

Accessible ICT

Research Actions to facilitate eInclusion

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Structure of presentation

- Results from CARDIAC project
- Walk through the CARDIAC Roadmap
- Research priorities in network based services
- Research priorities in inclusive user interaction
- Priorities in technology transfer and service delivery

Core aim of CARDIAC

*Coordination Action in R&D
in Accessible and Assistive ICT
01.03.2010 – 28.02.2013*

*Advise the European Commission as to where to
direct research funding in the near and more
distant future within the context of ICT for
independent living, inclusion and governance*

How

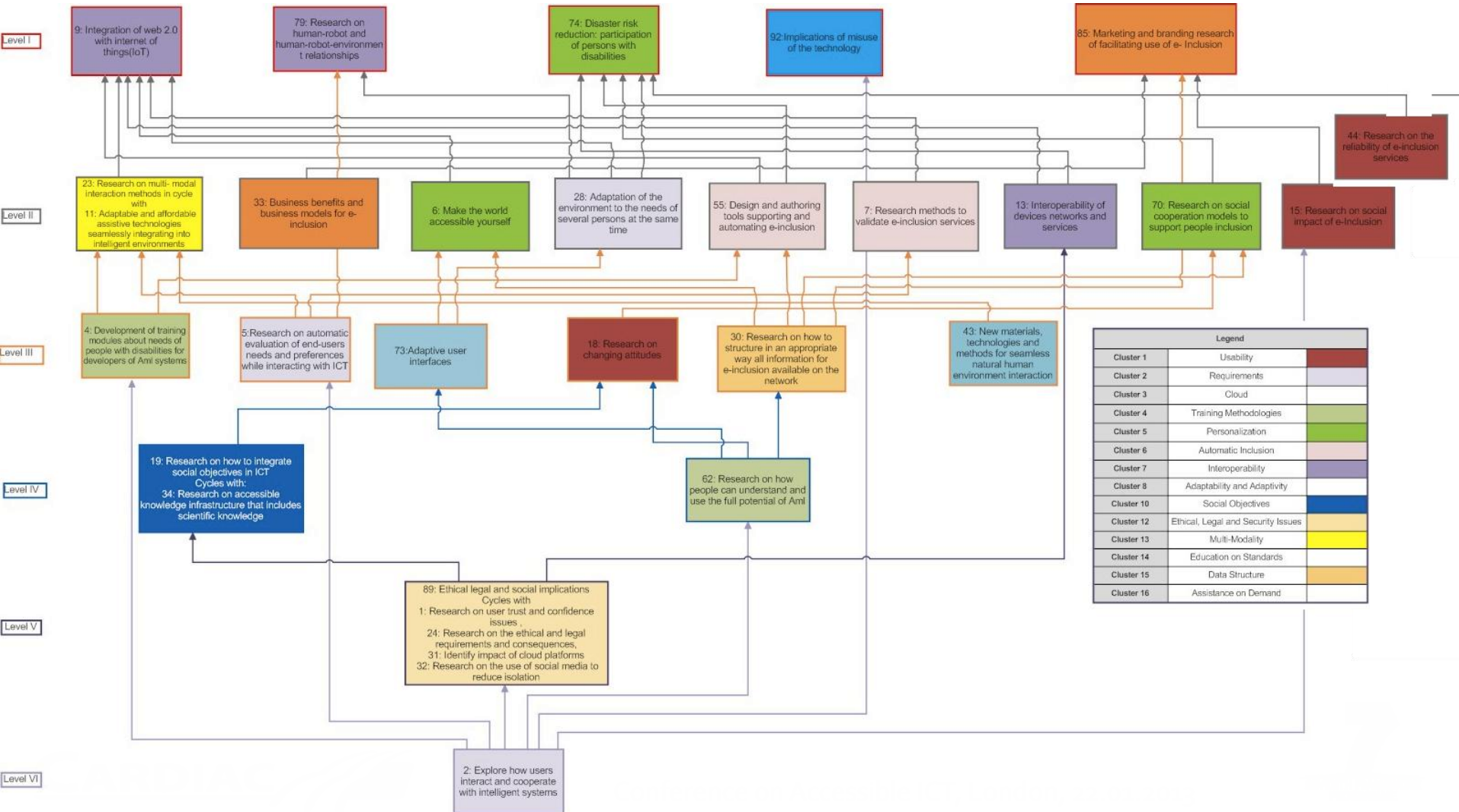
- Consultation with all relevant stakeholders
- Structured process for generating influence maps known as:
Structured Dialogic Design Process (SDDP)
- Three SDDP workshops held

