



## **SEVENTH FRAMEWORK PROGRAMME**

### **ICT-1-1.5**

### **Networked Media**

*Specific Targeted Research Project*

### **My-e-Director 2012**

(FP7-215248)

### **My-e-Director 2012 - Real-Time Context-Aware and Personalized Media Streaming Environments for Large Scale Broadcasting Applications**

#### **[D2.1- End-User Requirements]**

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## Table of Contents

1	Executive Summary .....	11
1.1	Scope .....	11
1.2	Audience.....	11
1.3	Summary.....	11
1.4	Structure.....	12
2	Introduction .....	13
2.1	Importance of User Requirements .....	13
2.2	User Requirements Analysis Phases.....	13
2.3	Types of Requirements .....	14
2.4	Extracting End User Requirements for My-e-Director 2012 .....	15
3	End-user categorization and analysis: .....	17
3.1	Content producers.....	17
3.1.1	Directors.....	17
3.1.2	Producers.....	18
3.2	Content distributors .....	20
3.2.1	TV broadcasters .....	20
3.2.2	xDSL Internet Service Providers .....	20
3.2.3	Cable telecom operators.....	21
3.2.4	Mobile phone telecom operators.....	21
3.3	Content consumers .....	21
3.3.1	Mobile phone users .....	21
3.3.2	Portable computer (PDA, PocketPC) users .....	21
3.3.3	TV users .....	22
3.4	Service providers. ....	22
3.4.1	Internet Service Providers.....	22
3.4.2	Independent/Virtual Service Providers .....	22
3.5	Rights holders .....	22
4	User requirement capture methodology .....	24
4.1	Data collection methodologies .....	24
4.2	Addressing each stakeholder group in My-e-Director 2012 .....	25
4.2.1	Content producers .....	25

4.2.2	Content distributors.....	25
4.2.3	Content consumers.....	26
4.2.4	Service providers .....	26
4.2.5	Rights holders .....	26
4.3	End User Questionnaire Based Survey.....	26
4.3.1	Questionnaire overview .....	27
4.3.2	General framework of the survey .....	27
4.3.3	Question categorisation.....	28
4.3.4	Questionnaire analysis .....	30
4.3.4.1	Language used by the respondents.....	30
4.3.4.2	Question 1a: Gender.....	31
4.3.4.3	Question 1b: Age.....	31
4.3.4.4	Question 1c: Education level.....	32
4.3.4.5	Question 2a: Experience with Internet .....	33
4.3.4.6	Question 2b: Internet Access frequency.....	34
4.3.4.7	Question 2c: Type of the Equipment Used .....	35
4.3.4.8	Question 2d: Type of Internet Connection at home .....	36
4.3.4.9	Question 2e: Use of Wireless Network Technologies .....	38
4.3.4.10	Question 2f: Software installation on Devices.....	39
4.3.4.11	Question 3a: Sport Popularity .....	40
4.3.4.12	Question 3b: Mobile Device User’s Requirements.....	42
4.3.4.13	Question 3c: Live Sport Events Interest.....	43
4.3.4.14	Question 3d: Use of mobile devices from attendees of a live event .....	44
4.3.4.15	Question 3e: Camera preference for a broadcasted event .....	45
4.3.4.16	Question 3f: User Interface preferences.....	47
4.3.4.17	Question 3g: Learning to use the My-e-Director 2012 Interface.....	48
4.3.4.18	Question 4a: Personalisation at device level .....	48
4.3.4.19	Question 4b: Willingness to pay for personalised viewing of events .....	49
4.3.4.20	Question 4c: Time Shift usage .....	51
4.3.4.21	Question 4d: Device – shift usage.....	51
4.3.4.22	Question 5a: User Grouping.....	52
4.3.4.23	Question 5b: Personal Privacy Concerns .....	53
4.3.4.24	Question 5c: Protection of privacy rights over the internet .....	54

4.3.4.25	Question 5d: Privacy Risks .....	55
4.3.4.26	Question 5e: Awareness of Personal Data Protection .....	56
4.3.4.27	Question 5f: Personalized User Experience .....	57
4.3.4.28	Question 5g: networked digital rights .....	58
4.3.4.29	Question 5h: Content Watermarking.....	59
5	Discussion of results.....	61
5.1	Selection of devices, User Interface and interactivity .....	61
5.1.1	General findings.....	61
5.1.2	Requirements .....	63
5.2	Personalised viewing of sports events .....	63
5.2.1	General findings.....	63
5.2.2	Requirements .....	65
5.3	Rights management .....	65
5.3.1	General findings.....	65
5.3.2	Requirements .....	67
5.4	Use of networking technologies .....	70
5.4.1	General findings.....	70
5.4.2	Requirements .....	70
5.5	Privacy .....	71
5.5.1	General findings.....	71
5.5.2	Requirements .....	72
5.6	Service provision .....	72
5.6.1	General findings.....	72
5.6.2	Requirements .....	73
5.7	Conclusions and input to specifications tasks .....	75
6	Bibliography and references.....	82
7	Annex A .....	85

## Table of Figures

Figure 1: End-user categories .....	17
Figure 2: Language .....	30
Figure 3: Age distribution .....	32
Figure 4: Education.....	33
Figure 5: Skill Level .....	33
Figure 6: Internet Access .....	34
Figure 7: Use of devices for internet content access.....	36
Figure 8: Internet connection type .....	37
Figure 9: Internet connection type per country .....	37
Figure 10: wireless network connection type .....	38
Figure 11: Software use (install vs. web based) .....	40
Figure 12: Sports Interests and Viewing Habits .....	41
Figure 13: mobile user device requirements .....	43
Figure 14: Live sports event interest.....	44
Figure 15: Use of mobile devices from attendees of a live event.....	45
Figure 16: Camera preferences .....	46
Figure 17: Control interaction.....	47
Figure 18: Methodologies for Learning the My-e-Director 2012 Interface .....	48
Figure 19: Preferred device.....	49
Figure 20: Willingness to subscribe to a viewing service.....	50
Figure 21: Willingness to pay for time shifting capability .....	51
Figure 22: Willingness to pay for device shifting capability .....	52
Figure 23: Personalisation supported by user grouping.....	53
Figure 24: Personal privacy concerns .....	54
Figure 25: Status of privacy rights protection.....	55
Figure 26: Awareness of privacy risks.....	56
Figure 27: Control loss over personal information protection.....	57
Figure 28: Willingness to provide personal information for advanced personalised services .....	58
Figure 29: Willingness to pay more for enhanced DRM support.....	59
Figure 30: Attitude towards content watermarking .....	60

# **1 Executive Summary**

## **1.1 Scope**

This document contains the user requirements for the provision of the My-e-Director 2012 platform. It also contains an analysis of the stakeholders and users expected to be interested in and make use of the platform.

## **1.2 Audience**

This deliverable is public. It contains the result of the user requirements capturing process, and can be used by system designers and implementers as the basis for the provision of system specifications. The document is intended to be used as input to the specifications process in my My-e-Director 2012 program.

## **1.3 Summary**

This deliverable presents the end user requirements for the My-e-Director 2012 platform, which define a service platform capable of supporting unique interactive broadcasting services enabling end-users to select focal actors and points of interest within real-time broadcasted scenes. In particular, in this document we will specify the methods to collect elicit, organize, structure and manage end-user requirements with respect to user-directed personalized streaming services. Requirements have been collected based on conventional engineering methods such as:

- use of stakeholder analysis [WBG] for :
  1. identification of the user groups,
  2. identification of user needs,
- interviews with experts,
- survey of end users,
- study of the literature and related technical documentation.

The data collected has been analysed and the results are presented in the following sections of the deliverable.

End-user requirements focus mainly on specific issues related to personalised access to live streaming content through a multimodal-networking interface (mobile, fixed). During the user requirements capture, the incorporation of advanced face recognition and tracking mechanisms in correlation to the sensing environment and the personalisation in the My-e-Director 2012 platform, have been taken into account. The challenge faced during the user requirements identification lies in the selection of the “correct mixture” of parameters, which should satisfy both the need for transporting high volumes of streaming data produced by high definition cameras over the backbone network, as well as the need for QoS-aware media transmission to the end users through a limited bandwidth wireless access network. Therefore, issues of media

transmission over heterogeneous networks (e.g. broadband terrestrial network, mobile access network) have also been addressed, in parallel with adaptive media encoding of the transmitted multimedia content. Last but not least, we have considered the user expectations and experience regarding access to multimedia content for the coverage of large sports events.

The result is a comprehensive list of user requirements and the classification and evaluation of the significance of these requirements by the project's experts so that they can be used directly as input to the My-e-Director 2012 platform specification process.

## 1.4 Structure

The rest of the deliverable is structured in the following way: Section 2 is an introductory section covering the need for user requirements capture and user requirements analysis. After a general presentation on user requirements analysis methodological issues, the section concludes with the general methodology framework selected for user requirements analysis in the project.

Section 3 continues with the presentation of the stakeholders' analysis, where the major stakeholder groups that have been identified as potential users of the platform are presented in details.

Section 4 presents the methodology used for users' requirements capture in detail. The selected data collection methodology for each user group is described, giving emphasis to a survey carried out by the project that mainly attempted to capture the requirements of content consumers.

The deliverable concludes with section 5 where the results of the user requirements capture work are analysed and specific requirements for 6 different categories are given, following a specific identification scheme that will allow the platform specifications to be matched to the corresponding user needs:

- 1. Selection of devices, User Interface and interactivity.**
- 2. Personalised viewing of sports events.**
- 3. Rights Management.**
- 4. Use of networking technologies.**
- 5. Privacy.**
- 6. Service provision.**

The result is the compilation of a table of requirements that will be used as input to the platform specification task. The table contains an extra column containing the project's experts evaluation of the significance of each requirement.

The deliverable closes with an Annex, in which screenshots from the questionnaire used for the project's user requirements capturing survey.

## **2 Introduction**

### **2.1 Importance of User Requirements**

The general aims when identifying user requirements throughout system design are the following:

- First, to understand more about the users: that is, to clarify issues regarding who the expected/addressed users are, what are the tasks that they will be performing with the system, and the environment and context in which the system will be used?
- Second, to produce a stable set of system requirements in order to translate the needs of the users into a set of clearly identified requirements that can be understood by the system designers and can support the development of the system.

The user requirements analysis and definition phase is generally considered one of the most important phases of system design and development, for a number of reasons:

- Requirements definition is the stage where failure most commonly occurs: due to the complexity of the analysis processes and tools, and the importance that human factors play.
- Getting requirements right is crucial since the proper identification of user requirements can lead to a system that addresses user needs and supports the desired tasks. On the contrary, if the user requirements are not properly identified, the users will feel reluctant to use the system.
- Requirements guide evaluation: the user requirements provide the dimensions upon which the system will be evaluated after (or throughout) its initial deployment.

### **2.2 User Requirements Analysis Phases**

User requirements are generally identified throughout the phases of an iterative ‘User Requirements Analysis’ process. The general phases of this process are the following:

- Data gathering activities: these are the activities carried out throughout the process which are related to the collection of data associated with the user requirements, from various sources and using various tools.
- Data analysis activities: these are the activities carried out throughout the process which are related to the analysis of the collected data, so that general conclusions about the user needs and requirements can be made.
- Expression as ‘requirements’: these are the activities carried out throughout the process in order to translate the general conclusions made about user needs and requirements in a set of system-oriented user requirements that the technical developers of the system can understand and use for system design.
- All the process is iterative: at each point, a single phase or all phases can be repeated, in order to validate the results and fine-tune the user requirements.

The methodology described above has been followed in the production of this deliverable. It has to be kept in mind throughout the user requirements analysis process, that requirements need

clarification, refinement, completion, and re-scoping. Therefore, the system design and development process requires:

- Clear Input: this is provided by a users' requirements document that is directed to the system designers and developers (this is the aim of this Deliverable D2.1).
- Clear Output: this is provided by translating user requirements into a set of design specifications that drive the system development and deployment (this is another aim of Deliverable 2.1).

In order to achieve the above targets, a list of guidelines for providing a good user analysis has been compiled according to [Sharp]

<b>Guidelines for good user requirements analysis</b>
Focus on identifying the stakeholders' needs
Involve all the stakeholder groups
Involve more than one representative from each stakeholder group
Use a combination of data gathering techniques
Support the process with props such as prototypes and task descriptions
Run a pilot session
You will need to compromise the data to be collected and the analysis to be done, but before making sensible compromises, you have to decide what are your true needs
Consider carefully how to record the data
Start data analysis soon after data gathering session
Initial interpretation before deeper analysis
Different approaches emphasize different elements e.g. class diagrams for object-oriented systems, entity-relationship diagrams for data intensive systems

**Table 1:** General guidelines for requirements analysis [Dzida]

Most of the guidelines above have been followed during the user requirements process, limited by the availability of resources and supporting tools (e.g. running a pilot session was not feasible at this early stage of the project).

## 2.3 Types of Requirements

Different types of user requirements can be identified. These include functional and non-functional requirements, requirements about the data used by the system, the environment in which the system will be used, and the intended user groups. These requirement types include [Sharp]:

- Functional requirements: corresponding to what the system should do. This has been in general the main focus of requirements activities for years.
- Non-functional: corresponding to other types of system requirements (e.g. technical ones,

such as the required memory size of the system or the minimum response time required).

- Data: corresponding to the kind and the nature of the data to be stored, and the format of the databases that will store them.
- Environment or context of use: corresponding to a number of requirements related to the physical environment (e.g. dusty/noisy/illuminated/warm/humid), the social environment (e.g. sharing of files/displays/paper, work from a distance/individually, privacy issues), the organizational environment (e.g. hierarchy, IT department's attitude and remit, user support, communications structure and infrastructure, availability of training).
- Users: corresponding to the identification of the users, their characteristics (ability, background, attitude to computers) and their experience level (e.g. novice, expert, casual, frequent user).
- Usability: corresponding to the requirements related to a number of usability factors (e.g. learnability, throughput, flexibility and attitude).

## **2.4 Extracting End User Requirements for My-e-Director 2012**

In order to define the My-e-Director 2012 platform's End User Requirements it is essential to correctly identify and categorize the users of the system and the services provided. This has been the starting point for the system requirements analysis, which should ensure the definition of a system which covers the user requirements. The analysis and definition of the characteristics of each user category followed user categorization.

In accordance with the user identification and categorization, we have to follow the same steps for the definition of service scenarios that the platform will support. We then have to select the most efficient method of collection and customise the selected methods to categories of users. The customisation of the collection methods is based on the specific needs of each user category.

Finally, in order to correctly map the user requirements definition to the tasks identified in the technical annex and the specific My-e-Director 2012 platform components 6 categories have been defined. The following table links these categories with the requirements types described above.

Requirements category	Requirements type					
	Functional	Non-functional	Data	Environment	Users	Usability
Selection of devices, User Interface and interactivity.				<b>X</b>	<b>X</b>	<b>X</b>
Personalised viewing of sports events.	<b>X</b>			<b>X</b>	<b>X</b>	<b>X</b>
Rights Management.	<b>X</b>					
Use of networking technologies.	<b>X</b>	<b>X</b>				
Privacy.			<b>X</b>		<b>X</b>	
Service provision.	<b>X</b>	<b>X</b>	<b>X</b>			

**Table 2:** Mapping of user's requirements categorisation to requirements type

### **3 End-user categorization and analysis:**

In this section, a presentation of the different stakeholders [WBG] will be given, identifying each category and giving a description of their role and possible use of the platform. Through this categorization, we will provide feedback to the business model and identify the contribution that should address all these stakeholders.

An initial proposal for the definition of stakeholders follows:



Figure 1: End-user categories

Each category is described below, with sub categories of possible users of the platform that form this specific category. The definition of each group is presented through the description of the tasks that they perform with respect to the My-e-Director 2012 system. [Webster]

#### **3.1 Content producers**

This category includes all user groups related to the production of media that will be distributed through the My-e-Director 2012 platform. This includes two types of users: Directors and Producers.

##### **3.1.1 Directors**

A **director** is a person who supervises the production and making of a project, in general, and controls resources and expenditures. He/she is supposed to direct the entire crew and is,

moreover, responsible for the final completion of the project. For example, a film director visualizes the script, controls the film's artistic and dramatic aspects, while guiding the technical crew and actors in the fulfilment of their vision. He/she should be controlling all aspects of action in front of the camera, including lighting, talent, and camera movement. *Examples:* Sports Director position in TV broadcasters (see following section)

### 3.1.2 Producers

A **producer** creates the conditions for making a project, finds financing for and supervises the presentation of the project. He/she initiates, coordinates, supervises and controls other matters as well, such as hiring key personnel, and arranging for distributors. The producer is involved throughout all phases of the making process from development to completion. In the scope of fine arts, he/she manages and organizes the production of a show or video project (as for stage, screen or radio transmission) from pre- to post-production and works closely with the director to determine resources, quality levels and budget. ).

*Examples:* TV broadcasters (ESPN [ESPN], Eurosport, BBC sport [BBC]), corresponding national and international sport associations (NBA [NBA], FIFA [FIFA], FIBA [FIBA], UEFA [UEFA])

Commissioners decide what events are to be covered and what types of content will be produced (e.g. conventional TV, interactive TV, online, etc.), and who is going to produce the content. A broadcaster might produce its own content ("in-house" production), or might employ an external production company ("independent" or "indie"). Unlike some other BBC production areas, BBC Sport commissions its own programmes, which means that the commissioning role is typically combined with an editorial or executive production role (see below). This role is particularly important with respect to new events or programmes. In sport, rights are a major constraint on what can be commissioned.

Producers are responsible for coordinating and controlling how a production is made. This includes developing programme ideas, ordering outside broadcast resources, and directing operations. The producer typically selects which camera to use in the main programme, by operating a piece of equipment called a "vision mixer" or "switcher". (In other genres of production, this is often done by a separate operator, also called a "vision mixer", but the highly reactive nature of live sports broadcasting means that this is rare in a sports outside broadcast.)

There is a hierarchy of producers:

- Executive producers typically have a responsibility for a sport, or a "programme strand". [For example the BBC "Match Of The Day" football strand includes the main programme on Saturday evening showing all the day's highlights, a more relaxed programme the following day showing Sunday games and providing more analysis of what happened the day before, and additional programmes for FA Cup, England team matches etc.] Executive producers are not involved in the day-to-day running of productions but will be consulted on important decisions. Often executive producers are involved in securing finances for a programme [and so have some similarities to film producers]
- Senior producers will typically be responsible for coordinating and controlling the production for the whole of an event, such as an athletics meeting. [So a senior producer is

similar to a film director, although films normally use only one camera whereas sport normally uses several.]

- Producers will typically be responsible for one part of the production for the event. For example at an athletic event, there may be one producer responsible for covering the track races and one for the field competitions. In this case, the senior producer might be responsible for the presentation, i.e. how the different parts are combined together to create the final live programme that is transmitted to the audience. A VT Producer is responsible for the recording of the event, or an Interactive Producer will be responsible for creating versions for DVB interactive TV services.

There may also be other producers associated with the event, e.g. International Producers manage the delivery of content to overseas broadcasters showing the event.

Editors are responsible for deciding what goes into a programme (rather than how it is made). Similar to producers, there are different levels of editors responsible for entire sports/strands and individual events. [Many types of production e.g. Comedy and Drama don't have editors -- Sport has them because of the journalistic aspect.]

Production Assistants / Coordinators handle many aspects of the actual work for which senior producers and producers are responsible, e.g. booking resources, ensuring that staff is in the right place at the right time. During the event they will also make a record of what happens at what time to aid creation of action replays, highlights, etc. This activity is called "logging".

Engineering Managers are responsible for managing the technology and work of technical operators for the production, at an outside broadcast or at a television centre.

**Camera operators** control the direction, zoom and focus of the broadcast cameras, either directly or remotely (e.g. a "railcam" is remotely operated). There may also be some fixed cameras that do not require operators. Typically camera operators will know from experience the best framing for a particular scene at the event; however the director will often request a particular shot from a particular camera. This is done using an intercom system called "talkback". A camera supervisor is responsible for the work of several operators, and typically will also be one of the camera operators.

VT Editors are different from Editors and create new versions from the video and audio recorded at an event. These might be simple action replays, packages of highlights to be shown at the end of a day's coverage, or a different version. There may also be sequences of action replays, sets of highlights to be shown at the end of a programme or on another occasion, highlights packages for interactive, mobile or online viewing. The VT editor will use a video editing system which accesses video and audio content stored on disk-based video servers. [Note that "VT" stands for videotape, although this is now rarely used at sports outside broadcasts, the old name is still used.]

Data/Graphics Operators handle the process of incoming data feeds from an appropriate source and producing relevant graphics for use in the programme. The details will vary according to sport (e.g. the data feed used for football scores from the UK Football Premiership is very different from that used for lane and time information at an athletic event, and some data will be entered manually).

Media Managers [a new role that the BBC has recently introduced] have specialist library skills and work with a production to identify previously recorded content that can be used in a programme (e.g. to show a previous event involving a particular competitor) and to ensure that recorded content is logged with the correct metadata to help find it at a later date.

Presenters and commentators introduce events and explain what happens.

## 3.2 Content distributors

This category includes all user groups that relate to the distribution of the media content produced. In the case of the My-e-Director 2012 project, content distribution is focused on real time distribution. It includes four types of users: TV broadcasters, xDSL Internet Service Providers, Cable telecom operators and Mobile phone operators.

