark-up languages and five different operating systems (programming language). On the other hand, transcoding software already available alleviates fragmentation to a degree.

In order to accelerate investment by all actors, an interoperable and cross-regional standardized approach for interfacing and updating new mobile content applications is essential. The standard profiling choice and its evolution should be open and multilaterally governed or neutrally administered by a trusted third party. The industry should continue its efforts in open application interface development. This is the best way to achieve compatibility and interoperability of different systems which would contribute to a healthy trade in mobile content in Europe and, potentially, worldwide.

### **3. Strong Copyright Protection and Digital Rights Management (DRM)**

Strong copyright protection, effective copyright enforcement and the creation of a secure environment for content are indispensable cornerstones for reaching the full potential of mobile use of certain types of content and for developing much richer services including audiovisual clips and animations, mobile publishing and mobile TV.

The EU should use all tools at its disposal to protect and enforce rights, secure payment methods for rights, and allow sufficient ability to trace infringing behaviour in order to enable the enforcement of rights and prevention of unauthorized distribution.

The EU Mobile Communications & Technology Platform therefore strongly recommends the following actions:

- Strong copyright protection for mobile content

With regard to the accession countries, the EU and Member States should reaffirm that any appropriate legal remedy against the infringement of intellectual property rights and related rights apply also to mobile content, in line with the EU Electronic Commerce Directive 2000/31/EC, the Copyright Directive 2001/29/EC and the recently approved IPR Enforcement Directive. The EU and Member States should co-operate and ensure that infringements can be effectively prosecuted across national borders.

- Support for and harmonization of interoperable DRM technologies

Technical protection measures to prevent unauthorised use of protected content and to ensure that right holders receive an adequate payment for any digital content made available to users are essential for the development of legitimate services, as it became apparent in Japan and Korea. DRM technologies will allow right holders to be compensated for the actual copies and performances; they are therefore on the way to become a key issue in the context of the debate on the management of copyright and related rights in the new digital environment.

DRM technologies provide a significant opportunity for a new mobile content market. They will support new business and consumption models such as single viewing or limited period subscriptions.

Therefore, in collaboration with all industry players, the EU Commission should encourage the adoption of an efficient DRM mechanism by supporting a market-orientated solution. To enable the transfer of content within the mobile domain, and to and from other domains, the EU should support an effective interoperability solution as the most appropriate way to develop the market for consumers while protecting the interests of the rights holders. This could be the industry proposed OMA DRM reference model or other reference models.

In this regard, the Authorized Domain concept for content protection and usage will play a key role. This concept recognizes the subtle balance between the interests of the content provider/distributor and those of the consumer. On the one hand it provides a secure environment for content distribution, on the other hand it enables content usage in line with established consumer expectations: the user can access and move his music, video or games within a certain domain. But beyond this, private domain usage is more restricted, in accordance with usage licenses. Issues such as the definition of the domain, the 'intra' and 'extra' domain usage licenses and interoperability with other content protection systems are parameters that significantly influence the value for the consumer and content provider. Implementation of the concept therefore requires agreement among various stakeholders on such issues.

It should be widely acknowledged that DRM requires adequate legal provisions to ensure that circumvention and unauthorised uses of protected content can be prevented effectively and infringements prosecuted, including across national borders.

The EU Mobile Communications & Technology Platform follows with open interest the work of the High-Level DRM Group and expects its positions to become fully involved in the High-Level Group's deliberations.

- No new levies on handsets

New levies on mobile equipments, such as mobile handsets, would further seriously hamper the introduction of new mobile handsets capable of offering richer services and therewith the successful further development of the European mobile sector. The EU should take steps to ensure that the levy systems in the Member States are compliant with the principles enshrined in the EU Copyright Directive 2001/29/EC, and that any levies, if applied to digital equipment and media, particularly including mobile handsets and storage devices, take into account proportionality and the application of technological measures to new digital products. The implementation of remuneration principles should be in line with the new Copyright Directive principles in which no double payment for content is due. Moreover, once DRM based systems – fully operational and fully introduced into the market – are the more accurate and appropriate model for ensuring payment for content, the EU Commission should dissuade national authorities from extending levies further to digital equipment and media, particularly to mobile handsets and storage devices.

- Education of consumers on the boundaries of the legal use of content

The EU Commission has an important role to play in encouraging education and consumer awareness to combat unauthorized distribution of content. Unless a secure environment is created, right holders cannot provide authorised means of access to mobile content, and consumers are likely to continue to use illegal alternatives. In addition to the legislative instruments already in place, the EU Commission and the Member States should therefore promote educational campaigns or even organise such campaigns on a European-wide

level, which make crystal clear that stealing intellectual property is as serious a charge as if stealing a shirt in a department store.