Acknowledgements to Christakis A.N and Laouris, Y.

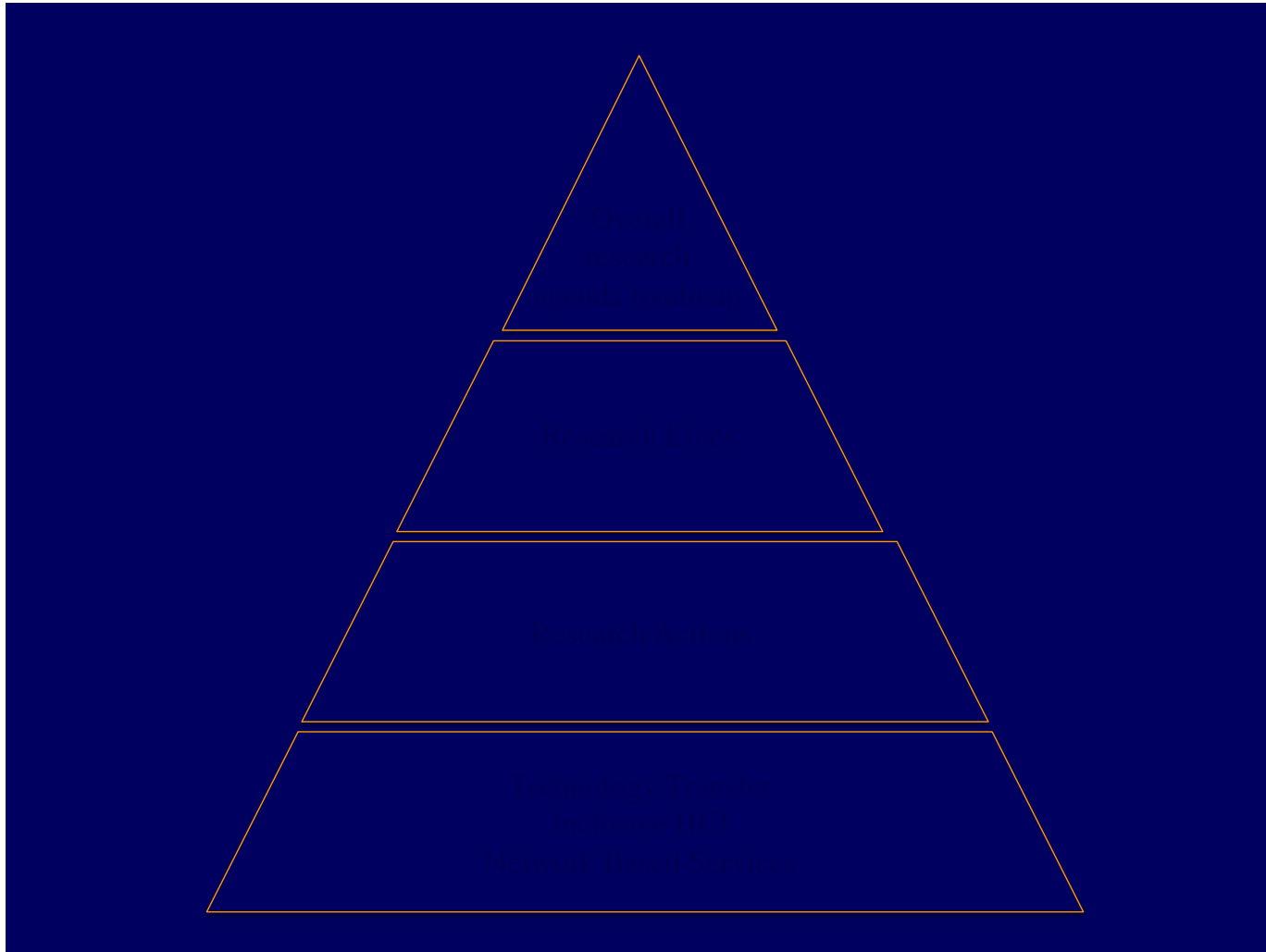
Three SDDP Workshops

- SDDP1 on Technology Transfer, Triggering Question: “What mechanisms would ensure successful technology transfer in accessible and assistive products services”
- SDDP2 on Inclusive HCI, Triggering Question: “What type