### 3.2.1 TV broadcasters

A **television broadcaster** is the organisation or company which is responsible for the production and transmission of television programmes, including the installation and control of transmission or studio. Traditionally, TV stations made their broadcasts by sending analogue or digital radio signals over the air. This type of service is called terrestrial television. Also, it is possible to transmit the programme, over coaxial cable in the case of “cable TV”, which is appropriate for subscription TV, or over satellite, in order to provide wide area broadcast coverage. Individual television stations are usually granted licenses by a government agency to use a particular section of the radio spectrum (a channel) through which they send their signals.

*Examples:* BBC [BBC], Eurosport [Esport], ESPN [ESPN]

### 3.2.2 xDSL Internet Service Providers

An xDSL ISP (abbreviation for Internet Service Provider), is a company which provides Internet access and related services for individuals, organizations and companies, via xDSL technologies. The xDSL technology refers collectively to all types of digital subscriber lines, the two main categories being ADSL and SDSL. Two other types are High-data-rate DSL (HDSL) and Very high DSL (VDSL). DSL technology offers the capacity needed for delivery of broadband entertainment services thus opening market opportunities that are becoming very attractive for telecom operators. Cable and satellite operators currently dominate this market, so that broadband services delivered over DSL have to provide an added value to the customer in order to be successful. DSL connections typically work by dividing the frequencies used in a single phone line, so as to transfer voice and data in real time distribution. Nowadays the state of the art services provided by such networks are triple play (TV, Internet and telephone). More specifically the end user could have access to multiple services, like web browsing, internet telephony VoIP over the xDSL internet connection, with extremely low cost rates and supplementary access to live TV streams from all over the world. Also due to the interactive nature of the system, the end user could have access to various interactive services like video on demand.

*Examples:* America Online [AOL], CompuServe [CServe], Hellas On Line [HOL], Hellenic Telecommunications Organization (OTENET) [Onet]

### 3.2.3 Cable telecom operators

The **cable telecom operator** is a company which administrates wired telecom services, often triple play. In telecommunication, the cable telecom operator uses a distribution network over coaxial or xDSL network that is established and operated by an administration for the specific purpose of providing land mobile telecommunications services to the public.

*Examples:* Kabel Deutschland G.m.b.H [Kabel], Hellenic Telecommunications Organization (OTENET) [Onet], Numericable France [Nmrc]

### 3.2.4 Mobile phone telecom operators

This is a telephone company which provides and administrates wireless telecom services for mobile phone subscribers. This kind of company has to acquire a radio spectrum license from the government, depending on the type of mobile phone technology it intends to deploy. The state of the art Radio Access Technologies that this operator is utilising depends on the national regulations. In Europe the most common mobile access technologies are GSM 900, DCS 1800, and UMTS 2100.

*Examples:* Orange [Orange], Vodafone [Vodafone], WIND [Wind], COSMOTE [Cosmote]

## 3.3 Content consumers

This category includes all user groups that relate to the consuming (access and reproduction) of media that will be distributed through the My-e-Director 2012 platform. This includes three types of users: Mobile phone users, Portable computer (PDA, PocketPC) users and TV users.

### 3.3.1 Mobile phone users

The **mobile phone users** prefer to use mobile phones, often called wireless, cellular phones. These are long-range, portable electronic devices used for mobile communication. This terminal gains access to the network via specialised and distributed base stations which are in turn connected to the public switched telephone network (PSTN). Mobile phones support many services, and accessories, such as SMS for text messaging, email, GPRS packet switching for access to the Internet, and MMS for sending and receiving photos and video. Here, it should be noted that the penetration rate of these devices is increasing rapidly. Western European average penetration rate for mobile phone subscriptions was 110% in 2007, i.e. 1.1 subscriptions per person [Informa 2007]

### 3.3.2 Portable computer (PDA, PocketPC) users

**Portable computer user** is the person who uses a portable computer. This is a computer that is designed to be moved from one place to another (portable). Portable computers such as personal digital assistants (PDA) and Pocket PCs are handheld computers which can offer most of the functionalities of desktop computers. Similarly to the use of mobile devices, the use of PDAs and Pocket PC devices is also increasing at a very high rate. The following figures are indicative. Worldwide PDA Unit Shipments, by Vendor: Palm 5,055,918, Hewlett-Packard 2,236,667 Sony 506,358, Handspring 1,371,028 (2001&2002 [EContent])TV users

### 3.3.3 TV users

The **television users** are people who use the television in terms of their amusement, education and acquiring information and who also exploit the services that are provided, for example teletext (stock market, weather forecast, television guide etc.). The percentage of households in Europe that owns at least one TV set is very high: 96%, with 13% of them having access to Digital TV [Eurostat, 2000].

## 3.4 Service providers.

This category includes all user groups that relate to the provision of services that can be deployed over the My-e-Director 2012 platform. This includes two types of users: Internet Service Provider and Independent/Virtual Service Provider. The main role of the service provider is to provide high level services to end users. In some cases, the service provider acts as the common reference point in the service supply chain, maintaining interactions with the majority of people involved.

### 3.4.1 Internet Service Providers

**Internet Service Provider (ISP)** is a company, which provides other companies, or individuals, with access to, or presence on, the Internet and other related services such as Web site design, building and administration. Most telecommunications operators are ISPs and equip home and business customers with the corresponding terminal units i.e. a modem so as to provide Internet connectivity, ranging from traditional dial-up to DSL, usually for a monthly fee.

*Examples:* America Online [AOL], CompuServe [Cserve], Hellas On Line [HOL], Hellenic Telecommunications Organization (OTENET) [Onet]

### 3.4.2 Independent/Virtual Service Providers

The term **independent service provider** is used to distinguish a service provider that is an independent, separate company from a telephone company. A **Virtual ISP (vISP)** is also the legal person who purchases services from another ISP (even a mobile operator) and offers them to the vISP's customers. There are two main models for the delivery of the services of the vISPs. In the first model, customers' traffic is routed toward its destination by the vISP's network and in the second one the vISP only provides authentication, authorization and accounting functions to the users.

*Examples:* PLATOnet [Plato], AIASnet [Aias], Frog Mobile [Frog], Mo-MAD mobile telephony [MoMAD]

## 3.5 Rights holders

This category includes users that relate to the holders of rights regarding the events that are covered by the media distributed over the My-e-Director 2012 platform, such as the sport event rights holder and the sponsorship professionals in sectors like arts, government, media and charities. The main aim of the rights holders is to use their skills and tools to develop and manage sponsorship programmes and deliver value back to them. Rights holders usually use

third party companies for the rights management and the distribution process to maximise the exploitation of the broadcasting, streaming and mobile technologies.

Examples: UEFA, National football league associations (e.g. Bundesliga [Bundesliga], Greek SuperLeague [Superleague], Automobile or Motorsport associations (FIA) [FIA]

## **4 User requirement capture methodology**

This section describes the methodology used to capture the requirements of the different stakeholder categories related to the platform. First, a presentation of the method commonly used for data collection is given, followed by identification of the different methods used to capture the requirements of each different group.

### **4.1 Data collection methodologies**

User requirements are generally related to the collection and analysis of data. The reasons behind this close relation are:

- Requirements arise from understanding users' needs: that is, information about user needs has to be collected in some form, in order to be analysed.
- Requirements can be justified and related to data: that is, the definition of user requirements can be justified if it is related to a set of data that has been collected and supports this definition.

For this purpose, a number of data collection methods are generally used [Sharp], [ESA]:

#### **Questionnaires**

Questionnaires generally include a series of questions designed to elicit specific information. They may require different kinds of answers (such as simple YES/NO; choice of pre-supplied answers, comments). Questionnaires are often used in conjunction with other techniques. They can give quantitative or qualitative data, and they are suitable for answering specific questions from a large, dispersed group of people.

#### **Interviews**

These are a forum for discussing requirements with people. Interviews can be structured, unstructured or semi-structured. Several types of supportive material can be used in interviews, such as sample scenarios of use, prototypes. They are good for exploring issues, but they should be restricted to a small number of expert users, since they are time consuming and it may be infeasible to visit and interview members of a target group.

#### **Workshops or focus groups**

In principle, workshops are a type of group interview. They are good for gaining a consensus view and/or highlighting areas of conflict.

#### **Naturalistic observation**

Observation involves spending time with the users in their day-to-day tasks, observing work as it happens and recording requirements at that time. This helps to gain insights into stakeholders' tasks and in understanding the nature and context of the tasks. On the other hand, it requires time and commitment from a member of the design team, and can result in a huge amount of data which then also requires substantial time for analysis.

### **Studying documentation**

This is a useful process for identifying user requirements, as there are several principles, procedures and rules recorded in existing literature and documentation. Documentation is a good source of data about the steps involved in an activity, and of any regulations governing a task. This method should not be used in isolation but only in combination with others. Nevertheless, it is a good method for understanding legislation and getting background information, and it requires no users' stakeholder time, which is a limiting factor in the other techniques.

## **4.2 Addressing each stakeholder group in My-e-Director 2012**

In this section, we describe the specific methods that will be applied to each stakeholder group, the tools and process that will be followed.

### **4.2.1 Content producers**

#### **Methodology for capturing requirements**

In order to capture the end user requirements that are related to the stakeholders of this category, interviews were used. These interviews were addressed to experts in the corresponding fields (directing, producing), recording their opinions and views regarding the services and options that a platform like My-e-Director 2012 should offer to the end users.

Content producer requirements relating to television broadcasters were captured by BBC project members. These included:

- a) use of project members' expertise and expertise of sports production and associated technologies
- b) discussions with producers and editors and other staff from sports production departments and their facilities providers
- c) practical observation of how events are covered, e.g. the arrangement of cameras and microphones at an athletics event
- d) discussions with BBC groups considering what could be done to improve coverage for the London 2012 Olympics and Paralympics

### **4.2.2 Content distributors**

In order to capture the end user requirements that relate to the stakeholders in this category, documentation was studied. Information from articles, surveys, and the internet was used in order to produce the requirements for platform capabilities, as these could be obtained from existing documentation.

An overview of content distributor requirements for television broadcasters was captured by BBC project members making use of:

- a) their own expertise and experience of the broadcast industry
- b) discussions with colleagues working in relevant areas of the BBC and its media partners.

#### **4.2.3 Content consumers**

In order to capture the end user requirements that relate to the stakeholders in this category, a bi-folded method was selected. First, an internet user questionnaire based survey was carried out, that tried to capture the consumer's approach to issues such as quality, pricing, privacy, personalization, user experience, end user devices and networking technologies. This was supported by all partners in the project.

Secondly, reports from existing BBC studies were used [BBC2004]. These were concerned with the experiences and preferences of UK consumers for interactive and mobile viewing of sport content, and their viewing habits during the Athens Olympics. Though the exact content of the research is confidential, the results of the surveys have been processed and provided as input to the requirements identification task of the project. Study of audience reaction to the Beijing games would be an additional useful contribution, but this is not currently available to the project.

#### **4.2.4 Service providers**

In order to capture the end user requirements that are related to the stakeholders in this category, documentation was studied. The documents showed the requirements from existing solutions and state of the art project proposals.

#### **4.2.5 Rights holders**

In order to capture the end user requirements for the stakeholders in this category, documentation was studied. The documents showed the requirements for the management of digital rights and for the ownership of rights for the coverage of major athletic events.

An overview of rights holder user requirements relating to television broadcasters was captured by BBC project members making use of:

- a) their own expertise and experience of the broadcast industry
- b) discussions with colleagues working in relevant areas of the BBC and its media partners.

### **4.3 End User Questionnaire Based Survey**

In order to capture the end users' requirements, an Internet-based questionnaire took place. In this section we present the questionnaire structure, the details of the survey performed and the evaluation of the results, together with the conclusions for the My-e-Director 2012 platform requirements.

### 4.3.1 Questionnaire overview

The main objective of the questionnaire is to help collect user requirements for the customisation and personalisation of interactive viewing of Live Broadcast Sports Events. For this a questionnaire consisting of 29 questions grouped into the following categories was compiled:

- Demographics (3 Questions)
- Technology Experience (6 Questions)
- Sports Interest and Viewing Habits (7 Questions)
- Media-quality-price (5 Questions)
- Personal & Privacy (8 Questions)

Where applicable, the answer format used throughout the questionnaire followed the Likert scale [Likert], since it is the most widely used scale in survey research. The questionnaire was designed to include an equal number of negative and positive statements so as to avoid the problem of acquiescence bias. Other problems such as central tendency bias or social desirability bias were also taken into account during the design of questionnaire statements. All such possible distortions were taken into account during the analysis of results.

For each question a short analysis follows, including the rationale and objective of the question, an analysis of the results, and the corresponding conclusions drawn. Before the presentation of the questionnaire results, a short analysis of the categories selected in order to capture the user requirements is given.

### 4.3.2 General framework of the survey

The questionnaire survey was posted on the My-e-Director 2012 portal (<http://www.myedirector2012.eu/>), on the 14 of July and lasted 2 months. There were 27 questions grouped into the following categories:

- Demographics (3 Questions)
- Technology Experience (4 Questions)
- Sports Interest (7 Questions)
- Media-quality-price (5 Questions)
- Personal & Privacy (8 Questions)

The partners of the project disseminated the questionnaire, and as a result, a set of 445 answers from 7 countries (namely: England, Greece, Spain, Portugal, France, Germany and Italy) were collected and included in the following evaluation.

The questionnaire has been made available in all project partner languages (namely: English, Greek, Italian, Portuguese and Spanish) and also in French and German. The survey site has not been closed after the end of the questionnaire process, so that it may be used for additional input, especially once the platform is available for demo.

### 4.3.3 Question categorisation

In order to spherically address the user needs and requirements, the identification of users as regards their profile, background, viewing habits and interests is necessary. To achieve this, the questionnaire was designed to accommodate questions that cover 4 major identification topics (in addition to demographics). These were: the technology awareness, the interest in particular sports and the preferences in regard to viewing sports over an electronic medium, the importance of quality (and how this translates to willingness to pay for extra functionality), and finally, the relative and absolute importance of privacy and personalisation. A detailed description of the question categories follows.

#### Demographics

This includes questions about the gender, age and education group. Demographic information ensures that the questionnaires collected reasonably represent the target group. Any conclusions drawn must be based on the proportion of gender, age and education level that match the intended target. Once these parameters match, results can be safely examined to draw conclusions about the connection between demographics and the rest of the categories. This further helps personalization and adaptation of the services provided by providing a default level for technology experience, sports interest, media-quality-price and privacy preferences based on the demographic parameters of the user. Of course the default level can change based on the preferences of the user, but the initial service provisioning (e.g. an advertisement for sports news) will be adapted to sports from the preferences of the corresponding demographic group.

#### Technology Experience

The initial target here is to record the level of experience with computers and the Internet. This affects the questions that should be answered, as each requires a minimum of technological experience. The rationale here is to understand, for each demographic group, the extent to which they have accepted new technologies. How much effort they are willing to make in order to benefit from a new service (e.g. would they install it?), how often and where they use the Internet as well as what devices and technologies they use in their everyday life. The fact is that even though ubiquitous and pervasive computing may be progressing at full speed, people react more slowly to this evolution. We expect with this category to understand which is the best technical mode of delivery for My-e-Director 2012 services for each target group.

#### Sports Interest and Viewing Habits

This category is the one focusing on the User Interaction and Interfacing. Users will express their interest in sports as well as their live viewing and event attendance habits. Users staying at home are expected to enjoy their services from a fixed infrastructure (e.g. DTV) while users at the event venue will have to use services on a mobile device. This naturally sets totally different requirements and constraints in terms of the audiovisual or touch interfaces available. Moreover, users are asked to express their interest in possible novel My-e-Director 2012 services as well as their preference regarding the interfaces.

### Media-quality-price

In this category, we begin by focusing on the media of service delivery, namely the device. This has a direct relation with the quality of the service delivered as well as the cost. As feedback for business models, the results will create different target groups, connected with a specific device and also cost model (rental, pay-per-view, subscription, etc.). Depending on the demographic analysis of the target group, adaptable business models will be more likely to succeed based on these results. Offering even more detail, this category includes questions for finding extra cost tolerance thresholds concerning time-shift usage and device-shift usage of the services.

### Personalisation & Privacy

Alan Westin was the first to divide people into three categories according to their concerns about privacy [Westin 2003]:

- The privacy fundamentalists: Fundamentalists are generally distrustful of organizations that ask for their personal information, worried about the accuracy of computerized information and additional uses made of it, and are in favour of new laws and regulatory actions to spell out privacy rights and provide enforceable remedies. They generally choose privacy controls over consumer-service benefits when these compete with each other.
- The privacy pragmatists: They weigh the benefits to them of various consumer opportunities and services, protection of public safety or enforcement of personal morality against the degree of intrusiveness of personal information sought and the increase in government power involved. They look to see what practical procedures for accuracy, challenge and correction of errors the business organization or government agency follows when consumer or citizen evaluations are involved. They believe that business organizations or government should “earn” the public’s trust rather than assume automatically that they have it. And, where consumer matters are involved, they want the opportunity to decide whether to opt out of even non-evaluative uses of their personal information as in compilations of mailing lists.
- The privacy unconcerned: The Unconcerned are generally trustful of organizations collecting their personal information, comfortable with existing organizational procedures and users are ready to forego privacy claims to secure consumer-service benefits or public-order values and not in favour of the enactment of new privacy laws or regulations.

The questions explore the trust users have in any system that handles their personal preferences and identity information, as well as their awareness and general concern in privacy matters, classifying them into the corresponding privacy category. Depending on the privacy category, a different approach in terms of service, technology pervasiveness and personal information involvement should be made.

As a trade-off between services availability-functionality and privacy exists, the privacy concerns of the target group are directly connected to the level of acceptance or suspicion towards novel My-e-Director 2012 services. These concerns will affect related privacy requirements of the system as well as business models.

#### 4.3.4 Questionnaire analysis

Following, a detailed analysis of the questions and user answers is given. The presentation of each question starts by describing the scope and rationale of the question, continues with the presentation of answers, and closes with the corresponding conclusions.

##### 4.3.4.1 Language used by the respondents

###### *Scope and rationale of the question*

The language used was not identified by a separate question, but by a selection made by the respondents at the beginning of the questionnaire. All the European languages were supported as answers. However, since the survey involved mainly the countries of the My-e-Director 2012 participants (since it was disseminated there), the results are biased towards the corresponding languages.

###### *Evaluation of Results*

Figure 2 illustrates the speaking languages of the population that participated in this survey. As is expected, English is the most popular language in the survey. The second most popular language is Spanish with a percentage of about 26% while Greek is the third most popular one with 22%. The fourth most popular language in the survey is Portuguese with about 14%. Other European languages, like French and Italian present much smaller percentage, since the respective countries are not represented by any partner in the project.

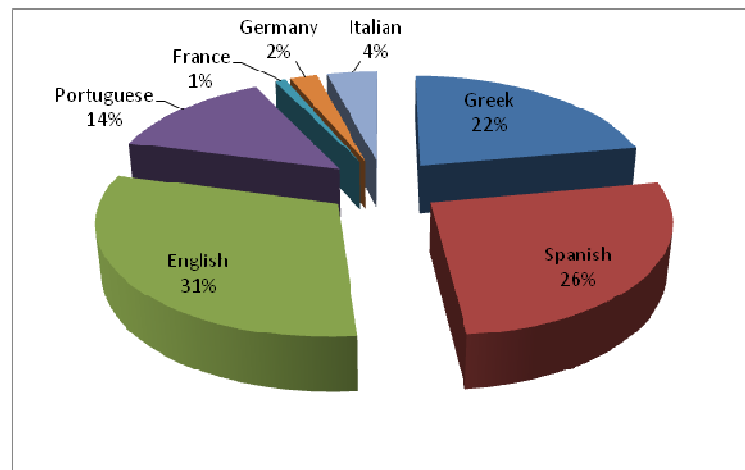


Figure 2: Language

###### *Conclusion*

The distribution of the results for this question is significantly affected by the geographical distribution of the partners involved in the My-e-Director 2012 consortium. Consequently, the results of the survey reflect the average language preferences for users belonging to the countries of the project participants. As regards other European countries which are not involved in the My-e-Director 2012 consortium, we anticipate similar results.

#### 4.3.4.2 Question 1a: Gender

##### ***Scope and rationale of the question***

The first question of the survey refers to the gender of respondents.

##### ***Evaluation of Results***

From the total of the people that answered the questionnaire, the majority were men, 77.8%, while the rest were women (22.2%). This was expected, as similar surveys, report that the percentage of men interested in sports compared to that of women is higher [PewResearchCenter],[New York Times]. In fact, in Europe the percentage is even higher, since football is very popular compared to USA or Asia, and the vast majority of football fans are men.

##### ***Conclusion***

The figures of men/women percentage that have answered the questionnaire is in agreement with the expected numbers. One extra reason for the high percentage of men is that the survey was promoted mainly from the participants in the project, where again the percentage of men employees compared to that of women is higher. The result indicated that the statistical sample can be directly processed as regards the results.

#### 4.3.4.3 Question 1b: Age

##### ***Scope and rationale of the question***

This question refers to the age of the respondents. In order to capture the age groups of respondents, 5 different age categories were defined:

- Less than 18 years old.
- Between 18 and 24 years old.
- Between 25 and 44 years old.
- Between 45 and 54 years old.
- Above 55 years of age.