#### **4. Support for Market Driven Solutions for Pan-European Licensing and Creation of an Internal Market for Content and Services**

The EU Mobile Communications & Technology Platform strongly supports market-driven initiatives that facilitate pan-European licensing for mobile content and therefore asks the EU Commission to address the following issues:

- One-Stop-Shops for mobile content

The starting point for community-wide licensing for music and related multimedia copyrights (including in the mobile field) is that rights for pan-European uses are obtained through separate territorial licences granted by national right holders (individual or collecting societies). Reciprocal agreements among collecting societies which impose territorial restrictions (“customer allocation”) are contradictory to the objective of an Internal Market and could impair the development of coherent business strategies within the industries. This traditional system is insufficient with regard to the needs of the Information society, all the more in view of the enlargement of the EU. We therefore welcome recent steps taken by the EU Commission which will enable users to obtain multi-territory, multi-repertoire rights for on-line uses from the European collecting society of their choice. At the same time, operators should be able to conclude direct license agreements whenever that is in their interest. Often, the most expedient way to obtain pan-European licenses is to obtain them from the right holder directly.

A One-Stop-Shop system for each of the necessary collectively managed rights to distribute mobile content is desirable. It would allow for the clearance of each of such rights at a single collecting society of the users’ choice for the entire EU. Moreover, the creation of such a system would likely increase competition among collecting societies with regard to administration and reporting services they deliver as well as the level of transparency of the costs of such services for their members and users. We kindly request the EU Commission to enforce these principles in pending cases involving the collecting societies and in proposals for future EU legislation on rights management.

- The controversial question of access to mobile content

There was no uniform view on this subject among the members of the platform.

Some companies (mobile network operators) felt that it should be solely up to the market, and ultimately consumers, to determine the most successful models for the provision and consumption of content. Both the content available and the business models securing access to such content are rapidly evolving. Market forces should therefore be left to prevail. In a genuine mobile content market, several models should be able to co-exist.

Other companies (content providers, hardware manufacturers) stressed the need for openness and securing a wide internet-like choice for consumers. Because it should be up to the market of mobile content to decide which models ultimately prevail, end consumers as well as content providers should be in a position of unrestrained choice. End consumers should have the ability to freely choose between content and application providers and download applications of their choice, to use content in various formats and to freely choose the default portal setting on their mobile handsets. Mobile portals should not be closed by technical means or proprietary solutions that restrict the choice of consumers and limit the access of other service providers. Content providers must have a choice between co-operating with mobile portals and/or offering content through independent portals. These

companies therefore believe that the EU Commission therefore should continue to ensure effective competition among the providers of telecommunications services, especially in 3rd generation (UTMS) services.

- Reduced VAT rates for cultural mobile content

To enhance cultural services – such as music content, mobile publishing and mobile TV applications – as an integral part of rich and widespread mobile content, reduced VAT rates for such content should be made possible by the EU legislator via its inclusion in Annex H of the 6th VAT Directive.

- Create a proportionate legal framework for micro-payments

The EU and the Member States should ensure that there is no barrier to the widespread adoption of micro-payment solutions, which represent low risk and are essential to the breakthrough of mobile content. It is clear that the availability of viable, simple and easy means of payment by prepaid customers for new data services will ultimately be crucial to the success of 3G. This requires a proportionate implementation of the current E-money Directive, in a manner which does not affect existing mobile communications services, especially on prepaid mobile platforms, and which avoids over-regulating future mobile payment services. Moreover, the E-money Directive should therefore be revised as soon as possible. In addition, the Electronic Signatures Directive should be reviewed to specifically address low risk transactions.

In light of the crucial importance of a workable and effective m-payments regime for the development and availability of mobile content, the EU Mobile Communications & Technology Platform has prepared more detailed recommendation in a separate paper.

## **5. Forbearance from regulation of Mobile Content Services**

Existing approaches to content regulation should be restricted to the media they were created for, and – if not fully liberalised – under no circumstances be extended to mobile. In view of the multitude of offerings in digitised formats, available at any time, at any place, additional content regulation is neither necessary nor legitimate in the mobile sector.

The EU Mobile Communications & Technology Platform therefore asks the EU Commission to take the following steps:

- Ensure that broadcasting regulation is not applied to mobile content

Authorities should not apply existing broadcast content regulation to content delivered via new delivery channels, such as mobile multimedia video services. The mere fact that applications may also be available via mobile handsets does not change at all their nature as point-to-point communication on individual demand. Also, the progression of cellular and broadcast technology will enable distribution of mobile content via broadcast distribution networks to mobile handsets. The reception of mobile broadcasting is based on individual demand, where the access on protected digital content is enabled by service keys.