of research is missing that could facilitate development of inclusive HCI”
- SDDP3 on Network-based services, Triggering Question: “What research actions should be supported in network infrastructures and services to facilitate eInclusion”

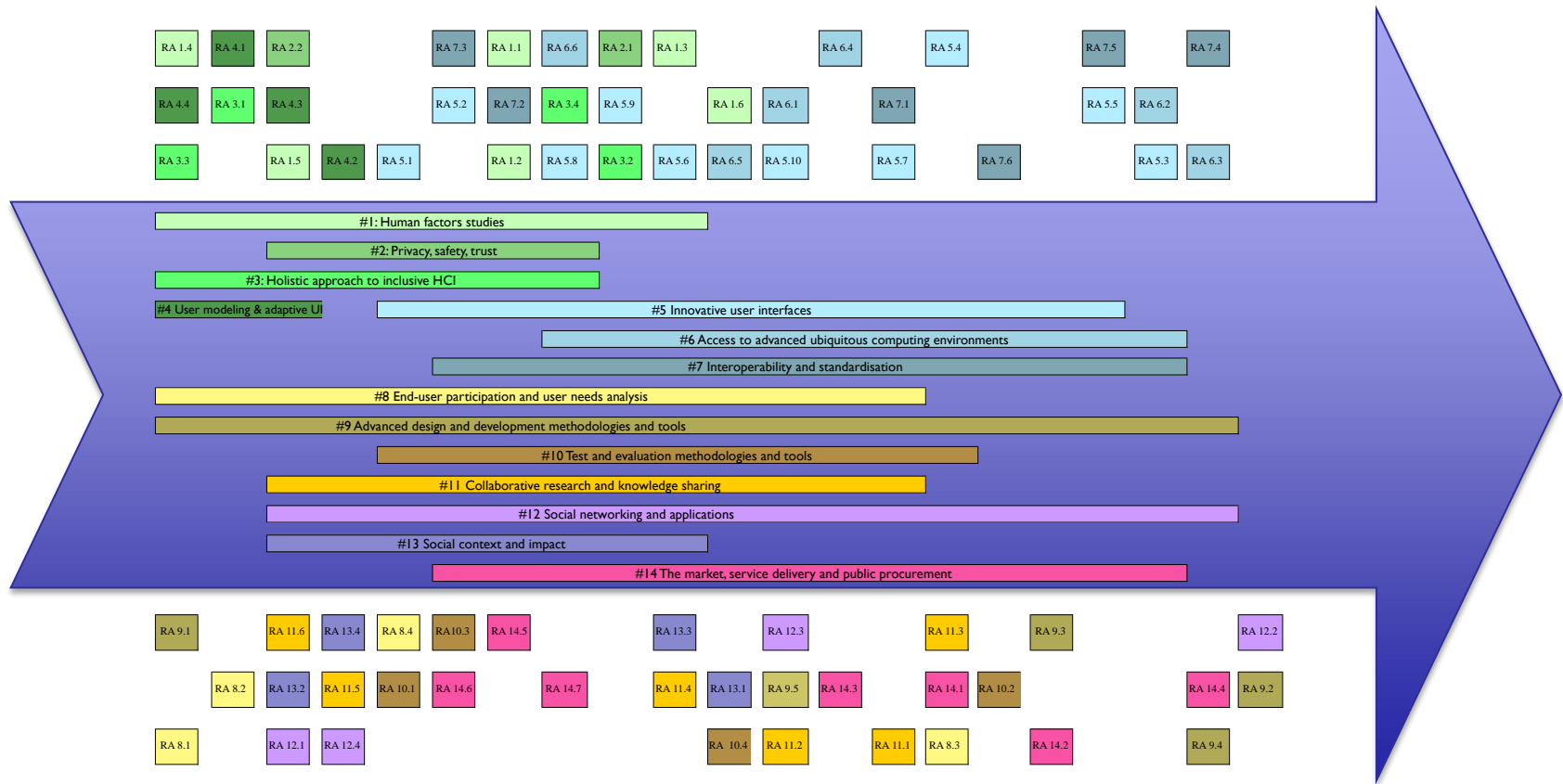
INFLUENCE MAP-SDDP₃ on network-based services