The age of 18 as the lower limit was selected based on a recent survey on the NBC audience [New York Times] indicating that about 90% of the people viewing the 2008 Olympic games were above 18 years old.

##### ***Evaluation of Results***

As regards the age distribution, from the corresponding Figure 3, we see that the majority (67%) of the people fall with the age of 25 to 44 years, with the category of years 18 to 24 following by a percentage of 24%.

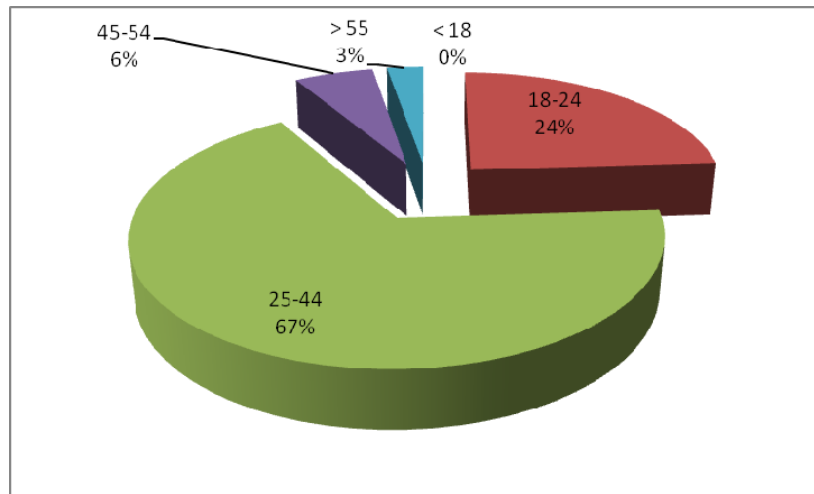


Figure 3: Age distribution

### ***Conclusion***

The findings are very close to the survey conducted by NBC [New York Times], therefore, the findings from the second demographic question also support the validity of the statistical sample collected.

#### ***4.3.4.4 Question 1c: Education level***

##### ***Scope and rationale of the question***

This question refers to the education level of the participants. Six different levels of education groups were defined:

- Primary school education.
- High school education.
- University degree.
- Master's degree.
- PhD.
- Post doc.

##### ***Evaluation of Results***

The results displayed in Figure 4, indicate that the majority of the respondents have a university or higher degree (95%).

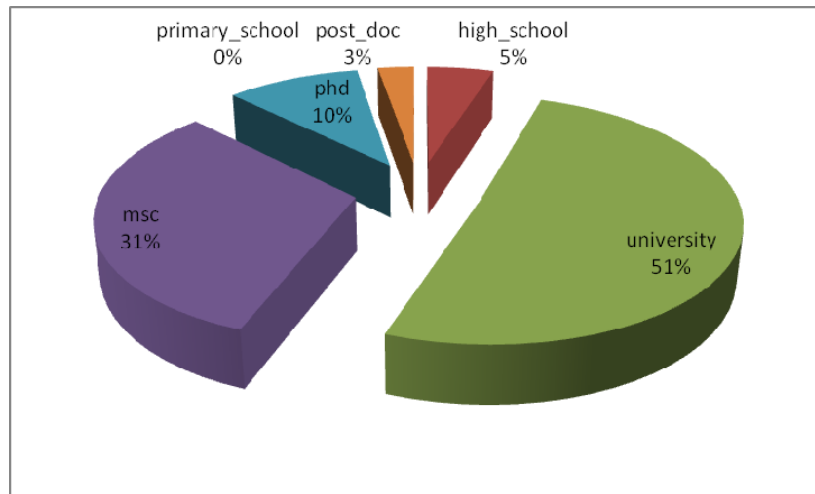


Figure 4: Education

**Conclusion**

The results of this question indicate that the respondents have a high educational background, and are therefore expected to have good knowledge of use of the internet and ICT technologies in general.

**4.3.4.5 Question 2a: Experience with Internet**

**Scope and rationale of the question**

In this question the respondents were asked to indicate their experience level related to computers and the Internet. Three different levels (novice, medium expertise and expert) were selected and the users were asked to position themselves within these groups.

**Evaluation of Results**

We can see from the statistical results that 61% of the people asked have good skills with computers and Internet services. On the contrary only 11% of the people have novice skills.

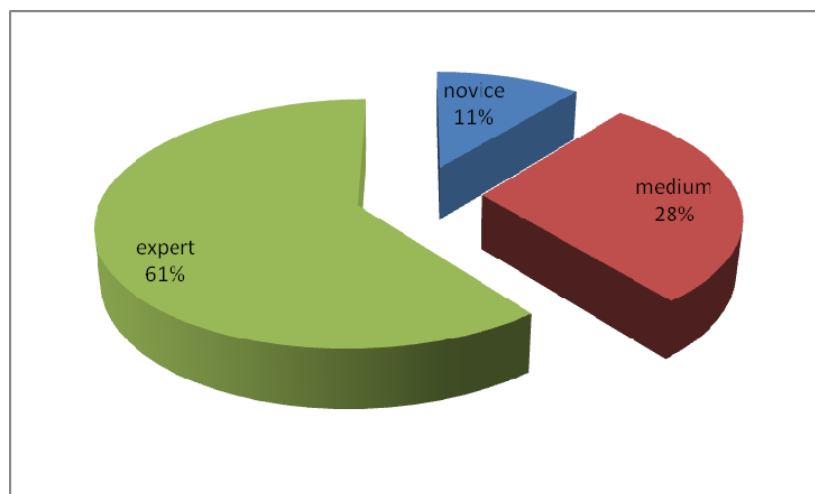


Figure 5: Skill Level

**Conclusion**

The results were expected, since according to the demographics, more than 67% of the people surveyed were in the age of 25 to 44 year old and 95% have academic education.

**4.3.4.6 Question 2b: Internet Access frequency**

**Scope and rationale of the question**

The aim of this question is to reveal the behaviour of users with regard to the access to and use of the Internet. The users were asked to state the frequency of access to the internet from different places (home, office, school, public and communal places). The users could choose between, never, daily basis, weekly basis and monthly basis.

**Evaluation of Results**

As far as home access is concerned, the overwhelming majority of the users use the Internet very frequently (over 80% of the users access the Internet daily at home, while the percentage that access the internet at least once a week reaches 95%). Regarding Internet access at work, daily usage of the Internet is higher (of about 86%), while daily access of the internet from school is much smaller (about 32%), while a large percentage of people, (more than 40% for all cases) never uses the internet from public places (school, public, communal).

In general, the results indicate that the respondents prefer to access the internet from private access points (their personal, home or work computers) rather than from public places. The complete results for this question are depicted in Figure 6.

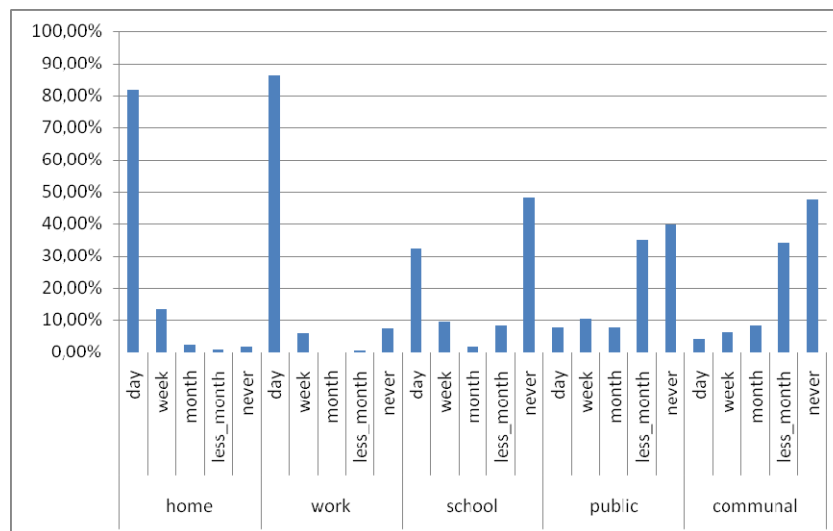


Figure 6: Internet Access

**Conclusion**

In conclusion, the respondents access the Internet very often (more than 80% have reported daily access). However, one important result is that people tend to access the internet privately rather than publicly. This could be attributed to the proliferation of devices that are internet

enabled, but also indicates that the users are accustomed to accessing the internet in a private environment. This conclusion can be combined with the results of the privacy related questions in order to extract conclusions about the privacy related requirements for the My-e-Director 2012 platform.

#### *4.3.4.7 Question 2c: Type of the Equipment Used*

##### *Scope and rationale of the question*

The aim of this question is to reveal the equipment (devices) employed by a user to access internet content, over both traditional channels (e.g. TV) and the Internet. Possible devices would include mobile, game consoles and TV sets. For this reason, the users were asked to select between the following options:

- Desktop Computer
- Laptop Computer
- Mobile Phone
- Pocket PC, Palm
- TV Set / Media Set Top Box
- Game Console
- Wireless Networked Computer (WiFi)

The above categories, attempt to cover all the state of the art internet access devices. Emphasis was given to portable and mobile devices which nowadays offer high media handling capabilities, and the fourth category covers more sophisticated mobile phone devices, like PDAs and pocket PCs with more computing functionalities. The final three categories refer to other media handling devices, like TV sets which are very popular multimedia content display devices, the game consoles and WiFi computing gadgets.

##### *Evaluation of Results*

From the answers to the question (**Figure 7**) the most popular device for accessing internet content is the Laptop (percentage above 80%) with the Desktop computer coming second (with more than 70%). We also observe that a significant number of users access the Internet through non-conventional computing devices such as mobile phones (about 70%) TV sets (about 45%), or WiFi computing (more than 50%). The least popular device for accessing the Internet are the game console (less than 20%) and the pocket palm (less than 25%).

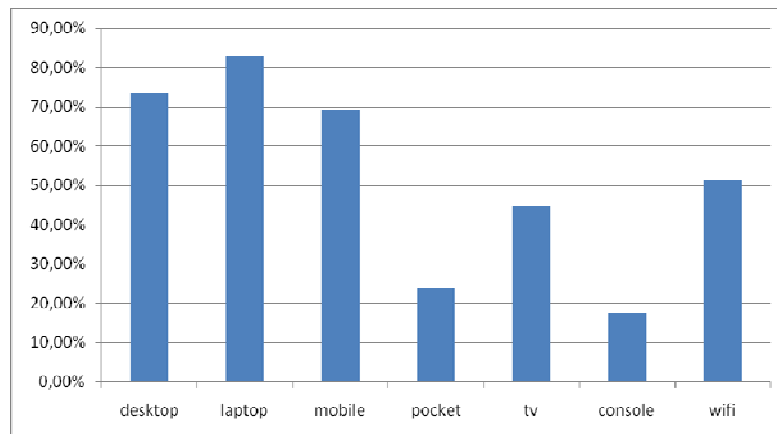


Figure 7: Use of devices for internet content access

### **Conclusion**

Conventional computing devices such as laptops and desktops are the most popular for accessing internet content. However, the use of other non-conventional computing devices such as mobile phones and TV sets is very popular. Trying to translate this to a result for the selection of target devices, we see that we can distinguish two major categories: Devices that can be used in a fixed location, (PCS, desktop and laptops), and devices that are portable but also incorporate wireless or mobile internet connectivity (e.g. PocketPCs). It should be noted that since about 2004, the functions of pocket PC, PDA and phone have really converged into a single device, the Smart Phone, which combines WAN and LAN mobile communication and mobile desktop work and leisure applications into one device. The terms PDA, PocketPC and mobile phone are this considered to be synonyms today. Therefore, in the context of the project, planning of trials should include at least one representative of each of the two categories, in order to be able to cover most of the needs of end users.

#### **4.3.4.8 Question 2d: Type of Internet Connection at home**

##### **Scope and rationale of the question**

This is a specialised question which reveals the type of the network used for accessing web content at users' homes. Four different types of internet connection were selected to be used as options in this question. The first refers to the simple dial up Internet access, the second to the ISDN Internet connection, while the rest two to broadband internet access with a rate of less or more than 2Mbps. Figure 8 presents the results of this question.

##### **Evaluation of Results**

The most popular network connection is that of wired/wireless broadband access at a speed that is less than 2Mbps. This type of connection is used by more than 70% of the users. The faster network line of more than 2Mbps comes second but with a much smaller percentage of about 20%. The dial up technology or the ISDN access is used by a very small group of people which consists of about 5% of the total.

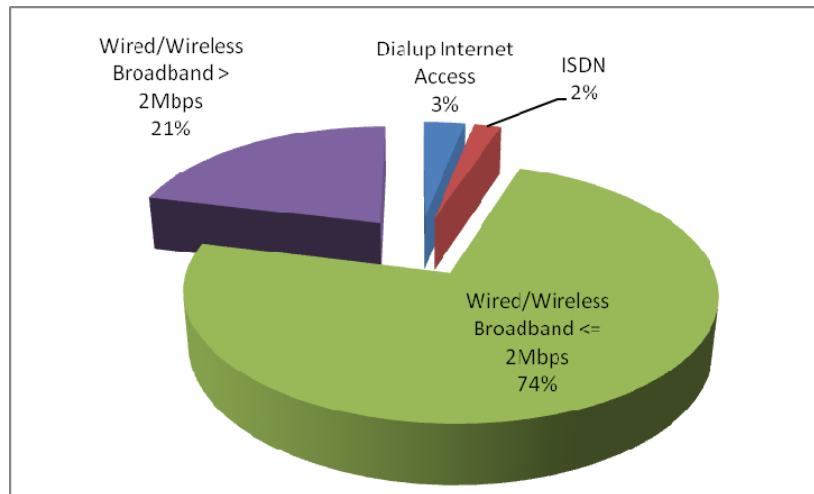


Figure 8: Internet connection type

Going one step further, we have tried to identify the differences between countries, and for this an analysis of the results per country was attempted. The reason for this was to determine the profile of users in each country, so that this could be used during the planning of the trials and demos of the project. From the evaluation of results, it is obvious that in all countries of the partners in the project, the percentage of internet access at high bit rates (but lower than 2Mbps) is very high. When it comes to high bit rate access (over 2Mbps), Spain and Greece have the highest percentage, with Portugal and UK following (France has by far the biggest percentage, but there is no French partner in the project).

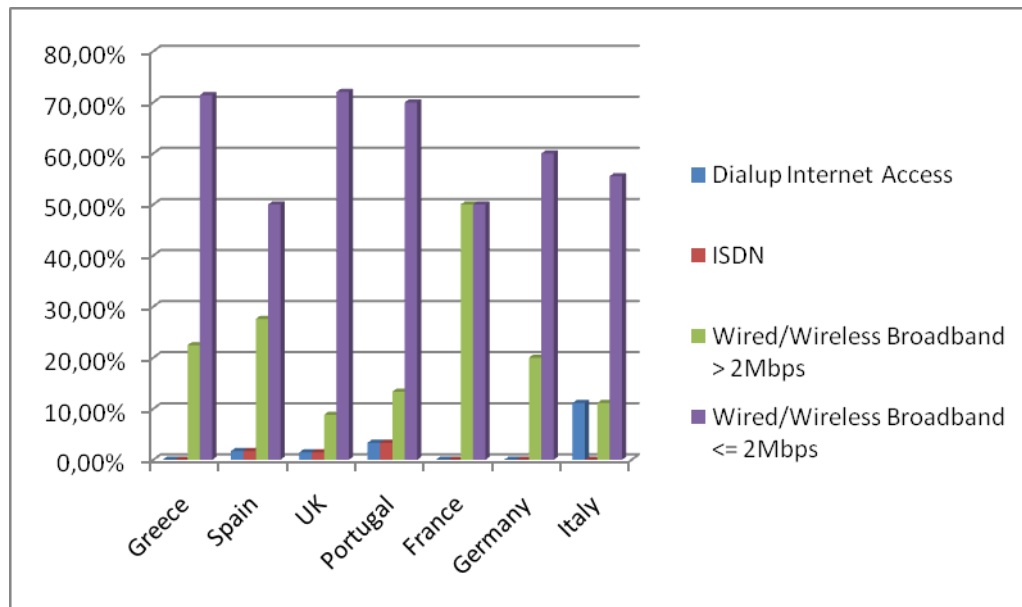


Figure 9: Internet connection type per country

**Conclusion**

Wired/wireless broadband access is the most common type of network used to access web content. This is expected since we have a very young and highly educated population sample. The preference for devices indicates that two types of device seem to. These are:

- laptops, which can cover the need for desktop and portable devices, but can also simulate a TV set environment (they can either be connected directly or to an LCD screen and even be remotely controlled),
- PocketPCs which can be considered as representatives of mobile phones, PDAs, WiFi access devices, and in some cases even game consoles.

The answers of the participants in the survey support this decision, since the selection of the above devices not only covers most of the needs for heterogeneous device representation in the trials, but is also the most preferred by the survey participants.

#### 4.3.4.9 Question 2e: Use of Wireless Network Technologies

##### *Scope and rationale of the question*

This question aims to reveal the type of wireless technology used to access internet content. Four different types of wireless technologies are evaluated in this survey. The first concerns the traditional GSM wireless technology, the second refers to new generation wireless networks like the 3G/UMTS wireless infrastructures, the third to the WiFi architectures, and finally the fourth to the DVB-H protocol. These wireless technologies cover all the ways that a user can access the athletic content of the My-e-Director 2012 in a personalized framework.

##### *Evaluation of Results*

The results of this question show that the most popular type is the WiFi-WLAN which is used by more than the half of the users. The less popular is DVB-H used only by a 3%. The low percentage of DVB-H is probably due to the fact that this technology is very new and therefore it is not known to the wider public. Mobile technologies, (2G and 3G) are equally used at a percentage of about 28%. This indicates that wireless networking technologies should be given priority, together with mobile.

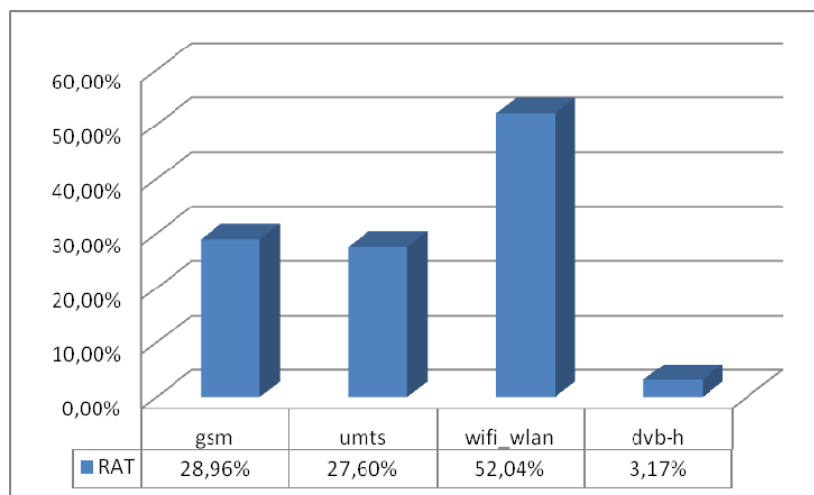


Figure 10: wireless network connection type

### ***Conclusion***

From the evaluation of results, it is obvious that the majority of users prefer the use of wireless (WiFi) and mobile (2G, 3G) technologies for internet content access. Of course up to now there has not been a great demand for TV-like services, which require excessive bandwidth, and the use of DVB technologies. Even though this is expected to change in the future, in order to plan successful trials, the results of this question are important, and indicate that at least as regards real users' participation in the trials, emphasis should be given to WiFi and 3G technologies. The limitations in terms of bandwidth should be considered here, but the inherent advantage of these technologies compared to DVB with regard to bidirectional channel support and unicast connections is another important parameter that supports the selection of WiFi and 3G access for the demos.

#### ***4.3.4.10 Question 2f: Software installation on Devices***

##### ***Scope and rationale of the question***

This question tries to capture the users' preferences with respect to the willingness to install new software on their devices in order to access a new service. The users were asked about how they feel about installing new software on their device, and four different types of device have been included in this question; PC, PDA, Phone and other. For each device type, the respondents had to select between installation of new software and access to the service directly through a web interface, without the need for any installation. Different results are obtained for each device type, which are presented in **Figure 11**.