There is no justification to extend regulation of broadcast services to services that differ in nature and access. Broadcasting regulation is sector specific and should not be applied to mobile content. The progression of technological convergence should rather be taken as a chance to liberalize all areas of media sectors. Further, mobile devices should not be subject to the mandatory fees (broadcasting licenses or equivalent fees payable by end users levied) to finance public broadcasters.

- Reaffirm the country-of-origin-principle for mobile content services

The country-of-origin-principle – solidly enshrined in the E-Commerce-Directive and in other Internal Market legislation – should continue to govern jurisdiction over communications services, including mobile communications. The platform calls upon the EU Commission to reaffirm this principle and not to depart from it. The principle is of key importance for competition in the Internal Market and for liberalising national regulatory restrictions.

- Priority must be given to self-regulation

The mobile industry should be given an opportunity to develop self-regulatory tools to achieve public policy objectives, such as consumer protection or protection of minors. It is in its key interest that these self-regulatory instruments are efficient and trustworthy. The mobile industry has actually already demonstrated its willingness and ability to do so, for instance in the UK where the five mobile operators adopted in January 2004 a Code of Practice for the self-regulation of new forms of content on mobiles.

## **Annex Security**

# **Mobile Communications and Technology Platform General Purpose Customer Identification and Authentication for Secure Applications**

### **Table of Contents**

Annex Security.....	49
1. Statement of Problem or Issue.....	50
2. Challenges to be overcome.....	52
3. Activity plan.....	53
4. Criticality for collective actions.....	54
5. Urgency and priority.....	55

## 1. Statement of Problem or Issue

In the next future we will have a progressive data-access integration among different systems, technologies and types of end-user equipment; data services business will become much more robust as new sensible data-intensive services are expected to emerge. These would include corporate and consumer applications but, in any case, personal and sensitive data would be managed, and external data will be downloaded and exchanged through every kind of user equipment. For all these trusted and secure transactions, a customer Identification and authentication is needed and a clear market need will exist.

Typical examples of such kind of applications could be:

- Banking and financial applications: most of the Banks already offer to their customers a multi-channel data access to their account with a large portfolio of services: information services about the account, trading on line, on line transfers etc. In the next future they will create a new banking model able to reach over 30% of the customer base in a secure trusted environment;
- Citizen and Public Administration: a large number of Public Administrations will offer data services in order to increase the citizens satisfaction and to reduce the complexity of the actual procedures (i.e. automatic documentation requests, on line payments, electronic complaints, public info-communication etc);
- Health application: through the IP world a customer could exchange information with his doctor or hospital. He will be able to receive the blood test electronic results or to book a global check-up;
- Interactive services: the customer will have a digital TV powered by every kind of user equipment, and he will download application on it or interact with service providers;
- Commerce and ticketing: we will not probably search for coins or cards to buy a ticket or a Coke or a T-shirt over the next few years; the "click on a button" will progressively take place of the actual exchange of physical money and credentials;
- Access services: the customer will need credential verification for a service access or a network access (GSM/WLAN/IP Domain, access to corporate back end including company email, access to subscription services etc.).

The emergence of these services with robust and secure authentication needs comprises a major part of the future opportunity set for all participants in the mobile value chain, as all these services can be perfectly used through mobile equipment and over a mobile connection; moreover, most of the data services and scenarios require:

- Ability to carry out an online transaction (i.e. connectivity with a secure computing device)
- Customer secure Identification for each access;
- Customer authentication for each application;
- Interactive ID of the customer based on dynamic applications execution (i.e. linked to the "presence" concept)
- End to End security for the all communication chain;

- Data storage protection and encrypted transmissions both for the secure storage and authenticated access to user profile information, and for the capability to interoperate with content protection and DRM systems over different networks and devices;
- Seamless mobility between several access networks and technologies

New integrated solutions which will guarantee end to end trusted solutions can be deployed through the different countries as an additional layer on the existing GSM networks and emerging 3G and other access methods (WLAN etc.). The handset, the handset manufacturers, the SIM manufacturers, the network operators and the network manufacturers have to play an active role describing this evolution scenario and suggest end to end trusted services provisioning solutions enabled and guaranteed over the entire value chain.