CARDIAC Roadmap structure



CARDIAC Roadmap



WP4

Trends on Inclusive Network-based Applications

Triggering question:

What research Actions should be supported to exploit emerging infrastructures and services to facilitate eInclusion?

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WP4: Objectives and rationale

➤ Objectives

- To study the advancements in network services and applications both in general (Web2.o, Semantic Web etc.) and from the perspective of eInclusion (WCAG2.o, support services, etc.)
- To point out research and developments activities favouring eInclusion though the use of network services and applications

➤ Rationale behind the discussion

- Materialization of the Information Society as some form of Ambient Intelligence (Aml) environment, where intelligent objects will offer functionalities, i.e. combinations of services, meant to facilitate independent living and social inclusion
- Accessibility guaranteed by activities in the HCI environment: emphasis on usability and usefulness

Research line 12:

Social Networking and applications

- Present situation: the Web from a repository of information is becoming
 - A virtual space where people can meet, discuss and cooperatively produce information
 - A Web of services, where service providers or users themselves can make available services and applications addressing different aspects of access to information and interpersonal (also group) communications
 - A Web of Things: people are immersed in a virtual environment where machine intelligence and human intelligence may be available to help them
 - A Semantic Web, where meta-information can allow agents to reason about its contents
- A carefully planned cooperation of machine intelligence in the environment and human intelligence in the network can be an invaluable support for inclusion of people

12.1: Use of social media to reduce isolation

- Rationale
 - Emerging experience of services available in the Web 2.0 environment
 - Knowledge about human relations mediated by technology
- Available possibilities for reducing exclusion, e.g.:
 - By offering a virtual space where people can share multimedia information (i.e. text, images, video) that can be modified by users, thus giving them the possibility of discussing and cooperatively producing multimedia materials
 - By offering a virtual space, where people can meet, chat and discuss about problems of common interest
 - By giving the possibility to service providers of producing support services using which machines and/or human beings can support people in everyday occupations.

12.2 : An example: Disaster Risk Reduction

- Rationale
 - World trends in problems related to disaster risk reductions are more and more toward a "whole community" approach
 - "Whole community" means that all citizens must make themselves a Disaster Risk Reduction (DRR) asset, i.e. it may be not convenient that people rely on rescue specialist outside of the community
- Mobilization of all assets in the community, requires
 - Sharing of scientific knowledge on disasters
 - Participation in DRR planning
 - Participation of evacuation drills
 - Development of personal scenarios for DRR, including people with activity limitations and persons who do not understand the main language of the community

12.3: Social cooperation models to support people inclusion

➤ Rationale

- Cooperation of people mediated by a network is supposed to be useful to support inclusion

➤ Open questions in this environment:

- Are the present models of social networking suitable for supporting inclusion of people?
- How is it possible to start cooperation of people in the inclusion environment?
- How is it possible to sustain it?
- Is it possible to rely only on voluntary activities or an organised control is mandatory?