##### ***Evaluation of Results***

As far as PC users are concerned, about 53% of the respondents prefer the install option while the remaining 47% the web option. For PDAs the proportions are opposite, 55% of the users prefer web access and 45% the install. Similar results to the PDA are also obtained for the Phone device. Finally, for all other devices, the web option is much preferred (about 63%). In general, though, there are no big differences between the two options; users seem to prefer the installation option for PCs, but not for any other type of device. This should be expected, since the concerns about memory and small processing power of non PC devices (and the fear about loading the device with too much software) is important

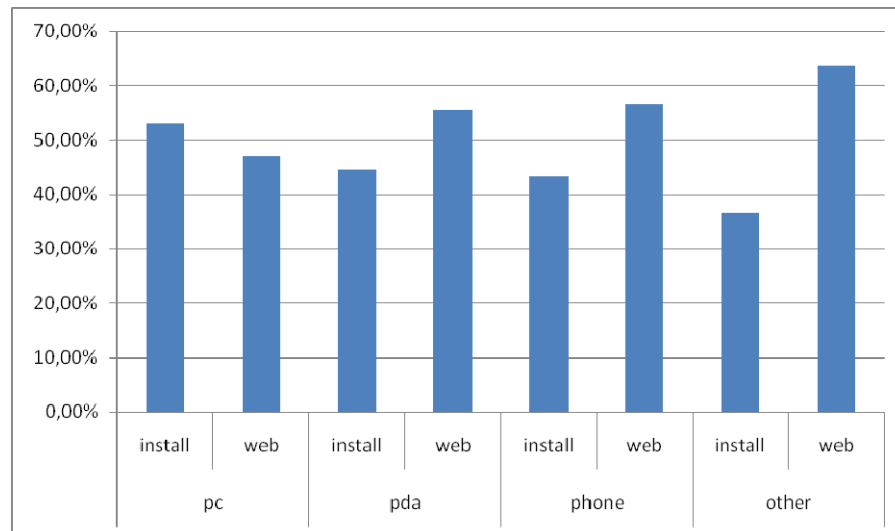


Figure 11: Software use (install vs. web based)

### **Conclusion**

As a conclusion, the web interface access option seems to be the preferable one. Since this type of solution also has fewer problems (e.g. failure of installation, incompatibility with other installed applications), this option should be considered by the project. Of course, the use of special software for media playback, or compatibility with the web pages (e.g. flash player, silverlight plugin) should also be kept in mind when designing the particular web interface.

#### **4.3.4.11 *Question 3a: Sport Popularity***

##### ***Scope and rationale of the question***

This question tries to capture the user's preferences as regards sports viewing on television. For this purpose a list of Olympic games sporting events has been compiled and for this question. The result was the following list of 28:

- Aquatics
- Archery
- Athletics
- Badminton
- Baseball
- Basketball
- Boxing
- Canoe / kayak
- Cycling
- Equestrian
- Fencing
- Football
- Gymnastics
- Handball
- Hockey

- Judo
- Modern pentathlon
- Rowing
- Sailing
- Shooting
- Softball
- Table tennis
- Taekwondo
- Tennis
- Triathlon
- Volleyball
- Weightlifting
- Wrestling

### *Evaluation of Results*

As expected, (as the survey took place in Europe), football is the most popular sport with a preference of 71%. Second are basketball and athletics with about 55% of preferences. Volleyball, weightlifting, aquatics, and cycling can be grouped as other cluster of about 23% of preferences. The results are presented in **Figure 12**. It seems that the answers of the respondents were not only focused on Olympic games, but were general viewing preferences for sports on television. However, the preference for football, basketball and athletics, indicates that there is interest in all categories of events (team, individual, close, open court). More details of the categories of sports, as identified in My-e-Director 2012 can be found in Deliverable D2.2.

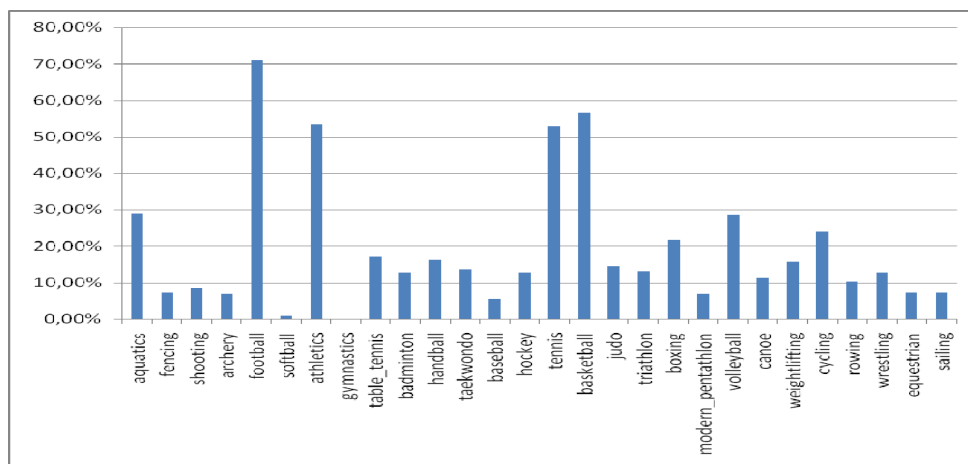


Figure 12: Sports Interests and Viewing Habits

### *Conclusion*

Football, basketball and athletics are the most popular sports in our survey. This indicates that in order to have a successful evaluation of the technologies, all the major categories identified in the project, including, team, individual, close and open court events should be considered for

the platform Footage to be used for the tests and evaluation of the solutions implemented should come from these events to meet most of the viewer's demands. Also, if possible, the final tests and trials should be designed to cover at least one of these preferred sports.

#### 4.3.4.12 Question 3b: Mobile Device User's Requirements

##### *Scope and rationale of the question*

Since the use of personal and mobile devices is at the core of the project's research, this question that tries to capture the user's preferences for potential use of mobile devices for the personalised coverage of sports events over web/internet is very important. The question asked the users to select the most appealing from a list of 10 different functions/capabilities. The list included not only viewing related functionality, but also personalisation, privacy and attitude towards the use of mobile devices:

- Ability to tag and track all athletes belong to a group, e.g., of the same nationality
- Ability to switch camera angles to view the event
- Ability to select and replay from a set of sports moments during the event
- Ability to watch replay in slow motion
- Ability to zoom in on user designated part of event, if quality of camera angle permits
- Ability to get summary information about a participant at any time
- Ability to get the event schedule at any time
- Audio commentary of the event
- Ability to replay or slow-motion of notable events
- Personalised Electronic Program Guide and Navigation to sports event

The users also had the option of stating extra functionality by using the option "other". This question extracts user's requirements for their mobile device functionality.

##### *Evaluation of Results*

Data from the answers collected is displayed in Figure 13. The ability to watch replays of a match in slow motion is the most popular action. This action is rated with about 65% of positive answers. The ability to switch the camera angles to view the event come the second with 62% while almost equal (61%) is rated the ability to get the schedule of the event at any time. Selection and replay from a set of sports moments during the event is also highly rated with 57% of positive answers.

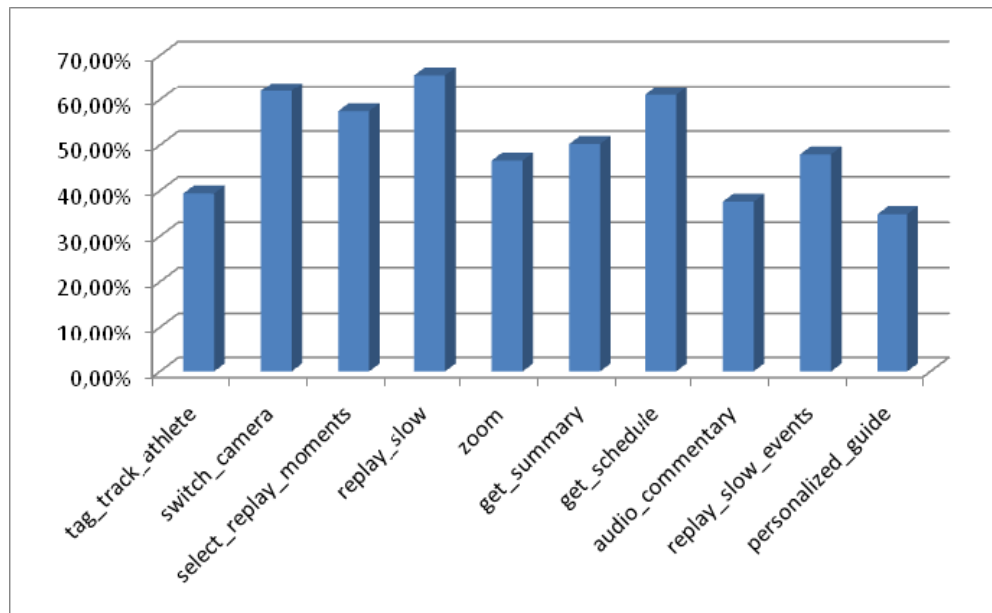


Figure 13: mobile user device requirements

### ***Conclusion***

From the answers collected, we see that the three most popular preferences are very close in percentage of popularity. However, it should be noted that for the live streaming capabilities (which is the main focus of the My-e-Director 2012 platform) only the switch camera functionality is the preference that covers most of the research to be performed in the project, as it is related to networking/protocol and device capabilities for supporting stream switching, and content annotation and image recognition for creating real time annotation data. The select replay moments and slow replay features do not represent any major research challenges. The same applies for the fourth most popular function, which is access to real time sports schedule data.

As a conclusion, focus should be given to camera switching capabilities, as this feature will not only demonstrate the results of research performed in the project, but will meet the needs of the viewers. In parallel, and in order to assist in the provision of an integrated personalised solution with the potential to evolve into a good market product, personalised slow motion related capabilities and the ability for real time feed of statistics and events schedule should also be pursued.

#### ***4.3.4.13 Question 3c: Live Sport Events Interest***

##### ***Scope and rationale of the question***

This question clarifies which sports would be the most popular to watch live at a venue for users. The sports selected to be included here are the same as the sports included in question 3b. The rationale behind this question is to discover the differences between the preference for attendance to a live event and viewing over the television/internet.

### *Evaluation of Results*

The answers here are quite similar to the answers collected in question 3a, with the difference that tennis now ranks very high. Again, football is the most popular sport to be watched live with a preference of about 58%. Basketball is the second most popular sport to be watched live with about half of users selecting this sport. Tennis and athletics come third with 38%.

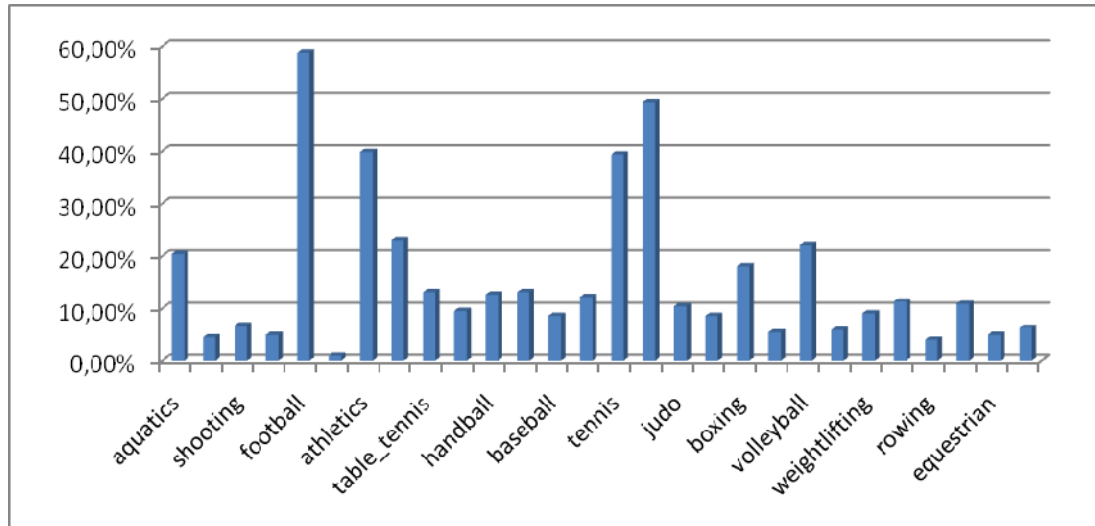


Figure 14: Live sports event interest

### *Conclusion*

Since the only difference for this question is the high percentage for tennis, the valuable conclusion here is the need for a rich viewing experience for the sport of tennis. It seems that viewers prefer to watch tennis live, since they have richer and personalised experience, compared to the more static view of the television. This could be translated to a challenge for the project to offer the users a viewing experience much more attractive than the current (TV based) one through the technologies that the project will deploy. It would also be interesting during the evaluation of the project to ask users to compare their opinion of the coverage of a tennis match using My-e-Director 2012 technologies with traditional internet/tv technologies.

#### *4.3.4.14 Question 3d: Use of mobile devices from attendees of a live event*

##### *Scope and rationale of the question*

The purpose of this question was to capture the requirements of the users for the use of the mobile device while attending the actual event. The deployment of a mobile device on the site of the event would give the users the capability to “attend” the event while having at their disposal tools that would enhance their viewing experience. For this reason, the following 5 choices for extra functionality were offered:

- Tag and track all athletes of a group.
- Switch camera angles.
- Select and replay moments.

- View the event from a camera that presents a different view than otherwise would not be accessible.
- No use of the mobile device at all.

It should be mentioned that the selection of more than one option was available here.

### ***Evaluation of Results***

The most popular functionalities according to the answers collected are i) to see different camera angles (45%) and ii) replay significant moments in slow motion (41%). The option to see the athletes is also preferred by 36% of the users while the ability to switch a camera is preferred by 35%. The actions of getting the schedule, getting a summary, zoom in out content of interest, replay in slow motion, personalized guide, comment on the audio channel are rated with zero.

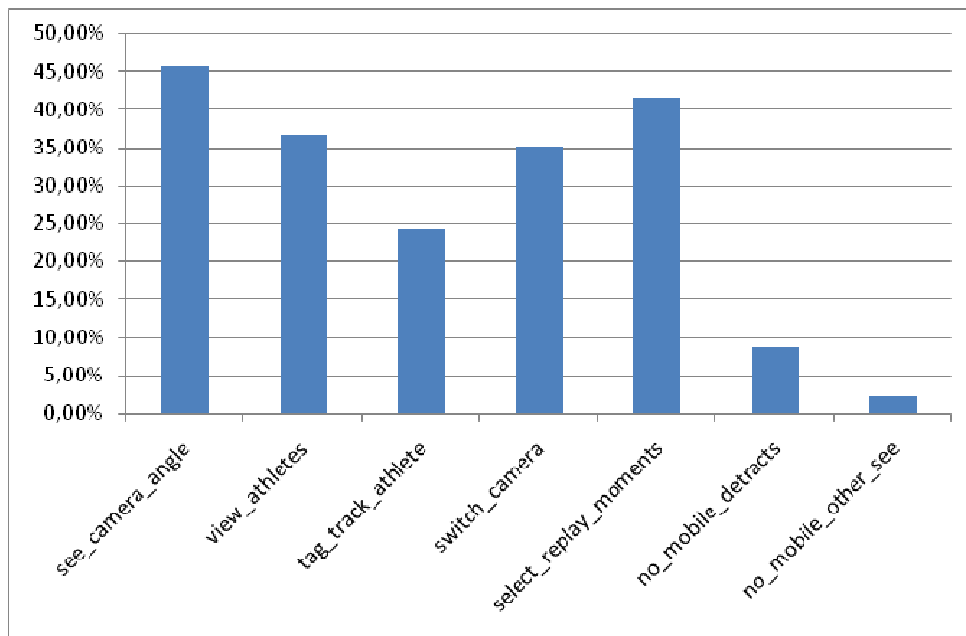


Figure 15: Use of mobile devices from attendees of a live event

### ***Conclusion***

To see different camera angles and replay significant moments in slow motion are the most popular actions for the users.

#### ***4.3.4.15 Question 3e: Camera preference for a broadcasted event***

Imagine you are watching a long-distance athletics race, and could choose the view that is presented. What type of view(s) would you like?

#### ***Scope and rationale of the question***

This type of question aims to reveal users requirements when watching long distance athletics races. In this question, we investigate the user's preference in regard to the selection of the preferred camera for a broadcast event. Five different options are offered:

- A camera showing close-ups of the athletes
- A camera showing the front runners (in the case of a running event)
- A camera showing the whole set of athletes
- An aerial camera, and
- The standard feed from the director of the event coverage.

The selection of more than one option was available here.

Furthermore, a separate question on concerns about the use of mobile devices was available: In this question we tried to record possible reasons for not using the mobile device (distraction from the event or fears about privacy).

### ***Evaluation of Results***

The most popular actions are to get an aerial view of the event, preferred by about half of the users. The second preference is for close-ups of specific athletes. The third preference is for the front runners, while viewing the main track is rated by about 28% as the fourth choice. **Figure 16** displays the results for this question.

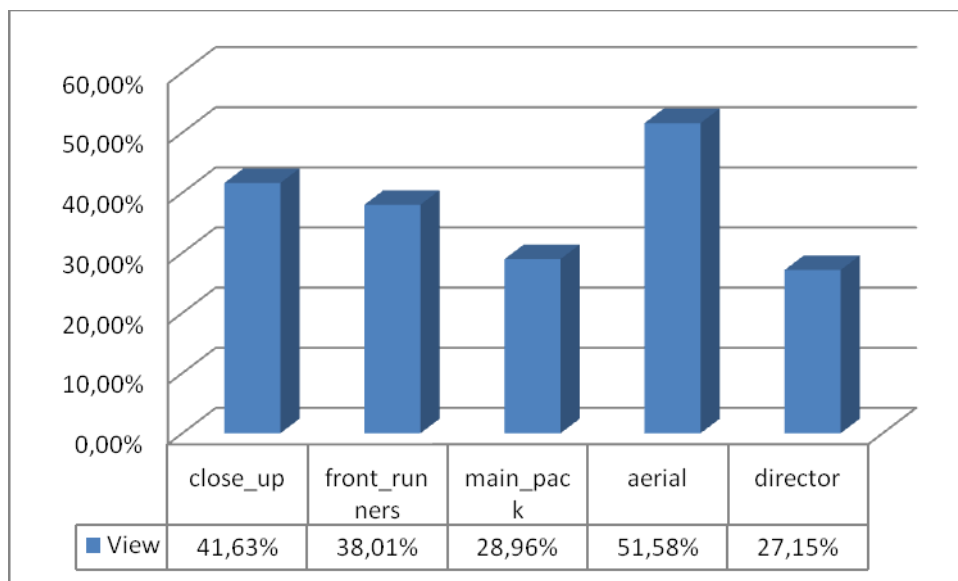


Figure 16: Camera preferences

### ***Conclusion***

Apart from the aerial coverage that collects the preference of half of the replies (which is the highest), the rest of options are at the same level. Trying to translate this result, we see that the existence of a camera with the general picture of the event is appealing to many users, and should therefore be considered as a candidate for camera use in the trials.

Furthermore, it should also be noted that there was very little concern about the use of mobile devices either as regards privacy issues or distraction from the event, which indicates that for viewing of content, the respondents have no requirements for privacy protection, which can also give input to the specification task as regards the level of privacy, and where it should be enforced.

#### 4.3.4.16 Question 3f: User Interface preferences

##### **Scope and rationale of the question**

This question reveals users' requirements as far as the interface is concerned. The question gave the option to the respondents to select among the use of a keypad or keyboard, a mouse, a remote control, a touchpad or a touch screen for controlling the interaction.

##### **Evaluation of Results**

The use of a touch screen is the most popular interface, with 47% of positive answers. The use of the mouse comes second with a rate of about 20%. The keyboard, remote control and the use of touch pad are the less preferred modes. This indicated that the use of a mobile device with a touch screen is the preferred one, while a mouse is the preferred UI method for desktop computers.

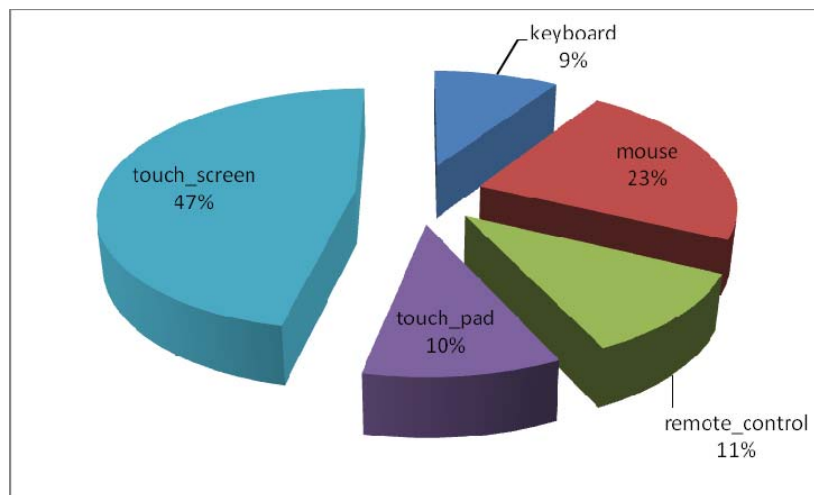


Figure 17: Control interaction

##### **Conclusion**

Trying to translate the responses into user requirements, it is important to combine the results of the answers given in this question with the results for question 2c, where the preferred user devices were identified. The results indicate that the users prefer PDA phones/PocketPCs deploying touch screens for the UI, and laptop terminals using a mouse for controlling the input. Both choices are in line with what is considered to be the major trend for computer/mobile phone use in desktop and on the move environments.

#### 4.3.4.17 Question 3g: Learning to use the My-e-Director 2012 Interface

##### **Scope and rationale of the question**

The goal of this question is to evaluate different learning techniques for the use of the interface. With this question, we try to reveal the preferred way of learning the my-e-director interface and the respective services. For this reason, four different options were offered to the users. The first option is to design a very simple interface with limited functionalities. Under this assumption training for My-e-Director 2012 is limited. The second option presents the case where a recorded demo is used as a My-e-Director 2012 training option. The other two remaining options consist of training as either a) an on-line help system or b) an off-line manual.