The acceptance and penetration of the listed services will be highly dependant from the usability and presentation of the services themselves to the end user, and from the perceived level of security and privacy for the customer. For this reason the terminal equipment will guarantee on one side, a usable User Interface for all these data services; on the other side, a) the SIM/USIM Card or b) the SIM/USIM Card and the terminal or c) the terminal with a security element either integrated in the terminal or connected through the terminal will represent a secure repository for the customer ID and Authentication elements (whether based on tokens, PKI key pairs or generation of one time passwords OTP) and also a valuable and trusted environment for the application's execution required by these services. The SIM/USIM already provides Identification/Authentication in the GSM/GPRS environment but, in the same way, the UICC could be used to perform all cryptographic functions in a secure environment or could be used to securely store other user credentials such as global authentication key for the extended IP domain. Such an authentication can be done either locally (operating with an authentication terminal over a local connection), directly (over the mobile network connection, e.g. using RFID technology for contactless transactions or indirectly (using a local connection such as WLAN, Bluetooth, Near Field Communication or IR connection to another device, such as PC or set top box, accessing authenticated services).

A standard SIM/USIM could reuse the available keying material for the Identification process; an enhanced a) SIM/USIM or b) SIM/USIM and the terminal or c) the terminal with a security element either integrated in the terminal or connected through the terminal, equipped with certificates or other kinds of electronic credentials, could manage every kind of automatic authentication process.

Moreover, in order to provide all these enhanced data services the Mobile User Equipment are progressively becoming as powerful as PCs, allowing consumers to:

- receive emails;
- process attachments;
- surf the Web;
- install interpreters of programming languages, scripting tools and application with automatic execution capabilities.

As the overwhelming majority of the whole population is in permanent possession of mobile devices with these capabilities and with a permanent ability to connect to various services over the mobile connection, the mobile device (and SIM) capabilities combined with mobile access has a unique opportunity to become the general purpose secure access method for applications execution. Therefore, the Mobile Platform can observe that mobile connected

devices are in a very favourable position that can be harnessed to become the starting point for meeting of the generic need for user authentication for a wide variety of services. Several other dimensions of the total challenge need to be addressed however, as a technological solution is not sufficient to achieve the intended goal.

## **2. Challenges to be overcome**

The European markets are in many cases fragmented along national borders regarding the provision of services that could utilize strong authentication. Therefore, significant attention is needed to ensure that a common interoperable authentication framework is made available for general purpose authentication uses across Europe. Mobile communication based authentication is well placed to serve as a basis, as it is already assisted by the universal availability of GSM networks and terminals across Europe. The framework includes technical aspects (networks, protocols, authentication methods and the like) but harmonization will be necessary also in relation to the business processes and data structures utilized by government and service businesses across Europe.

Provision of ID issuance and authentication services to consumers and between services requires development and adoption of appropriate business scenarios and cooperation structures that meet the needs of all stakeholders, including

- end users;
- connectivity service providers;
- content and service providers (including corporations for their employees and governments for the provision of eGovernment);
- ID providers and authentication service providers;
- Software and hardware vendors providing solutions for each part of the total value chain
- Payment clearing houses

Government provided identity is an important case in point: Government issued IDs could be utilized by a variety of services if the ID formats and the authentication methods used were harmonized across Europe. This is currently not the case. Creating a single European standard for government electronic ID data structures and potentially fully implemented ID formats [government as ID provider] and for the authentication of citizens by eGovernment services [government as content/service provider] should be a high priority. Mobile connected devices offer an excellent opportunity for creating an interoperable platform also for government IDs and government authentication.

Different business sectors traditionally have different approaches to security processes (administrative systems, premises security etc.) related to authentication, depending on the level of trust needed and level of elimination of abuses (such as fraud) that may be applicable. Thus businesses may only trust their own credentials and their own internal processes, whereas markets may very well develop for specialized “trust providers” to supply ID issuance, credentials provisioning and also authentication services to service/content providers. The authentication infrastructure should have the capability of serving multiple approaches to ID and authentication services.

Characteristics of ID provision and authentication business models capable of delivering a general purpose authentication capability with the potential to achieve both end user

acceptance and wide adoption by the multilayered service industries, span a range of many complicated factors, including:

- Utilization of a Europe-wide consistent open interoperable technical architecture for end user (“client”) devices, networks and service provider back end systems, that supports independent implementations by multiple vendors on multiple platforms (hardware, OS, connection protocol and bearer technology neutral) and achieves strong security or user credentials in a robust implementation;
- A trusted architecture able to protect the ID data exchange through separate elements without violating any privacy issue. The citizen should be able to carry with him all the necessary personal info to act a secure transaction through the mobile device (handset and SIM);
- An open and neutral authentication service provision business model that can be harnessed by any willing content or service provider for authenticating the users of that service and meets the criteria for secure verification of user credentials;
- A neutral and trusted ID provider business model that meets the criteria for a high level of trust in user credentials and their validity and is available on an open and non-discriminatory basis;
- A trust model that supports the trust of all players in the veracity and security of credentials utilized;
- A compensation and fee structure that compensates ID providers and authentication providers for the value added provided by them (to content/service providers authenticating their users) in a cost efficient manner, conducive to the attractive introduction and mass market adoption of authenticated services;
- A federated, single sign on service or services supporting the user convenience through minimizing the number of times (and potentially different mechanisms) a given user needs to perform an authentication related task and the potential reliance by one service provider on ID (and credentials) issued by a 3rd party ID provider and on authentication carried out by (the same or different) 3rd party authentication service provider;
- An approach to end user privacy that meets applicable regulations relating to personal data and fosters end user trust
- User anonymity provided with some pre-paid schemes.

### **3. Activity plan**

We recommend that this proposal goes to a “whitepaper” stage analysis with the following brief:

- Review the current approaches and potential use cases to identification, authentication and the available mobile platforms including SIM/USIM and terminal devices (Members of the Mobile Platform).
- Establish integrated platforms of services able to provide simultaneously multiple access conditions (i.e. ID/Authentication/ Presence/...) in order to increase the security level for enhanced applications, and correctly validate the Customer;

- Provide requirements for new authentication mechanisms over new set of applications (i.e. IMS, DRM,...)
- Involve the Security assets to evaluate the risk effects deriving from the service implementation (Public Authorities);
- Establish a common table within the GSM community (operators and manufacturers) to evaluate the possible assets to establish an area of secure transactions (UE Commission);
- Review the legal scope and implications;
- Review the optimal business scenarios characteristics for ID issuance, credentials provisioning, authentication services particularly from end user (choice, convenience, trust, privacy etc.) and supported service/content provider (neutrality, cost, reliability and trust) points of view (Members of Mobile Platform)
- Review the options for providing operator delivered identification and authentication;
- Review other capabilities and functionalities that could be delivered on top of an enhanced SIM/SW solution/Networks, especially for customer protection type benefits;
- Extend the proposed mobile device and SIM based approach to the Public Administration (i.e EU, US Administration Bureau, etc) in order to spread the concept of the mobile terminal and SIM/USIM as ID device (UE Commission);
- Promote an inter-Operator, inter-ID provider and inter-service provider infrastructure for one or multiple federated Identification and Authentication process among their customers (e.g. support Liberty Alliance scheme) (Members of Mobile Platform);
- Define common rules to endorse a global ID-Auth environment through different applications.
- Call for government and businesses across Europe to define their ID issuance and authentication requirements using a coherent set of parameters for which a technical infrastructure and ID and authentication service business model can be developed, deployed and operated in a unified and interoperable manner (UE Commission).

#### **4. Criticality for collective actions**

This is essential to address through a collective effort because:

- The real value lies in having a common approach/solution so that together we provide a robust environment. Approaches that are driven by individual operators or in a country by country fashion will create fragmentation and uncertainty in the minds of customers. It will also not offer governments and third party providers of service the critical mass that they require.
- A unified approach is essential to drive standardisation and standard adoption (e.g. in a new SIM/USIM architecture, changes to handset design and to handset O/S, establishment of neutral business models acceptable to wide constituencies). Fragmentation will materially lower the overall probability of success.
- Identification/authentication and personalisation capability are more hygiene factors rather than differentiators between operators and so not o much in the competitive

arena. How operators use these capabilities to offer differentiated solutions will be up to them.

- Governments and key service provider industries (such as banks, wholesale and retail chains – as well as corporations in respect of their mobile or distant workforce) must be enlisted in this general effort so that fragmented solutions are avoided as much as possible.

Cooperation between Operators Manufacturers and Public Authorities is mandatory to succeed in this kind of initiative.

## **5. Urgency and priority**

GPRS and 3G are in the process of launch right now. If we wish to implement an identification and authentication solution, we have to do it in 2004 (or lose the chance). The activity should be synchronised with the SDOs' activities process and should take into account the diffusion on the market of new handsets/networks supporting these features. From a prioritisation perspective, if this issue can be solved, it would be in the top tier of issues as it:

- Will add enormous value to customers and governments
- Drive take-up of data services benefiting the entire industry

The main benefits from the customer perspective will be addressed through:

- The protection of personal data (privacy,...)
- The performance of services through multi access channels adopting the same ID credentials (convenience through single sign on)
- The achievement of scale and scope economies due to the unfragmented industry

Help ensure that operators have relevant value-add for the services layer where the value opportunity lies in the medium term.