12.4: How people can understand and use the full potential of Aml

- Rationale
 - The degree of awareness, understanding and adoption of any emerging technology or service to support people is partly dependent on the degree to which end-users and their carers (both formal and informal) are able to understand the potential benefits
 - While it is clear how to show and test existing technology, the problem is more complex when technology is under development and intelligent environment where to run tests does not yet exist
- Therefore it is very important to allow users to become aware of what is under development and of the full benefits and possibilities of the ambient intelligent environments, especially when there are possibilities for users themselves to intervene directly in the design and setting up of applications

8.3: Make the world accessible yourself

➤ Rationale

- The development of web 2.0 with emphasis on social interaction, collective intelligence, and active role of users not only in producing information but also in conceiving and setting up services and applications implies that users are supposed to acquire a role in influencing the uptake of new services

➤ Possible contributions (crowdsourcing)

- Collecting and making widely available information about needs, requirements and preferences
- Contribution, through practical knowledge and, sometimes, specific technical expertise, to grant users an active role in improving accessibility and usefulness of the identified solutions

Daren C. Brabham (2008): Crowdsourcing is an online, distributed problem-solving and production model

WP3

Inclusive Human – Machine Interaction

Triggering question:
What type of research is missing that could
facilitate
development of inclusive HCI?



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Key question

- **What type of research is missing that could facilitate development of inclusive HCI?**
 - **Methodologies and tools** for inclusive HCI design, develop and market
 - **Guidelines, methodologies and tools** for automatic/manual evaluation of inclusive HC Interfaces
 - User/designer/developer/manufacture/provider **involvement** in the whole process

WP3: Objectives

- To **study** the **advancements** in inclusive HCI.
- To **gather data** from the **involved industry** about the **needs** for methodologies and tools for the **design of inclusive interaction** systems.
- To **analyse current research trends** in inclusive HCI, to **select recommendable methodologies** and **technologies**, and to **identify R&D gaps**.
- To **propose** a short/medium/long term **set of objectives** for the achievement of **inclusive HCI**.

Research line 6: Access to advanced ubiquitous computing systems

- **Rationale**
 - Advancements in ubiquitous computing allowed the design of Ambient Intelligence and Ambient Assisted Living environments that provide ad-hoc local services.
 - People with disabilities can very much profit from these services if barriers to Assistive Technology are removed and dynamically adapted user interfaces are provided.

Research line 6: Access to advanced ubiquitous computing systems

RA 6.6
New materials, technologies and methods for seamless natural human environment interaction

RA 6.4
Adaptable and affordable assistive technologies seamlessly integrating into intelligent environments

RA 6.1
Mobile technologies as access interfaces for public and private ubiquitous environments

RA 6.2
Inclusive user interaction n Aml

RA 6.5
Adaptation of the environment to the needs of several persons at the same time

RA 6.3
Integration of Web 2.0 with Internet of Things (IoT)

#6: Access to advanced ubiquitous computing systems

RA 6.1: Mobile technologies as access interfaces for public and private ubiquitous environments

- Rationale
 - Adequately adapted mobile devices, (e.g. smartphones) can be used to access local services provided by intelligent machines, such ATMs, by means of ubiquitous computing techniques.
- Focus on
 - Design tools for mobile apps to ensure accessibility
 - Basic access methods built into mobile device operating systems
 - Programming tools for ubiquitous computing
 - Guidelines for accessible mobile interfaces including the design of accessible Apps
 - Adoption of standard open middleware
 - Standards for physical characteristics (including minimum dimensions) of mobile devices