The users were also allowed to propose a different method using the “other “option.

##### **Evaluation of Results**

The preferred learning method is the use of onscreen help along with the use of a small set of simple controls but with a reduced interaction. Both ways are rated as positive by about 20% of the users. The use of a demo is rated at 10% of preferences while off-line access to an electronic user guide is preferred by only 7% of the users.

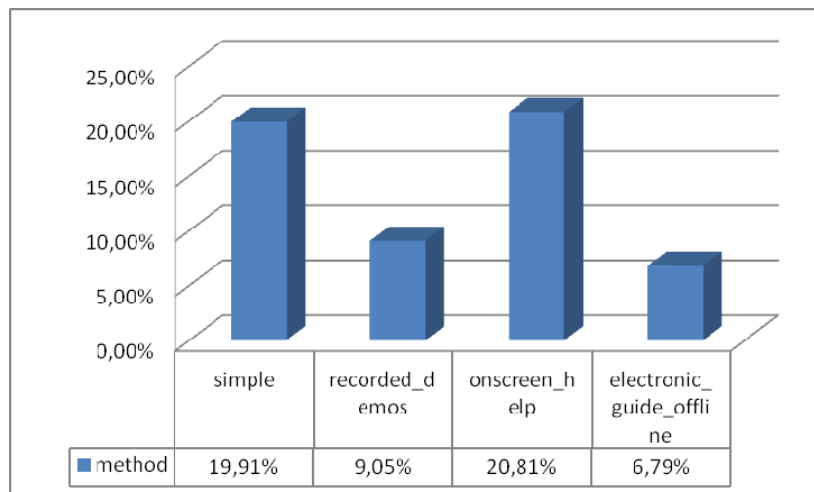


Figure 18: Methodologies for Learning the My-e-Director 2012 Interface

##### **Conclusion**

The on screen help and the use of a small set of simple controls but with a reduced interaction are the most highly rated methods for learning how to manage the interface. This conclusion is a clear result that can be directly translated into specifications for the design and implementation of the help and training tool of the platform.

#### 4.3.4.18 Question 4a: Personalisation at device level

##### **Scope and rationale of the question**

This question reveals the preferences of users as regards the personalisation of their viewing experience with respect to the device used for content access. Different access devices are evaluated for the customization degree. The devices examined are i) Home TVs, ii) desktops,

iii) laptops, iv) PDA's, Palms, Pocket PC's, and v) other types of devices. For each of the devices examined, five different query levels are available, ranging from strongly agree to strongly disagree. The results are presented in the following Figure.

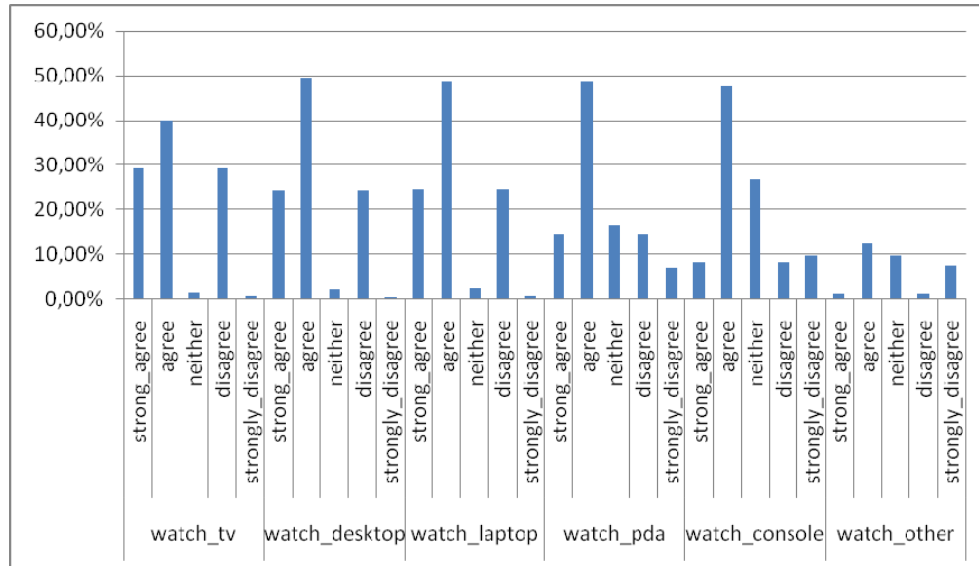


Figure 19: Preferred device

### ***Evaluation of Results***

As far as the home TV sets are concerned, about 70% of the users agree or strongly agree on the customization actions. For desktop devices, the agree/strong agree action reaches 75% of preferences, while a similar percentage is seen for the laptop case. In the case of pocket PC, PDA, and Palm the strongly agree/agree percentage reaches 65% with a decrease also in the strongly agree component. Finally, for the other types of devices, only 13% agree and strongly agree on customization.

### ***Conclusion***

The results indicate that the user's idea for personalisation is biased towards personal and internet devices, while the traditional TV is not the preferred candidate. This is expected due to the enhanced interaction capabilities offered by computers and mobile phones. In any case, the idea of personalised viewing of sporting events in any type of device is appealing, since in all cases, the percentage of positive opinions (agree and strongly agree) about personalised viewing is more than 70%.

#### ***4.3.4.19 Question 4b: Willingness to pay for personalised viewing of events***

##### ***Scope and rationale of the question***

This question evaluates the effectiveness of different devices that potentially can be used for accessing sport content in a paid personalised service. The introduction of payment is necessary since this makes the provision of a personalised service more attractive to a

broadcaster and also investigates marketing aspects. In a similar way to the previous question, the same types of devices are examined. For each device type, again five different query levels are available, ranging from strongly agree to strongly disagree. These levels indicate the degree that a user wants a personalized paid service for this specific type of device.

**Evaluation of Results**

For the Home TV sets, about 60% of the users are willing to pay for a personalized service. For laptop and desktop computer users wish about 50% would pay for a service. PDAs, pocket PCs and Game consoles presents smaller interest with a positive rate of about 48% and 44% respectively. Finally, users of other types of devices have less interest (about of 40%).

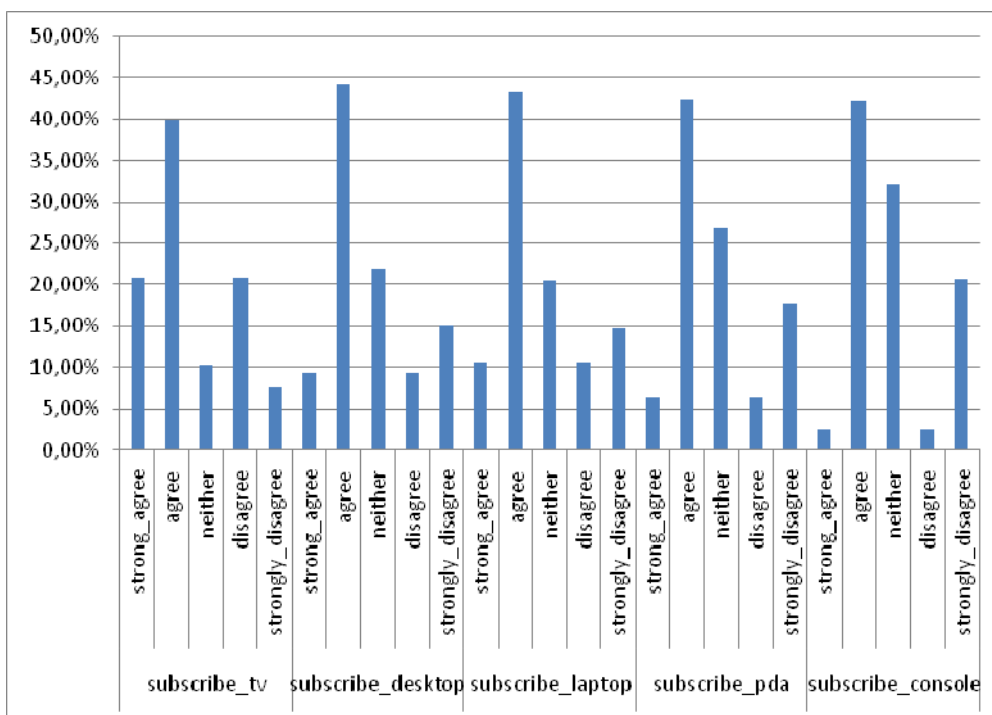


Figure 20: Willingness to subscribe to a viewing service

**Conclusion**

The results of processing the answers to this question indicate that the users are in general positive to the idea of paying for the ability to access content in a personalised manner. Overall, at least 50% give positive answers (compared to a much lower percentage of negative answers) for willingness to pay for the extra functionality. Taking into account that the question was addressed to users without a demo of what this functionality would mean, it is an indication that there is fertile ground for launching a service of personalised access to sports based on payment. The fact that the selection of TV as the preferred medium for which users would pay for personalised content strongly supports this, as there is already the experience of paid services for content access on TV. If we consider that TV is not the preferred medium for personalised access as it has been shown earlier, we can assume that the corresponding percentages will be much higher once a demo is available to be presented to the users.

#### 4.3.4.20 Question 4c: Time Shift usage

##### *Scope and rationale of the question*

The aim of this question is to reveal user's interest in the time-shift functionality of a personalized service. In order to quantify the results, the question asked was very specific: "For a content that costs you 2EUR, how much extra are you willing to pay for being able to watch the same content later (time-shift usage)?". The different levels of extra percentage to be paid was determined to be 5%, 10%, 25%, 50% and 75% or more, followed by the corresponding estimated actual cost in cents. Of course the option of not accepting to pay was offered.

##### *Evaluation of Results*

From the answers to this question, it seems that users are reluctant to pay for the time shift functionality. In particular, 53% of the users state that is not of interest. In addition, none of the users state that they are willing to pay an amount of 2Euros for this service. **Figure 21** depicts the results for this question.

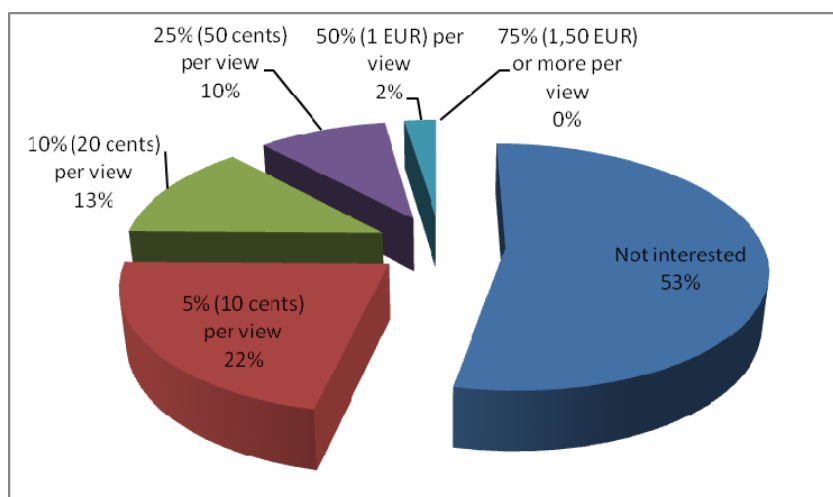


Figure 21: Willingness to pay for time shifting capability

##### *Conclusion*

The answers to this question do not suggest an obvious conclusion, since 53% of the end users are not willing to pay for time-shift capability, an interesting 47% of users are willing to pay slightly more to have the ability to review the content later. Since no user is willing to pay 100% to review the content, we can conclude that such functionality should either be offered for free, or should be available in some premium package (being attractive to 47% of the users).

#### 4.3.4.21 Question 4d: Device – shift usage

##### *Scope and rationale of the question*

Similarly to the previous question, this one tries to reveal user's interest in the device-shift functionality (ability of a user to watch the same content on different devices) of a personalized service. For this, the question to the participants in the survey is the following: "For content that costs you 2€, how extra are you willing to pay for being able to play the same content in

other devices (device-shift usage)?”. The different levels of extra percentage to be paid was determined to be 5%, 10%, 25%, 50% and 75% or more, followed by the corresponding estimated actual cost in cents. Of course the option of not accepting to pay was offered. The following figure contains the corresponding percentages for all answers.

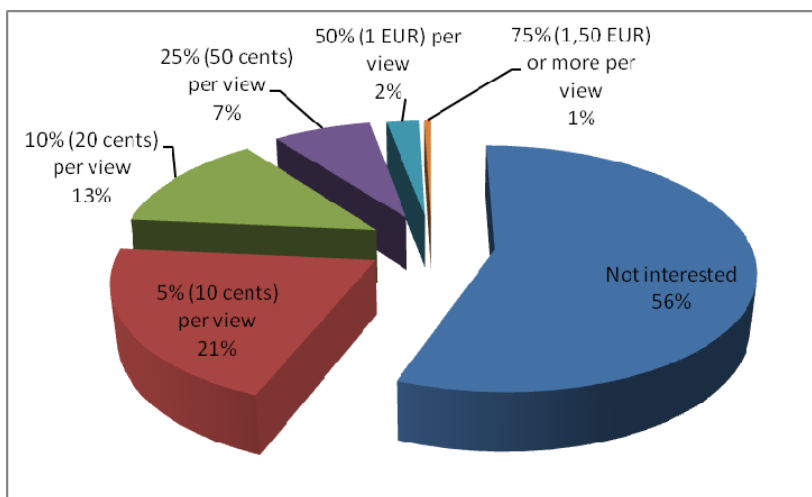


Figure 22: Willingness to pay for device shifting capability

**Evaluation of Results**

From the results, we observe that similarly to the previous question, users are reluctant to pay more for the ability to use the content in many devices. In fact, the majority of the end users (about of 55%) are not interested in paying an additional cost in order to have the opportunity of watching his/her content of interest in other devices. In the best of cases, only a small amount of money would be acceptable to be paid for this functionality, and only on a pay per view basis.

**Conclusion**

The conclusions here are similar to those of the previous question: From the results of this question, we see that the users consider that the device-shift functionality should be offered for free, and that there is little potential profit for offering this as an added value paid service.

**4.3.4.22 Question 5a: User Grouping**

**Scope and rationale of the question**

The aim of this question is to reveal the opinion of users regarding the use of grouping based on personal information as a means for assisting the personalisation of the services offered. Participants in the survey were offered five different query levels, which correspond to the willingness of the users to have grouping of their profile to provide a personalized sports viewing experience.

**Evaluation of Results**

The results indicate that the majority of users (more than 70%) consider that a user profile grouping increase the degree of personalization and service effectiveness. The exact percentages are depicted in the following chart.

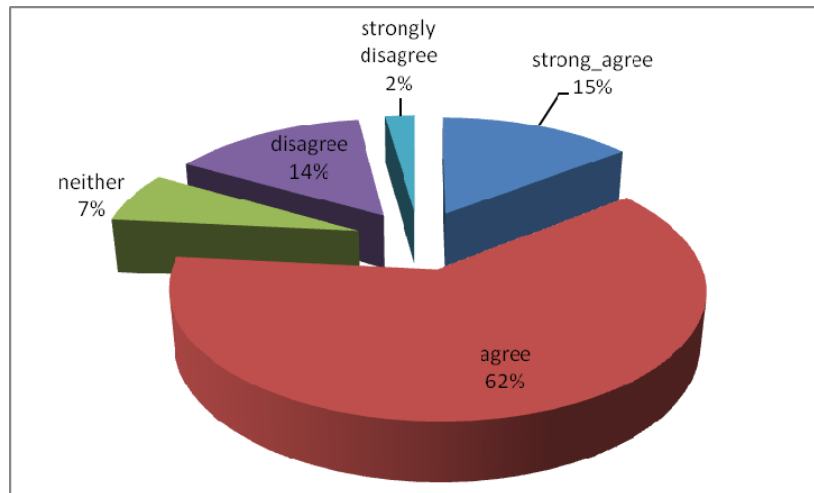


Figure 23: Personalisation supported by user grouping

### ***Conclusion***

The conclusion here is that the use of personal information for grouping of users according to their preferences as a tool for providing a personalised experience is accepted by the majority of users. However, this question does not measure the concerns about privacy, and it should be considered in conjunction with the answers to question 5f that tackles the issue of privacy when providing personal information.

#### ***4.3.4.23 Question 5b: Personal Privacy Concerns***

##### ***Scope and rationale of the question***

The aim of this question is to reveal the concerns about privacy in general. Again, in this question five different query levels are offered. These levels represent the level of concern of the end users about privacy issues in general.

##### ***Evaluation of Results***

The majority of the users (about 70%) agree that privacy issues are of great importance to them. On the other hand, a large percentage (about 24%) disagrees. Since this is a general question, it clearly indicates that privacy in general should be taken into consideration during the design of services. Later, we will present a more focused evaluation on the issue as regards the project's services.

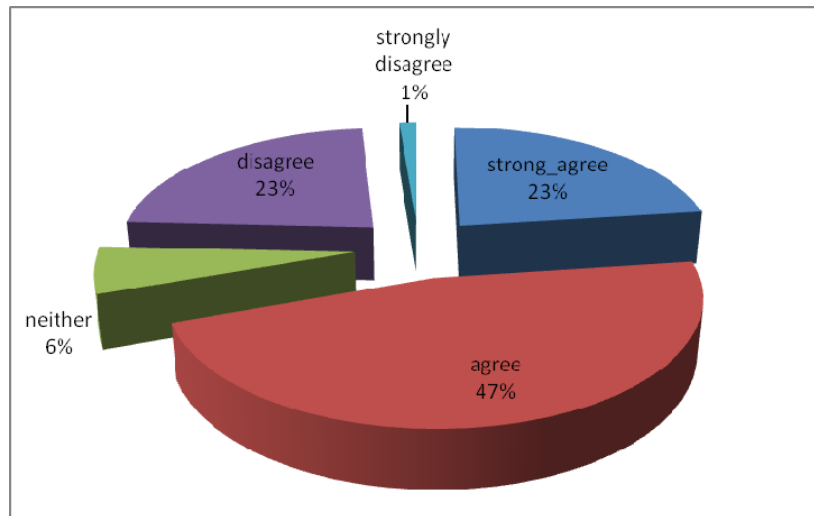


Figure 24: Personal privacy concerns

### ***Conclusion***

Privacy issues are considered of great importance in a personalized content delivery service by the end-users. This means that technologies that ensure privacy in personalised content delivery architecture significantly affect the service exploitation and success and should be considered during the design phase.

#### ***4.3.4.24 Question 5c: Protection of privacy rights over the internet***

##### ***Scope and rationale of the question***

This question records the opinion of the end users about the status of protection of privacy rights over the internet by the current law and business practices. Five different levels of interest are offered in this query. The first two indicate the positive agreement of the user to the query, while the last two negative agreement. Finally, there is a neutral level.

##### ***Evaluation of Results***

The evaluation of the results shows that only 1.7% believes that the legal framework strongly protects the end user privacy rights. 49% believes that their personal data are protected by the existing legislation and company practices. On the other hand only 11% do not believe that their personal data are adequately protected.

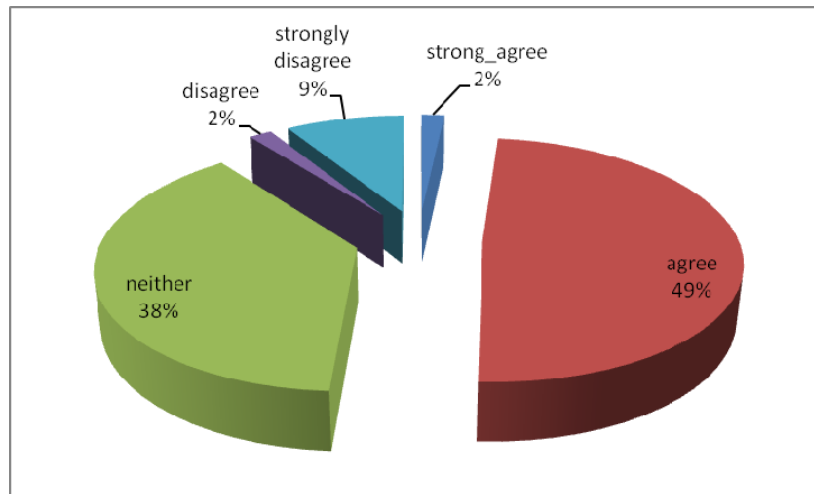


Figure 25: Status of privacy rights protection

### ***Conclusion***

The conclusion of this question is that the users in general trust the existing law and business practices in the methods that they use in order to guarantee privacy rights over the internet and networks in general. This is an indication that the use of current standards and practices should be considered in My-e-Director 2012 as regards protection of privacy.

#### ***4.3.4.25 Question 5d: Privacy Risks***

##### ***Scope and rationale of the question***

With this question, we reveal the level of awareness of users regarding privacy risks on the internet as well as the corresponding solutions and proposals for confronting them. In the same framework as the previous queries, five different levels are used in order to indicate the level of privacy risks that users are aware of.

##### ***Evaluation of Results***

The evaluation of the results shows that 10% of the users are fully aware of the risks to their personal information, while 58% are just aware. However, there is a large portion (about 30%) that they are not aware of the risks to their personal data.