RA 6.2: Inclusive user interaction in ambient intelligence environments

- Rationale
 - A great deal of research is already dealing with “smart” environments and Ambient Intelligence technologies. It is important to focus on the user aspects involved. Research on issues related to accessible user interaction is needed, focusing on people with disabilities and older people.
- Focus on
 - Tools for accessible adaptive User Interface design
 - Methods for sharing or exportation of user models
 - Legislation to Protect users’ privacy, security and safety, as well as consider user autonomy and other ethical issues.
 - Identify where research is needed to obtain universal access in ambient intelligence environments

RA 6.3: Integration of web 2.0 with internet of things (IoT)

- Rationale
 - The development of Web 2.0 is increasing the possibility of people in being active in the production of information and new services, and in socialising through the network. The Internet of things is offering the possibility of interactions with intelligent objects that populate the living places. Careful planning of the integration of the two environments and of the functionalities made available
- Focus on
 - Development of support services in Web 2.0, including mobile environments
 - Identification of functionalities useful for people with activity limitations, with a cooperation of human and artificial intelligence
 - Introduction in the environment of modules able to reason about activities carried out by users in the environment
 - Identification of aspects that characterise the mobile environment
 - Guidelines for the integration of different environments

RA 6.4: Adaptable and affordable assistive technologies seamlessly integrating into intelligent environments

- Rationale
 - Inclusion and participation of people with activity limitations often depends on using additional technologies (including also Assistive Technologies – AT) . It is necessary that this additional technology becomes smarter, and that the environment can be easily interfaced with any additional technology that people need or want to use (e.g Aml should be able to help hearing aids to adapt to changing acoustic environments).
- Focus on
 - Identification of special technology and functionalities to be integrated in the Aml environment
 - Modelling of people, technology and their interaction to integrate in the Aml environment
 - Definition of hardware/software interfaces available in the Aml environment in order to integrate personal technology
 - Construction of Aml reasoning systems able to adapt the environment to the introduction of new technology and functionalities

RA 6.5: Adaptation of the environment to the needs of several persons at the same time

- Rationale
 - Aml will allow proactive personalisation of the living environment and exhibit adaptivity to the activities that are carried out in it in real time. It is important to adapt the environment to the needs of several persons at the same time as the entire environment is part of the interaction with the individuals in it.
 - Research is needed focusing on how to deal with multiple users.
- Focus on
 - Study of models of the emerging environments
 - User modelling techniques, able to accommodate different users
 - Reasoning systems able to mediate among the needs, requirements and preferences of different users
 - Architectures and methodologies able to integrate different functionalities even if with contradictory specifications (e.g. serving at the same time a blind and a deaf person)

RA 6.6: New materials, technologies and methods for seamless natural human environment interaction

- Rationale
 - The entire living environment will become the interface with information, remote people and control systems.
 - All human interaction channels can take part in the process: voice, gesture, expression, manipulation/touch, gaze, as well as implicit channels like emotions and health/wellness status, and their physiological symptoms.
 - A wide range of new sensors and actuators, both on-body or embedded in the environment, and of new materials will be needed for this purpose.
- Focus on
 - Modelling of multimedia interactions taking into account the available abilities of people
 - Methodologies and architectures for the seamless integration of different media addressing available modalities
 - Modules able to reason about possible contradictory needs of different people in the same environment

WP 1

Technology Transfer – How to achieve accessibility

Triggering question:

What mechanisms would ensure
successful technology transfer
in accessible and assistive ICT products and services?