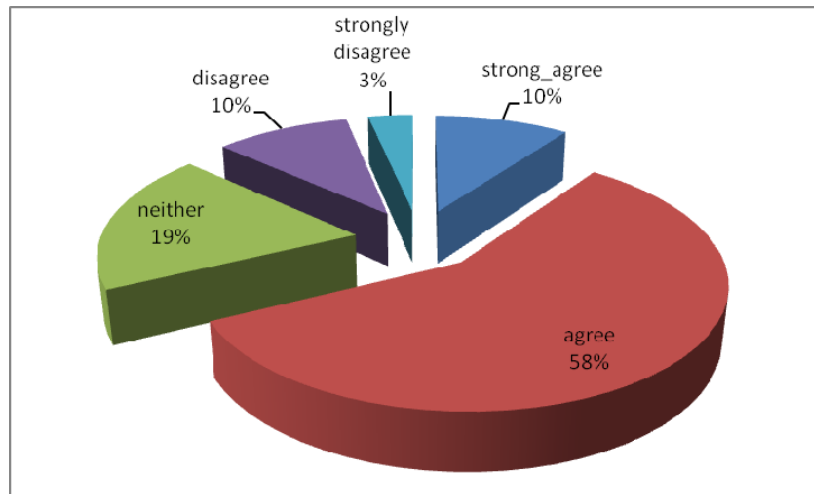


Figure 26: Awareness of privacy risks

### ***Conclusion***

It seems that users are aware of the privacy risks regarding their personal information on the internet. However, there is a large number of users (around 30%), who are not aware at all. Therefore, information about the protection of personal privacy of users of the platform should be made clear and in some cases should be reinforced by explanatory documentation.

#### ***4.3.4.26 Question 5e: Awareness of Personal Data Protection***

##### ***Scope and rationale of the question***

This is a general question about the loss of control from the users of the safety of personal data that are stored by the companies, internet and communication services. We handle this question in a similar manner to the previous question, giving five different states options for agreement/disagreement with statement that he/she has lost control over the amount of personal information that is collected and used by internet and communication services.

##### ***Evaluation of Results***

The processing of the results of this question shows clearly that more that 75% of the people asked believe that users have lost control over the amount of personal information that is collected and used by companies and/or in internet/communication services.

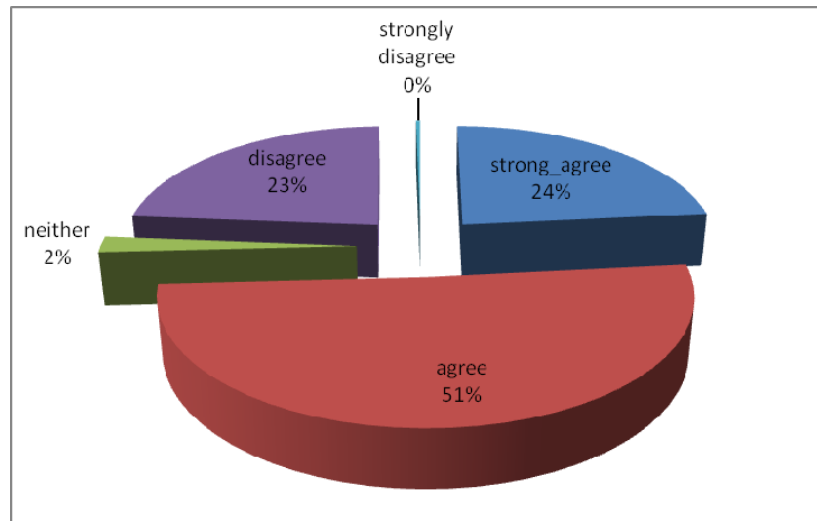


Figure 27: Control loss over personal information protection

### ***Conclusion***

The conclusion that can be drawn here is that provision for compliance to legislation and standards as regards the protection of personal information by the platform should be given priority and should also be made known to the users. Though this is not a technological challenge for the platform, it has a direct impact on the credibility and trust given by the end users and therefore constitutes an important requirement for the commercial exploitation of the platform.

#### ***4.3.4.27 Question 5f: Personalized User Experience***

##### ***Scope and rationale of the question***

This question aims to see the willingness of the users to give their personal preferences about sports in order to gain access to more personalised user experiences. We organize this question in the same framework as the previous questions. Five different levels of interest are adopted, the first two refer to the positive interest of a user to the personalized user experience services (strong agreement and simple agreement), the last two to the negative interest of a user (strong disagreement, disagreement), while the fifth one to the neutral position.

##### ***Evaluation of Results***

From the statistics analysis we can see that over 67% of the people asked are willing to give their personal preferences about sports in order to gain access to more personalized user experiences. Only 18% of the users have answered negatively, as can be seen from the graph that follows.

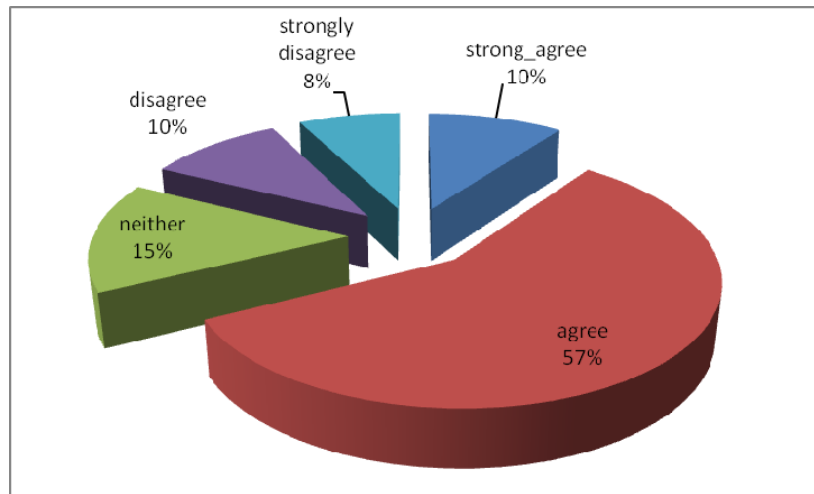


Figure 28: Willingness to provide personal information for advanced personalised services

### ***Conclusion***

Combining the results from this question with the corresponding results of question 5a, we see that the users are positive towards the use of personal information in order to be offered a more personalised experience when viewing sports. This could be attributed to the not so personal nature of the personal information provided, and combined with a good information policy for the end user can constitute a sound basis for getting and harnessing personal information for offering a really personalised experience.

#### ***4.3.4.28 Question 5g: networked digital rights***

##### ***Scope and rationale of the question***

This final question aims to record the opinion of the platform users about the ability to store the digital rights information in the network, in order to recover this information in the future, even if this may lead to a slight increase in service prices. This question is organized with five different levels of interest; the strong agreement, the simple agreement, the disagreement and the strong disagreement as well as the neutral position.

##### ***Evaluation of Results***

The results of this question show that around 59% of the users agree with this additional feature of the systems even this slightly increases service prices. On the other hand only 15% of the users disagree with it.

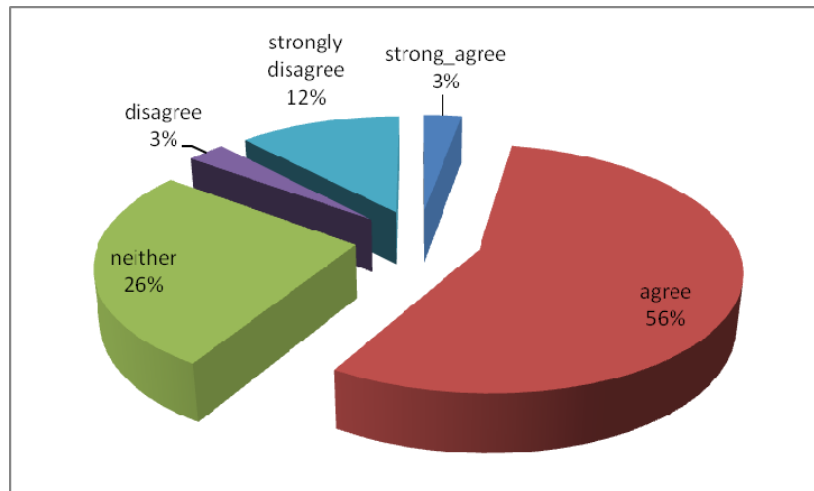


Figure 29: Willingness to pay more for enhanced DRM support

### ***Conclusion***

From the evaluation of results it is clear that the platform should consider a means of storing rights management information in the network, as the end users have a positive attitude towards this feature.

#### ***4.3.4.29 Question 5h: Content Watermarking***

##### ***Scope and rationale of the question***

The purpose of this question is to find out the percentage of the users that want to have the personalized content watermarked, using user's personal identification such as name. Again five different options similar to the previous questions were offered.

##### ***Evaluation of Results***

Almost half of the users are positive towards the use of watermarking methods in the content delivered. However, there is also a large percentage of users that are against watermarking techniques (more than 17%), while about 32% do not care about content watermarking.

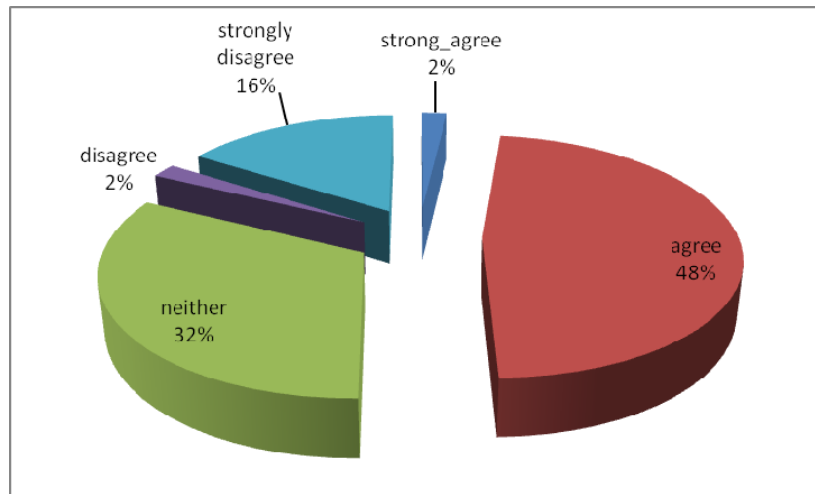


Figure 30: Attitude towards content watermarking

### ***Conclusion***

The conclusion of this question is that watermarking methods are acceptable for the majority of the users, and therefore the use of a DRM protection mechanism that is either integrated or compliant with the platform should be considered.

## **5 Discussion of results**

In this section of the deliverable, the conclusions drawn from the process of user requirements collection are summarized and are presented in accordance with the related area of design of the My-e-Director 2012 platform. The discussion focuses on aspects of:

- Selection of devices, User Interface and interactivity
- Personalised viewing of sports events
- Rights Management
- Use of networking technologies
- Privacy
- Service provision

The conclusions drawn from the surveys, interviews and literature review will be used in this section to provide a comprehensive presentation of the issues to address and the way these should be transformed into a clear set of requirements. The latter is in the form of a list of requirements that are presented following the general findings presentation for each area. The list of requirements is coded using a Letter abbreviation and an order number according to the following table:

#	Requirements code	Description
1	Req_Pers(X)	Description of the requirement.

**Table 3:** Requirements list format

As stated by [Dzida]: “Requirements do not necessarily describe what and how reality is, rather, they model reality as it should be”. Adopting this approach, the requirements collected by the user and reported in this document are intended to be used as the basis for the provision of platform specifications. A final decision about meeting each entry in the list of requirements will be taken after considering the impact and cost that the corresponding specifications will have, the context of the project and the technical annex of work that is to be performed, and the scientific, research and market priorities of the participant partners. In any case, an attempt to meet as many as possible from the requirements list will be made.

### **5.1 Selection of devices, User Interface and interactivity**

#### **5.1.1 General findings**

This section relates to the personalised experience of users in the way users of the system access and consumes content. Even though this category of requirements is not related to the specialisation of viewing experience at the individual’s level (which is addressed in the corresponding personalisation requirements group later in the document), it covers the general requirements as regards the selection of end user devices and the way viewers interact with them.

Previous audience research of how UK and other nations viewed the Athens Olympics 2004 [BBC2004], and a discussion of what might be done in the future as regards the use of devices and corresponding user interfaces, suggests that:

- There is significant interest in using interactive television features for Olympics coverage (the interactive audience was found to be much higher than for any previous event)
- There is also significant interest in use of web-based viewing of content and also information feeds related to this content. Although results of an official study have not been published yet, anecdotal evidence suggests that the BBC's Beijing Olympics 2008 web-based coverage has been even more popular, both with consumers who view the content itself, and consumers who just make use of news feeds (because of bandwidth or geographical restrictions).
- Many viewers still prefer to watch the "traditional" broadcast programmes. This is often because they consider that the editorial decisions taken by producers already show them the most interesting items.
- Any interactive or other user-customised content needs to be promoted and linked to "traditional" content, e.g. through captions or trailers in the regular television coverage.

As regards the preferences of the end users towards the use of devices, from the survey we see that we can distinguish two major categories: Devices that can be used at the desktop or as set top boxes, and devices that are portable but also incorporate wireless or mobile internet connectivity. Since it is obvious that the planning of trials should include at least one representative of each of the two categories in order to be able to cover most of the needs of end users, the selection of laptops (which can cover the need for desktop and portable devices, but can also simulate a TV set environment) and mobile Internet access devices (such as mobile phones, PDAs, WiFi access devices, and in some cases even game consoles).

Concerning the issue of the User Interface, from the project's survey we see that the web interface access option seems to be the preferable one for the end users, while with respect to the two types of devices mentioned earlier, deploying touch screens for the UI for PocketPCs, and a mouse for controlling the input of laptop terminals are the preferred choices. Regarding the assistance offered to the users for learning to use the platform and the UI, on-screen help and the use of a small set of simple controls but with a reduced interaction is the most highly rated preference. The personalisation of the UI is also an important aspect that will be addressed later in the corresponding personalisation related section.

Finally, whilst user requirements and input throughout development are vital in order to produce a useable system, there are some limitations in letting user interaction alone drive development. There is a common tendency for users to stick with models and techniques that are already familiar and to be unable to think outside the box to envisage novel alternative designs and requirements. Users often require experience through using actual prototypes in order to better appreciate new designs. Users can be fickle; their requirements can vary over time and from person to person. For this reason, it is envisaged, that high fidelity prototype systems will need to be developed within My-e-Director 2012 and that further user evaluations will be needed once these are available.

### 5.1.2 Requirements

Trying to transform the above findings into a set of clear requirements, the following list has been compiled.

- Req\_Dev\_UI\_Intr(1): Computers followed by mobile devices should be used as the main types of access device for My-e-Director 2012 .
- Req\_ Dev\_UI\_Intr (2): A Web browser type interface should be supported as this is regarded as a versatile and easy to use application environment by end-users. Note the key design issue here is how to simplify the installation process for applications users, to minimise the software size and support security whilst maintaining an acceptable performance for real-time streaming of content for live-events. Often, the APIs, tools, and network protocols available in Web-based development environments restrict the ability to use real-time streaming protocols, while real-time streaming protocols fallback to using HTTP which may result in less smooth real-time playing of live video streams. Further work is needed to investigate support for Web-based live streaming interfaces.
- Req\_ Dev\_UI\_Intr (3): Touch screens should be supported as the preferred type of input interface followed by mouse input . Note: not all computers and mobile devices support touch screens. Generally, this implies that users desire simpler interaction when interactively viewing sports event.
- Req\_ Dev\_UI\_Intr (4): Devices which support rich interactive capabilities should be supported.

## 5.2 Personalised viewing of sports events

### 5.2.1 General findings

Television broadcasters wish to provide more flexibility in how their content can be consumed. The amount of interactive content on digital television platforms is increasing with the advent of internet and Web based television platforms (for example the BBC's iPlayer) provides an opportunity to offer consumers an even wider choice of content on demand, and to present that content, and associated information, in novel ways.

The project's survey revealed that when asked about personalisation, users tended to focus on internet enabled devices. This is to be expected for two reasons. Firstly, using the internet offers increased opportunities for interactivity compared to traditional radio or television broadcasting. Secondly, multiple types of content can be accessed in combination, for example consumers can watch a streamed video of a sporting event and simultaneously view HTML-based statistics related to that event.

In any case, the idea of personalised viewing of sporting events on any type of device is very appealing, even up to the point where users are positive about the idea of paying to access content in a personalised manner. Here, television is the preferred medium for which users would pay for personalised content. Furthermore, the majority of users are willing to allow their personal information to be processed, so that they can be grouped with other users with similar viewing preferences.

As mentioned, personalised user interfaces for browsing is a key to ensuring content accessibility. Therefore it is important to introduce some concepts to aid the specification and generation of such interfaces. These concepts include user-friendly description languages and transformation rules for specific content types.

A television broadcaster or other large media organisation will likely impose its own “look-and-feel” and accessibility requirements on any user interface that it deploys.

According to earlier audience research [BBC2004] of how UK and other nations viewed the Athens Olympics, Olympics viewers are particularly interested in certain sports, with Athletics being by far the most popular Olympic sport. Other sports of interest vary significantly between nations, with viewers’ preferences heavily influenced by how well the national team is expected to perform (e.g. rowing and cycling are particularly popular for UK viewers). In support of this, the project’s survey confirmed the preference for athletics, and also identified football and basketball as preferred sports. Therefore, the use of content for these events would assist in attracting user’s interest during the trials.

On the other hand, the earlier analysis [BBC2004] revealed that apart from the events that attract greatest viewer attention, there is some demand for a greater variety of coverage (e.g. giving less of a national emphasis, and a wider range of sports covered). The idea of “virtual channels” for different sports or different teams may be important for the London 2012 games, and could be considered as an alternative to the traditional television coverage of the events.

The project’s survey identified potential interest in offering a rich viewing experience to spectators at a live athletic event (e.g. tennis). This could be possible by displaying statistics on mobile devices, together with a view of what is happening on the field from a particular camera angle.

Another important finding of the audience research [BBC2004] is that viewers are particularly interested in viewing live content, and therefore emphasis should be given to the coverage of live events. Also, many viewers still prefer to watch the “traditional” broadcast programs, suggesting the need to include a stream that is based on the broadcast feed, edited by the event director.

Finally we consider what functionality the users would expect the My-e-Director 2012 platform to introduce. Here, the project’s survey has revealed that the ability to switch camera according to personal preferences is very important. Such a feature could be helpful not only to remote viewers, but also to those attending the actual event (e.g. the case of tennis where extra information or views could be provided by a user’s device). Starting from these conclusions, it is logical that a camera with the general picture of the event is appealing to many users, and should therefore be considered as a good candidate for the trials.

A proportion of users appear to be willing to pay extra for the capability to time-shift their viewing, although for most users device-shift of their viewing is not considered attractive enough. Therefore, this could be considered as an appealing added value functionality, which could assist in the marketing of the platform. Though it is not among the priorities of the consortium according to the initial planning of research and development, My-e-Director 2012 should consider how this service should be supported.

## 5.2.2 Requirements

Trying to transform the above findings into a set of clear requirements, the following list has been compiled.

- Req\_Pers(1): The platform should provide the ability to collect and process user-related information to determine the user's profile and categorisation.
- Req\_Pers(2): The platform should allow easy configuration of user interfaces, both to meet users' personalisation requirements and to support the look-and-feel of existing services.
- Req\_Pers(3): Specific support for interactive viewing athletics, football and basketball should be targeted. Note: the popularity of support for other sports may vary between countries.
- Req\_Pers(4): The platform should provide live viewing of content, and if possible time-shifted (replays) viewing.
- Req\_Pers(5): The platform should allow switching of camera angles based upon personal preferences.
- Req\_Pers(6): A "traditionally mixed" broadcast view should be supported.
- Req\_Pers(7): Support to switch camera angles and to view replays in slow motion should be supported for mobile users and users at live events.
- Req\_Pers(8): "Team ball" type sports events should be targeted for live broadcasting.
- Req\_Pers(9): Aerial coverage type camera views for sports events should be available (Note this may be easier to support at outdoor sports events rather than at indoor events.
- Req\_Pers(10): Pay per view personalised content should be investigated.
- Req\_Pers(11): Personalisation which adapts content to group preferences rather than to individual user preferences can be supported.

## 5.3 Rights management

### 5.3.1 General findings

DRM is the management of rights to digital goods and content, including its confinement to authorised use and users and the management of any consequences of that use throughout the entire life cycle of the content.

This section identifies the requirements related with DRM on My-e-Director 2012 project. For that purpose, documentation analysis of previous surveys and studies is performed.

A DRM solution should ensure that users comply with usage rules, including copyright rules. For that end, tamper robustness and associated system complexity must be adapted to the desired level of security developed in consideration of the threat being addressed, but the implementation costs of such a system should not be prohibitive to its widespread adoption. Complexity of implementation,

maintenance and technologies must therefore be adequate to the threat model under consideration providing an appropriate level of security. Since most consumers are inherently honest, the DRM system must provide the means and incentive (adequate security level) for honest consumers to remain honest while deterring dishonest attackers of the system [CEN/ISSS]. From the questionnaire analysis we can conclude that most users are not interested in paying for time-shift and device-shift capabilities, so complex DRM systems that address those business models may be overkill. The security level of DRM should be determined in order to prevent, stop and trace infringement of the usage rules, including copyright rules, related to content. DRM must carefully balance the interests and operational requirements of rights holders against those of users and service providers [EC]. Simple solutions that are near transparent to the end user should be adopted as much as possible [Noring], examples: writing the purchaser's credit card info into the file; simple password entry to have full access to the content. A password can be tailored and registered specific to a person, possibly even including the buyer's personal information. From the questionnaire analysis we conclude that most (near 60%) users are open to have digital watermarking with information like the user's full name, others are strongly against it, then watermarking of unique (traceable) IDs can be considered. This simple technique can be enough to deter a significant percentage of unauthorized usage.

DRM should support business models such as: Time Limited View, Free Trial, Pay Per View and Usage Limited. DRM should support new business models such as: Rent-to-own, bundled physical and digital offers, separate delivery of rights and content. To win respect, all control or management systems have to be designed and operated in such a way as to provide the same opportunities for all consumers and to offer content in a non-discriminatory way. Approaches based on principles of "inclusive design" are of the utmost importance.

General consumer protection law specifies the kind of information that must be conveyed to consumers. In the context of digital content and DRM systems, sellers of goods and services have to provide all information that consumers need to make an informed decision. This includes, but is not limited to, the following [INDICARE]:

- the fact that DRM technology is being used;
- whether this means that you can play CDs, DVDs or downloaded pieces only on a particular player device, and or with particular soft-ware;
- whether you can make copies of files or not;
- whether a product installs additional software on your computer;
- specific software or hardware requirements;
- whether the DRM monitors your behaviour;
- whether there are restricted listening time in case of online-content;
- whether you can burn a downloaded content only a certain number of times.

Personal data should only be collected and further used by a DRM solution, if the user gives his unambiguous consent, or the data is necessary to perform a contract (for example billing).

A commercial entity that collects personal data is, moreover, obliged to ensure:

- the fair and lawful processing of data;

- that the data is collected for explicit and legitimate purposes and is used accordingly;
- that the data must be relevant and not excessive in relation to the purpose for which it is collected;
- that the data must be accurate and, where necessary, up to date;
- that consumers have reasonable measures available to them to rectify, erase or block incorrect data about them;
- that data which identify individuals must not be kept longer than necessary.

Other interesting features to have are [ITU-IPTV]:

- support associating content with protection and content management metadata in order to permit the expression of its rights of usage;
- support the secure delivery of content protection and content management metadata, including usage rights metadata;
- support content usage rights metadata that distinguishes between rights of use including rendering (viewing), storage, (re)distribution, and combinations thereof;
- support a means for conveyance of content tracing information (e.g. Watermark facilitation metadata);
- support the application of content tracing technology within the output of an My-e-Director 2012 terminal device for the purpose of uniquely identifying a session (e.g., channel, time/date), My-e-Director 2012 terminal device and/or network operator;
- support a “blackout mechanism”: a mechanism for limiting viewing-rights of certain programs to certain groups of subscribers (e.g. block viewing by residents of a specific area);
- support a mechanism for a Subscriber to request extensions (e.g. more plays, more play-time) to digital rights associated with specific content instances.

Again, from the project’s survey we can get some important feedback as regards the attitude of users towards DRM technologies. We see that end users have a positive attitude towards storing rights management information in the network, while watermarking methods are acceptable from the majority of the users, and therefore the use of a DRM protection mechanism that is either integrated or compliant to the platform should be considered.

### 5.3.2 Requirements

- Req\_DRM(1): A DRM solution should ensure that the users comply with usage rules, which include copyright rules, and enforce these rules.
- Req\_DRM(2): A DRM solution should be interoperable in a multi-provider multi-implementation environment, in order to allow sharing common resources such as consumer devices.
- Req\_DRM(3): Tamper robustness and associated system complexity must be adapted to the desired

level of security developed in consideration of the threat being addressed.

- Req\_DRM(4): Copy protection and rights management solutions must be based on open standards, under the intellectual property rights umbrella of recognised standardisation bodies.
- Req\_DRM(5): The implementation costs of such a system should not be prohibitive to its widespread adoption. Complexity of implementation, maintenance and technologies must therefore be in ad equation with the threat model under consideration providing an appropriate level of security.
- Req\_DRM(6): DRM should support business models such as: Time Limited View, Free Trial, Pay per View and Usage Limited.
- Req\_DRM(7): DRM should support new business models such as: Rent-to-own, bundled physical and digital offers, separate delivery of rights and content
- Req\_DRM(8): Since most consumers are inherently honest, the DRM system must provide the means and incentive (adequate security level) for honest consumers to remain honest while deterring dishonest attackers of the system. The security level of DRM should be determined in order to prevent, stop and trace infringement of the usage rules, including copyright rules, related to content.
- Req\_DRM(9): The DRM system and client-side software components should support full renewability, so they may be conveniently upgraded for improved security or corrected if revoked.
- Req\_DRM(10): Only cryptographic algorithms that are publicly released, well established, and proven secure through public, scientific peer review by the cryptology community should be used (if used).
- Req\_DRM(11): DRM systems have to follow existing legislation regarding privacy
- Req\_DRM(12): All control or management systems have to be designed and operated in such a way as to provide the same opportunities for all consumers and to offer content in a non-discriminatory way. Approaches based on principles of “inclusive design” are of the utmost importance.
- Req\_DRM(13): DRM must carefully balance the interests and operational requirements of rightsholders against those of users and service providers.

- Req\_DRM(14): General consumer protection law specifies the kind of information that must be conveyed to consumers. In the context of digital content and DRM systems, sellers of goods and services have to provide all information that consumers need to make an informed decision. This includes, but is not limited to, the following:
  - the fact that DRM technology is being used;
  - whether this means that you can play CDs, DVDs or downloaded pieces only on a particular player device, and or with particular soft-ware;
  - whether you can make copies of files or not;
  - whether a product installs additional soft-ware on your computer;
  - specific software or hardware requirements;
  - whether the DRM monitors your behaviour;
  - whether there are restricted listening time in case of online-content;
  - whether you can burn a downloaded content only a certain number of times.
- Req\_DRM(15): Personal data should only be collected and further used by a DRM solution, if the user gives his unambiguous consent, or the data is necessary to perform a contract (for example billing).
- Req\_DRM(16): Simple solutions that are near transparent to the end user should be adopted as much as possible, examples:
  - writing the purchaser's credit card info into the file;
  - Simple password entry to have full access to the content. A password can be tailored and registered specific to a person, possibly even including the buyer's personal information.
- Req\_DRM(17): The My-e-Director 2012 architecture is required to support associating content with protection and content management metadata in order to permit the expression of its rights of usage.
- Req\_DRM(18): The My-e-Director 2012 architecture is required to support the secure delivery of content protection and content management metadata, including usage rights metadata.
- Req\_DRM(19): The My-e-Director 2012 architecture is required to support content usage rights metadata that distinguishes between rights of use including rendering (viewing), storage, (re)distribution, and combinations thereof.
- Req\_DRM(20): The My-e-Director 2012 architecture is required to support a means for conveyance of content tracing information (e.g. Watermark facilitation metadata).
- Req\_DRM(21): The My-e-Director 2012 architecture is required to support the application of content tracing technology within the output of a My-e-Director 2012 terminal device for the purpose of uniquely identifying a session (e.g., channel, time/date), My-e-Director 2012 terminal device and/or network operator. Examples of such content tracing technology can optionally include visible and invisible information.
- Req\_DRM(22): The My-e-Director 2012 architecture is recommended to support a "blackout mechanism": a mechanism for limiting viewing-rights of certain programs to

certain groups of subscribers (e.g. block viewing by residents of a specific area (for example, this can optionally be useful for sporting events)).

- Req\_DRM(23): The My-e-Director 2012 architecture is required to be capable of indicating why access to content has been denied to the user.

## **5.4 Use of networking technologies**

### **5.4.1 General findings**

Though the selection of networking technologies is not a requirement that emerges directly from the end user preferences, current trends for the use of networking technologies and the familiarity of users with these technologies affect these requirements. For this, the results from the BBC survey of how UK and other nations viewed the Athens Olympics [BBC2004], and the project's survey have been analysed in order to be transformed into network related requirements. In detail, the results indicate that viewer interest is quite low before the games start, but picks up significantly during the games. For the fixed networks it is clear that the most popular network technology for home or office internet access is the aDSL. More specifically the most popular type of this network is the first generation of aDSL with broadband capabilities up to 2Mbps in the downlink direction. The other types of fixed internet access like ISDN are very rare and completely out of scope.

Also there is an increasing demand for using 3.5G HSPDA capable phones to consume the content, while the majority of users prefer the use of wireless (WiFi) and mobile (2G,3G) technologies for internet content access. On the other hand, we have the less popular DVB-H network which is used by only a small percentage of the users. The low percentage of DVB-H is probably due to the fact that this technology is very new and therefore it is not known to the wider public as there are not price accessible terminals that combine 3.5G mobile capabilities with a DVB-H receiver. This leads to the conclusion that in order to plan successful trials, at least as regards real users' participation and ease of use, familiarity and preference for technologies, emphasis should be given to WiFi and 3G technologies. The utilisation of other mobile networks like DVB-H will be available only in controlled lab trials. Also for the DVB-H case scenario we have to note the extremely high cost that will be demanded even to set up a lab test bed with limited functionalities.

### **5.4.2 Requirements**

Trying to transform the above findings into a set of clear requirements, the following list has been compiled.

- Req\_Net(1): The platform should allow the delivery of My-e-Director 2012 services over different access networks (e.g. cable, optical, xDSL, wireless).
- Req\_Net(2): The platform should give emphasis on the use of aDSL up to 2 Mbps for the fixed internet connection.
- Req\_Net(3): The platform should give emphasis on the use of WiFi and 3G technologies for mobile access.
- Req\_Net(4): The platform should be able to handle a sudden increase in traffic that will appear in the cases of important events, right after the event starts.

- Req\_net(5): The architecture is recommended to support means by which service/network providers can integrate My-e-Director 2012 subscriber management functions with a subscriber management system that can be used across multiple NGN services, including IMS-based services.
- Req\_net(6): The platform should support a mechanism for NAT (utilisation of SIP or STUN protocol).
- Req\_net(7): The multicast architecture is required to support the capability of multicast protocol adjacency authentication in order to establish a reliable peer.
- Req\_net(8): The architecture should allow network operators to hide network topology and its resources from unauthorized entities.
- Req\_net(9): The architecture should support or be compatible with the provision of security measures to block illegal-unwanted traffic and respond to network attacks.
- Req\_net(10): The architecture should be able to adapt dynamically to change in wireless networks characteristics when the service is delivered over a mobile network (e.g. bandwidth, packet loss rate, etc.)
- Req\_net(11): The architecture should support delivery of real-time encoded and pre-encoded stored programs.
- Req\_net(12): The architecture should comply with existing QoS capabilities (e.g. RACF [ITU-T Y.2111] and DiffServ [IETF RFC 2475]) when integrating My-e-Director 2012 services into NGN-based environments.
- Req\_net(13): The architecture should support mechanisms for My-e-Director 2012 traffic identification, classification and marking, policing and conditioning, scheduling and discarding.
- Req\_net(14): The platform should offer an admission control mechanism for admission of My-e-Director 2012 services over the access and core network resources from the home network to the service source.

## **5.5 Privacy**

### **5.5.1 General findings**

The results of the survey were instructive as regards the aspect of privacy and the end users' opinion about this. The first conclusion is that even though privacy issues are considered by the end-users to be of great importance in a personalized content delivery service, and users are accustomed to accessing the internet at a private environment, there seems to be very little concern about the use of mobile devices either as regards privacy issues or as a distraction when attending a sporting event. In parallel, users consider the privacy risks regarding their personal information on the internet unimportant, and in general trust the existing laws and business practices for the methods that they use in order to safeguard their privacy rights over the internet and networks in general. This could be considered as an indication that the use of current standards and practices

should be considered in My-e-Director 2012 as regards protection of privacy. At this point it should be reminded that users are positive towards the use of personal information in order to be offered a more personalised experience for viewing sports, so a means of guaranteeing privacy according to standard practices should be sufficient in order to overcome any privacy concerns in the context of the project. This means that the data mining tools for collecting and processing the personalised data have to protect this data from access by non-authorised persons or even by the system without any human intervention. Privacy-preserving data mining provides methods that can compute or approximate the output of a data mining algorithm without revealing at least part of the sensitive information about the data. One approach adopts cryptographic techniques to provide secure solutions in distributed settings.

### 5.5.2 Requirements

Trying to transform the above findings into a set of clear requirements, the following list has been compiled.

- Req\_Priv(1): The platform should give emphasis to the use of secure connections for the personal data and requirements transactions, like utilisation of the HTTPS protocol for communication between the end-user and the My-e-Director 2012 platform.
- Req\_Priv(2): The platform should give emphasis to the adoption of cryptographic techniques for the data mining tools that will process the personalised data stored on the platform.

## 5.6 Service provision

### 5.6.1 General findings

Service Providers have specific operational and business requirements applicable to a platform like My-e-Director 2012.

When a project team determines that a Rich Internet Application (RIA) solution is needed, deciding which solution is most suited to the job can prove difficult. The user requirements are designed to help in visualizing differences among RIA solutions, as well as how those solutions will aid in meeting the requirements of a particular project. In this case, it is flexible—it allows the service provider to define their own requirements. These requirements should be considered anew with every project (especially for the Questionnaire).

The service provider use requires three steps: weighting requirements, measuring capabilities, and comparing requirements to capabilities. This *Methodologies and Best Practices* (MBP) document defines the defined universal requirements, and also outlines the methodology for applying RIA to a hypothetical business problem or one special issue.

In order to evaluate and rank the user requirements, it is essential to understand each one, as well as understanding how to define an evaluation continuum. It is important to note that these user requirements are a starting point; users can add their own requirements, but the new requirements should address the technical capabilities of the RIA solution under consideration. The most important thing when choosing requirements is that they align with some quantitatively or

qualitatively measurable aspect of solutions in the problem space.

An arbitrary user audience is a set of users who may use any type of technology to access web content. This is usually the case when users' web devices or browser plug-in technologies cannot be predicted. For example, the site may need to be accessible to cell-phone browsers; or the total population of web browsers may include a variety of brands and software versions.

In contrast, a captive user audience consists of Web users who are (or can be) restricted to specific technologies by mandate, policy, rule, or convention. For example, internal employee users can be required to use specific operating systems, browsers, and plug-ins while accessing a web application – in our case – the questionnaire.

Some web applications require sophisticated UI capabilities (e.g., sortable tables, navigation trees, animations, and streaming video and/or audio) to enhance user productivity, user experience, and the “stickiness” of a web application. GUI sophistication requirements are sometimes at odds with web accessibility and reach requirements that de-emphasize the use of more sophisticated UI technologies.

Web accessibility addresses the capabilities of user requirements. Reach addresses the capabilities of web-browsing technology. Individuals who use internet browsers or other handheld devices to browse the Web have different UI requirements than those who use desktop browsers. Within each type of browsing technology, devices and software vary in their support for presentation technologies.

Responsiveness is the measurement of how quickly the web application responds to Web-user input (such as clicking a button, menu item, or web link, or activating any type of behaviour). Some applications require extremely responsive behaviour in order to facilitate fast data entry or efficient navigation and perusal of data. In such cases, web applications should provide subsecond responsiveness.

## **5.6.2 Requirements**

Trying to transform the above findings into a set of clear requirements, the following list has been compiled.

### Platform architecture level requirements:

- Req\_SerPr(1): The platform should be able to distinguish between end-user (ITU-T J.112: A human being, organization, or telecommunications system that accesses the network in order to communicate via the services provided by the network) and subscriber (ITU-T Q.3050.1: The subscriber is responsible for concluding contracts for the services subscribed to and for paying for these services).
- Req\_SerPr(2): Authentication, authorization and accounting (AAA) capabilities should be offered by the platform, in order to authenticate, authorize and charge the subscriber.
- Req\_SerPr(3): The platform should incorporate mechanisms for the service provider to perform subscriber management functions such as opening or cancelling or activating or freezing an account, searching user account's balance, searching user's consumption detail record, modifying user's information (e.g. accounts, login name, payment type), grouping users etc.

- Req\_SerPr(4): The platform should be able to allow the delivery of services with a defined Quality of Service (QoS) for the end-user.
- Req\_SerPr(5): The My-e-Director 2012 architecture is recommended to support mechanisms for the service provider to manage various services.
- Req\_SerPr(6): The My-e-Director 2012 architecture is recommended to support mechanisms for the service provider to provide the functions for service usage and the prevention of the service abuse.
- Req\_SerPr(7): P2P mechanism in My-e-Director 2012 is recommended to not preclude the use of client server mechanisms in IPTV.
- Req\_SerPr(8): The My-e-Director 2012 architecture is required to support mechanisms that allow My-e-Director 2012 services delivery from a 3rd party provider.
- Req\_SerPr(9): The My-e-Director 2012 architecture is required to allow for the utilization of Internet protocols and standards.
- Req\_SerPr(10): The My-e-Director 2012 terminal device is recommended to be able to declare Media-providing entities their usage environments description - e.g. Type of service, Type of Terminal, Type of transmission medium, User Preferences, Available QoS Level.
- Req\_SerPr(11): The My-e-Director 2012 architecture is required to support a mechanism that allows for service-based transport QoS to be managed across multiple network domains.
- Req\_SerPr(12): The My-e-Director 2012 architecture is recommended to support the ability to remotely configure and administer Network and Service elements.

#### End-user terminal level requirements:

- Req\_SerPr(13): The platform should allow the update of the end-user device remotely, e.g. update software.
- Req\_SerPr(14): The platform should be able to get QoS related information from the end-user device.
- Req\_SerPr(15): The platform should be able to capture the end-user terminal capabilities information (e.g.: codecs, access limitations, etc.).
- Req\_SerPr(16): The platform should be able to push content onto the end-user terminal (not only upon user's demand).
- Req\_SerPr(17): The platform should support mechanisms to Operate, Administer, Maintain, and Provision (OAMP) My-e-Director 2012 terminal equipments;
- Req\_SerPr(18): The platform should support a mechanism that allows service signalling messages to be routed based on the capabilities of the end-user device and/or the application servers available to support services.

#### Business level requirements:

- Req\_SerPr(19): The platform should support capabilities for exchanging My-e-Director 2012 services information between different My-e-Director 2012 services providers. For instance, the service information can optionally include the source information, channel

information, service start/end time, and QoS information;

- Req\_SerPr(20): The platform should support services charging through various payment methods (such as prepay, post pay, advice of charge, and third party charging);
- Req\_SerPr(21): The platform should support the establishment of sessions as a means of maintaining associations between users and the applications they use.

Maintenance and operation level requirements:

- Req\_SerPr(22): The platform should be capable of managing services with regards to Fault, Configuration, Accounting, Performance, and Security (FCAPS) as well as supporting a framework that identifies the key components and measurement points for Quality of Service Measurement (QoSM);
- Req\_SerPr(23): The platform should support viewership data tracking. For example this tracking may allow content provider and service provider to provide audience rating service, track popular programs, craft and target specific advertisements to particular groups of users demonstrating certain surfing patterns.

## 5.7 Conclusions and input to specifications tasks

Concluding the presentation of the work toward the identification of requirements, the following table summarizes the list of requirements. Going one step further, the project partners have proceeded to evaluate the importance of each requirement using a three level marking scheme (low, medium and high importance).

#	Requirement ID	Description	Importance
1	Req_Dev_UI_Intr(1)	Computers followed by mobile devices should be used as the main type of access device for My-e-Director 2012.	High
2	Req_Dev_UI_Intr (2)	A Web browser type interface should be supported as this is regarded as a versatile and easy to use application environment by end-users.	Medium
3	Req_Dev_UI_Intr (3)	Touch screens should be supported as the preferred type of input interface followed by mouse input .	Medium
4	Req_Dev_UI_Intr (4)	Devices which support rich interactive capabilities should be supported.	Medium
5	Req_Pers(1)	The platform should provide the ability to collect and process user-related information to determine the user's profile and categorisation.	High
6	Req_Pers(2)	The platform should allow easy configuration of user interfaces, both to meet users' personalisation requirements and to support the look-and-feel of existing services.	High
7	Req Pers(3)	Specific support for interactive viewing athletics, football and basketball should be targeted.	Low

8	Req_Pers(4)	The platform should provide live viewing of content, and if possible time-shifted (replays) viewing.	High
9	Req_Pers(5)	The platform should allow switching of camera angles based upon personal preferences.	High
10	Req_Pers(6)	A “traditionally mixed” broadcast view should be supported.	Low
11	Req_Pers(7)	Support to switch camera angles and to view replays in slow motion should be supported for mobile users and users at live events.	Low
12	Req_Pers(8)	“Team ball” type sports events should be targeted for live broadcasting.	Low
13	Req_Pers(9)	Aerial coverage type camera views for sports events should be available (Note this may be easier to support at outdoor sports events rather than at indoor events).	Low
14	Req_Pers(10)	Pay per view personalised content should be investigated.	Medium
15	Req_Pers(11)	Personalisation which adapts content to group preferences rather than to individual user preferences can be supported.	Medium
16	Req_DRM(1)	A DRM solution should ensure that the users comply with usage rules, which include copyright rules, and enforce these rules.	Low
17	Req_DRM(2)	A DRM solution should be interoperable in a multi-provider multi-implementation environment, in order to allow sharing common resources such as consumer devices.	Medium
18	Req_DRM(3)	Tamper robustness and associated system complexity must be adapted to the desired level of security developed in consideration of the threat being addressed.	Medium
19	Req_DRM(4)	Copy protection and rights management solutions must be based on open standards, under the intellectual property rights umbrella of recognised standardisation bodies.	Medium
20	Req_DRM(5)	The implementation costs of such a system should not be prohibitive to its widespread adoption. Complexity of implementation, maintenance and technologies must therefore be in ad equation with the threat model under consideration providing an appropriate level of security.	High
21	Req_DRM(6)	DRM should support business models such as: Time Limited View, Free Trial, Pay Per View and Usage Limited.	Low
22	Req_DRM(7)	DRM should support new business models such as: Rent-to-own, bundled physical and digital offers, separate delivery of rights and content	Low

23	Req_DRM(8)	Since most consumers are inherently honest, the DRM system must provide the means and incentive (adequate security level) for honest consumers to remain honest while deterring dishonest attackers of the system. The security level of DRM should be determined in order to prevent, stop and trace infringement of the usage rules, including copyright rules, related to content.	Medium
24	Req_DRM(9)	The DRM system and client-side software components should support full renewability, so they may be conveniently upgraded for improved security or corrected if revoked.	Low
25	Req_DRM(10)	Only cryptographic algorithms that are publicly released, well established, and proven secure through public, scientific peer review by the cryptology community should be used (if used).	Medium
26	Req_DRM(11)	DRM systems have to follow existing legislation regarding privacy	High
27	Req_DRM(12)	All control or management systems have to be designed and operated in such a way as to provide the same opportunities for all consumers and to offer content in a non-discriminatory way. Approaches based on principles of “inclusive design” are of the utmost importance.	High
28	Req_DRM(13)	DRM must carefully balance the interests and operational requirements of rightsholders against those of users and service providers.	Medium
29	Req_DRM(14)	General consumer protection law specifies the kind of information that must be conveyed to consumers. In the context of digital content and DRM systems, sellers of goods and services have to provide all information that consumers need to make an informed decision.	High
30	Req_DRM(15)	Personal data should only be collected and further used by a DRM solution, if the user gives his unambiguous consent, or the data is necessary to perform a contract (for example billing).	High
31	Req_DRM(16)	Simple solutions that are near transparent to the end user should be adopted as much as possible.	High
32	Req_DRM(17)	The My-e-Director 2012 architecture is required to support associating content with protection and content management metadata in order to permit the expression of its rights of usage.	Low
33	Req_DRM(18)	The My-e-Director 2012 architecture is required to support the secure delivery of content protection and content management metadata, including usage rights metadata.	Low

34	Req_DRM(19)	The My-e-Director 2012 architecture is required to support content usage rights metadata that distinguishes between rights of use including rendering (viewing), storage, (re)distribution, and combinations thereof.	Low
35	Req_DRM(20)	The My-e-Director 2012 architecture is required to support a means for conveyance of content tracing information (e.g. Watermark facilitation metadata).	Medium
36	Req_DRM(21)	The My-e-Director 2012 architecture is required to support the application of content tracing technology within the output of a My-e-Director 2012 terminal device for the purpose of uniquely identifying a session (e.g., channel, time/date), My-e-Director 2012 terminal device and/or network operator. Examples of such content tracing technology can optionally include visible and invisible information.	Low
37	Req_DRM(22)	The My-e-Director 2012 architecture is recommended to support a “blackout mechanism”: a mechanism for limiting viewing-rights of certain programs to certain groups of subscribers (e.g. block viewing by residents of a specific area (for example, this can optionally be useful for sporting events)).	Medium
38	Req_DRM(23)	The My-e-Director 2012 architecture is required to be capable of indicating why access to content has been denied to the user.	Medium
39	Req_Net(1)	The platform should allow the delivery of the platform services over different access networks (e.g. cable, optical, xDSL, wireless).	High
40	Req_Net(2)	The platform should support the use of aDSL up to 2 Mbps for the fixed internet connection.	Medium
41	Req_Net(3)	The platform should support the use of WiFi and 3G technologies for mobile access.	Medium
42	Req_Net(4)	The platform should be able to handle sudden increase in traffic that will appear in the cases of important events, right after the event starts.	Low
43	Req_net(5)	The architecture is recommended to support means by which service/network providers can integrate platform subscriber management functions with a subscriber management system that can be used across multiple NGN services, including IMS-based services	Low
44	Req_net(6)	The platform should support a mechanism for NAT.	Medium
45	Req_net(7)	The multicast architecture is required to support the capability of multicast protocol adjacency authentication in order to establish a reliable peer.	Medium
46	Req_net(8)	The architecture should allow network operators to hide network topology and its resources from unauthorized entities.	Low

47	Req_net(9)	The architecture should support or be compatible with the provision of security measures to block illegal-unwanted traffic and respond to network attacks.	Low
48	Req_net(10)	The architecture should be able to adapt dynamically to change in wireless networks characteristics when the service is delivered over a mobile network (e.g. bandwidth, packet loss rate, etc.)	Medium
49	Req_net(11)	The architecture should support delivery of real-time encoded and pre-encoded stored programs.	High
50	Req_net(12)	The architecture should comply to existing QoS capabilities (e.g. RACF [ITU-T Y.2111] and DiffServ [IETF RFC 2475]) when integrating My-e-Director 2012 services into NGN-based environments.	Low
51	Req_net(13)	The architecture should support mechanisms for My-e-Director 2012 traffic identification, classification and marking, policing and conditioning, scheduling and discarding.	Low
52	Req_net(14)	The platform should offer an admission control mechanism for admission of My-e-Director 2012 services over the access and core network resources from the home network to the service source.	Low
53	Req_Priv(1)	The platform should give emphasis on the use secure connection for the personal data and requirements transactions, like utilisation of HTTPS protocol for the communication between end-user and My-e-Director 2012 platform.	Low
54	Req_Priv(2)	The platform should give emphasis on adapting cryptographic techniques to the data mining tools that will process the personalised stored data on the platform.	Low
55	Req_SerPr(1)	The platform should be able to distinguish between end-user (ITU-T J.112: A human being, organization, or telecommunications system that accesses the network in order to communicate via the services provided by the network) and subscriber (ITU-T Q.3050.1: The subscriber is responsible for concluding contracts for the services subscribed to and for paying for these services).	Low
56	Req_SerPr(2)	Authentication, authorization and accounting (AAA) capabilities should be offered by the platform, in order to authenticate, authorize and account the subscriber.	Medium

57	Req_SerPr(3)	The platform should incorporate mechanisms for the service provider to perform subscriber management functions such as opening or cancelling or activating or freezing an account, searching user account's balance, searching user's consumption detail record, modifying user's information (e.g. accounts, login name, payment type), grouping users etc.	Low
58	Req_SerPr(4)	The platform should be able to allow the delivery of services with a defined Quality of Service (QoS) for the end-user.	Medium
59	Req_SerPr(5)	The My-e-Director 2012 architecture is recommended to support mechanisms for the service provider to manage various services.	Medium
60	Req_SerPr(6)	The My-e-Director 2012 architecture is recommended to support mechanisms for the service provider to provide the functions for service usage and the prevention of the service abuse.	Low
61	Req_SerPr(7)	P2P mechanism in My-e-Director 2012 is recommended to not preclude the use of client server mechanisms in IPTV.	Low
62	Req_SerPr(8)	The My-e-Director 2012 architecture is required to support mechanisms that allow My-e-Director 2012 services delivery from a 3rd party provider.	Low
63	Req_SerPr(9)	The My-e-Director 2012 architecture is required to allow for the utilization of Internet protocols and standards.	High
64	Req_SerPr(10)	The My-e-Director 2012 terminal device is recommended to be able to declare Media-providing entities their usage environments description - e.g. Type of service, Type of Terminal, Type of transmission medium, User Preferences, Available QoS Level.	Medium
65	Req_SerPr(11)	The My-e-Director 2012 architecture is required to support a mechanism that allows for service-based transport QoS to be managed across multiple network domains.	High
66	Req_SerPr(12)	The My-e-Director 2012 architecture is recommended to support the ability to remotely configure and administer Network and Service elements.	High
67	Req_SerPr(13)	The platform should allow the update of the end-user device remotely, e.g. update software.	Low
68	Req_SerPr(14)	The platform should be able to get QoS related information from the end-user device.	Medium
69	Req_SerPr(15)	The platform should be able to capture the end-user terminal capabilities information (e.g. codecs, access limitations, etc.).	High

70	Req_SerPr(16)	The platform should be able to push content onto the end-user terminal (not only upon user's demand).	Medium
71	Req_SerPr(17)	The platform should support mechanisms to Operate, Administer, Maintain, and Provision (OAMP) My-e-Director 2012 terminal equipments;	Low
72	Req_SerPr(18)	The platform should support a mechanism that allows service signalling messages to be routed based on the capabilities of the end-user device and/or the application servers available to support services.	Medium
73	Req_SerPr(19)	The platform should support capabilities for exchanging My-e-Director 2012 services information between different My-e-Director 2012 services providers. For instance, the service information can optionally include the source information, channel information, service start/end time, and QoS information;	Low
74	Req_SerPr(20)	The platform should support services charging through various payment methods (such as prepay, post pay, advice of charge, and third party charging);	Low
75	Req_SerPr(21)	The platform should support the establishment of sessions as a means of maintaining associations between users and the applications they use.	High
76	Req_SerPr(22)	The platform should be capable of managing services with regards to Fault, Configuration, Accounting, Performance, and Security (FCAPS) as well as supporting a framework that identifies the key components and measurement points for Quality of Service Measurement (QoSM);	Low
77	Req_SerPr(23)	The platform should support viewership data tracking. For example this tracking may allow content provider and service provider to provide audience rating service, track popular programs, craft and target specific advertisements to particular groups of users demonstrating certain surfing patterns.	Medium

**Table 4:** Summary of requirements

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## 7 Annex A

Demographics	Technology	Sports	Quality/Price	Personalization
Gender:	<input type="text"/>			
Age:	<input type="text"/>			
Education:	<input type="text"/>			
				Next

Demographics	ICT technology awareness use of end user devices	Sports	Quality/Price	Personalization	
Indicate your experience level related with computers and Internet					
<input type="radio"/> Novice <input type="radio"/> Medium <input checked="" type="radio"/> Expert					
How frequently do you access the web/internet from the following places?					
	At least once a day	At least once a week	At least once a month	Less than once a month	Never
From home (including a home office)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From a public terminal (e.g. library, cybercafe, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From a communal place such as a public bar or sports cafe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
What type of equipment do you use on a daily basis? (Select all that apply)					
<input type="checkbox"/> Desktop Computer <input type="checkbox"/> Laptop Computer <input type="checkbox"/> Mobile Phone <input type="checkbox"/> Pocket PC, Palm, PDA <input type="checkbox"/> TV Set / Media Set Top Box <input type="checkbox"/> Game Console <input type="checkbox"/> Wireless Networked Computer (WiFi)					
What type of internet connection do you use at your home? (Select one)					
<input type="radio"/> Dialup Internet Access <input type="radio"/> ISDN <input type="radio"/> Wired/Wireless Broadband <= 2Mbps <input type="radio"/> Wired/Wireless Broadband > 2Mbps					
What type of Wireless network technologies do you use? (Select all that apply)					
<input type="checkbox"/> GSM/GPRS <input type="checkbox"/> 3G/UMTS <input type="checkbox"/> WIFI/WLAN <input type="checkbox"/> DVB-H					
Depending on the device, what would be your preference?					
	Download and install	Use web service			
PC	<input type="radio"/>	<input type="radio"/>			
PDA/PocketPC (including Phone capabilities)	<input type="radio"/>	<input type="radio"/>			
Phone/Smartphone	<input type="radio"/>	<input type="radio"/>			
Other	<input type="radio"/>	<input type="radio"/>			
				Next	

Demographics	Technology	Sports Interests and Viewing Habits	Quality/Price	Personalization
<p>Which of the following sports/disciplines do you enjoy watching on television? (Select all that apply)</p> <p> <input type="checkbox"/> Aquatics   <input type="checkbox"/> Fencing   <input type="checkbox"/> Shooting   <input type="checkbox"/> Archery   <input type="checkbox"/> Football  <input type="checkbox"/> Softball   <input type="checkbox"/> Athletics   <input type="checkbox"/> Gymnastics   <input type="checkbox"/> Table tennis   <input type="checkbox"/> Badminton  <input type="checkbox"/> Handball   <input type="checkbox"/> Taekwondo   <input type="checkbox"/> Baseball   <input type="checkbox"/> Hockey   <input type="checkbox"/> Tennis  <input type="checkbox"/> Basketball   <input type="checkbox"/> Judo   <input type="checkbox"/> Triathlon   <input type="checkbox"/> Boxing   <input type="checkbox"/> Modern pentathlon  <input type="checkbox"/> Volleyball   <input type="checkbox"/> Canoe   <input type="checkbox"/> Weightlifting   <input type="checkbox"/> Cycling   <input type="checkbox"/> Rowing  <input type="checkbox"/> Wrestling   <input type="checkbox"/> Equestrian   <input type="checkbox"/> Sailing                 </p>				
<p>Imagine you are at a sports event and have a mobile device with you. Which of the following options (on the mobile) would appeal to you?</p> <p> <input type="checkbox"/> Ability to tag and track all athletes belong to a group, e.g., of the same nationality  <input type="checkbox"/> Ability to switch camera angles to view the event  <input type="checkbox"/> Ability to select and replay from a set of sports moments during the event  <input type="checkbox"/> Ability to watch replay in slow motion  <input type="checkbox"/> Ability to zoom in on user designated part of event, if quality of camera angle permits  <input type="checkbox"/> Ability to get summary information about a participant at any time  <input type="checkbox"/> Ability to get the event schedule at any time  <input type="checkbox"/> Audio commentary of the event  <input type="checkbox"/> Ability to replay or slow-motion of notable events  <input type="checkbox"/> Personalised Electronic Program Guide and Navigation to sports event  <input type="checkbox"/> Other, please specify: <input type="text"/> </p>				
<p>Which of the following sports/disciplines would you like to watch live at the venue?</p> <p> <input type="checkbox"/> Aquatics   <input type="checkbox"/> Fencing   <input type="checkbox"/> Shooting   <input type="checkbox"/> Archery   <input type="checkbox"/> Football  <input type="checkbox"/> Softball   <input type="checkbox"/> Athletics   <input type="checkbox"/> Gymnastics   <input type="checkbox"/> Table tennis   <input type="checkbox"/> Badminton  <input type="checkbox"/> Handball   <input type="checkbox"/> Taekwondo   <input type="checkbox"/> Baseball   <input type="checkbox"/> Hockey   <input type="checkbox"/> Tennis  <input type="checkbox"/> Basketball   <input type="checkbox"/> Judo   <input type="checkbox"/> Triathlon   <input type="checkbox"/> Boxing   <input type="checkbox"/> Modern pentathlon  <input type="checkbox"/> Volleyball   <input type="checkbox"/> Canoe   <input type="checkbox"/> Weightlifting   <input type="checkbox"/> Cycling   <input type="checkbox"/> Rowing  <input type="checkbox"/> Wrestling   <input type="checkbox"/> Equestrian   <input type="checkbox"/> Sailing                 </p>				
<p>Imagine you are at a sports event and have a mobile device with you. Which of the following options (on the mobile) would appeal to you?</p> <p> <input type="checkbox"/> Ability to tag and track all athletes belong to a group, e.g., of the same nationality  <input type="checkbox"/> Ability to switch camera angles to view the event  <input type="checkbox"/> Ability to select and replay from a set of sports moments during the event  <input type="checkbox"/> Viewing the event from a camera angle that can't otherwise be seen by you, e.g., close-ups because you are situated too far from the event field  <input type="checkbox"/> Viewing athletes during the times they may otherwise be obscured from your view, e.g., they are on a part of the sports stadium that is temporarily hidden to you etc.  <input type="checkbox"/> No desire to use a mobile event at an event because: <input type="text"/> </p>				
<p>Imagine you are watching a long distance athletics race, and could choose what view is presented. What type of view(s) would you like?</p> <p> <input type="checkbox"/> Close-ups of specific athletes  <input type="checkbox"/> The front-runners  <input type="checkbox"/> The main pack  <input type="checkbox"/> An aerial view of the event  <input type="checkbox"/> I'd prefer just to view what the director has chosen                 </p>				
<p>How would you like to control the user interface?</p> <p> <input type="radio"/> Use of arrow keys on keypad or keyboard  <input type="radio"/> Use of mouse  <input type="radio"/> Use of remote control  <input type="radio"/> Use of touch pad  <input type="radio"/> Use of touch screen                 </p>				
<p>How would you prefer to learn how to use the interface?</p> <p> <input type="radio"/> A small set of simple controls but reduced interaction  <input type="radio"/> Use of recorded demos to walk you through to show how the main feature work  <input type="radio"/> Use of an on-screen help and hints triggered by indicating specific features  <input type="radio"/> Access to electronic user guide off-line  <input type="radio"/> Other, please specify: <input type="text"/> </p>				

Demographics	Technology	Sports	Media quality/price	Personalization			
<p>Imagine you could customise what you view (e.g. like in the example shown here [...]). To what extent would you make use of this facility on the following devices?</p>							
			Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
	Home TV set	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Desktop computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Laptop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	PDA, PocketPC, Palm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Game Console	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Please, specify for other:	<input type="text"/>					
<p>For which of the following devices would you subscribe to a paid service that offers major sports events coverage in a personalised manner?</p>							
			Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
	Home TV set	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Desktop computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Laptop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	PDA, PocketPC, Palm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Game Console	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Please, specify for other:	<input type="text"/>					
<p>For a content that costs you 2EUR, how much extra are you willing to pay for being able to watch the same content later (time shift usage)?</p>							
<p><input type="radio"/> Not interested</p> <p><input type="radio"/> 5% (10 cents) per view</p> <p><input type="radio"/> 10% (20 cents) per view</p> <p><input type="radio"/> 25% (50 cents) per view</p> <p><input type="radio"/> 50% (1 EUR) per view</p> <p><input type="radio"/> 75% (1,50 EUR) or more per view</p> <p><input type="radio"/> Other, please specify: <input type="text"/></p>							
<p>For a content that costs you 2EUR, how extra more are you willing to pay for being able to play the same content in other devices (device shift usage)?</p>							
<p><input type="radio"/> Not interested</p> <p><input type="radio"/> 5% (10 cents) per view</p> <p><input type="radio"/> 10% (20 cents) per view</p> <p><input type="radio"/> 25% (50 cents) per view</p> <p><input type="radio"/> 50% (1 EUR) per view</p> <p><input type="radio"/> 75% (1,50 EUR) or more per view</p> <p><input type="radio"/> Other, please specify: <input type="text"/></p>							
Next							

Demographics	Technology	Sports	Quality/Price	Personalisation, Privacy and Digital Right Management
<b>At what level do you think the use of user grouping based on personal information would help in the provision of a more personalised user experience?</b>				
<input type="radio"/> Strongly Agree <input type="radio"/> Agree  <input type="radio"/> Neither agree nor disagree <input type="radio"/> Disagree  <input type="radio"/> Strongly disagree				
<b>Are threats to your personal privacy a major concern for you?</b>				
<input type="radio"/> Strongly Agree <input type="radio"/> Agree  <input type="radio"/> Neither agree nor disagree <input type="radio"/> Disagree  <input type="radio"/> Strongly disagree				
<b>Do you think that your privacy rights as a User inside the Internet and Communication Networks are adequately protected today by law and business practices?</b>				
<input type="radio"/> Strongly Agree  <input type="radio"/> Agree <input type="radio"/> Neither agree nor disagree <input type="radio"/> Disagree  <input type="radio"/> Strongly disagree				
<b>Do you consider yourself well aware of privacy risks regarding your personal information on the internet and/or the corresponding solutions and proposals for confronting them?</b>				
<input type="radio"/> Strongly Agree  <input type="radio"/> Agree <input type="radio"/> Neither agree nor disagree <input type="radio"/> Disagree  <input type="radio"/> Strongly disagree				
<b>Do you think that users have lost control over the amount of personal information that is collected and used by companies and/or in internet/communication services?</b>				
<input type="radio"/> Strongly Agree  <input type="radio"/> Agree <input type="radio"/> Neither agree nor disagree <input type="radio"/> Disagree  <input type="radio"/> Strongly disagree				
<b>Would you be willing to give information concerning your personal preferences about sports viewing in order to be offered a more personalised user experience?</b>				
<input type="radio"/> Strongly Agree  <input type="radio"/> Agree <input type="radio"/> Neither agree nor disagree <input type="radio"/> Disagree  <input type="radio"/> Strongly disagree				
<b>For content that you have purchased, how do you feel if the digital rights information is stored in the network, allowing future recoverability of rights information, even if it slightly increases service prices?</b>				
<input type="radio"/> Strongly Agree  <input type="radio"/> Agree <input type="radio"/> Neither agree nor disagree <input type="radio"/> Disagree  <input type="radio"/> Strongly disagree				
<b>For content that you have purchased, how do you feel if the content is watermarked with your full name and other unique identification?</b>				
<input type="radio"/> Strongly Agree  <input type="radio"/> Agree <input type="radio"/> Neither agree nor disagree  <input type="radio"/> Disagree <input type="radio"/> Strongly disagree				