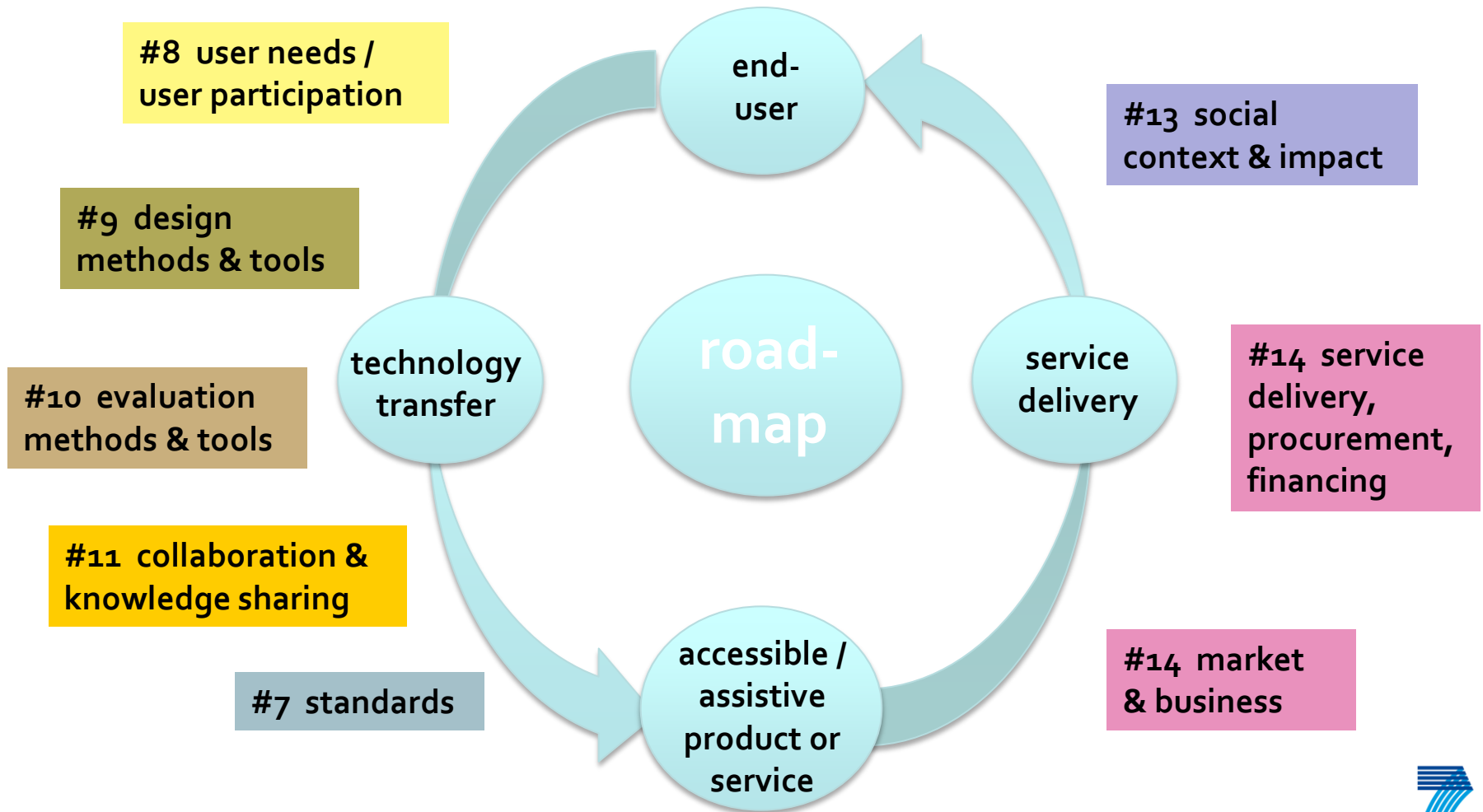
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WP1: Objectives

- To study organisational means and procedures – intra and inter – ICT developing companies to achieve accessibility of their products and services
- To study solutions for supporting developers in embedding generalised accessibility support within mainstream ICT-based products and services.
- To identify the existing supports for manufacturers or designers in bringing a proposed product or service successfully to market.
- To identify the main factors that influence how accessible and assistive ICT products are sold to consumers, in complex supply markets.

Research Lines of Technology Transfer & Service Del.



Research Line 14: Market, service delivery & public procurement

- Present situation:
 - highly fragmented market
 - different actors for accessible ICT and assistive ICT
 - different service delivery models in EU member states
 - frequently changing products (innovation)
- Goals
 - stimulated market
 - competitive companies
 - innovative products & services
 - effective and efficient social system
 - well informed and well aided, active consumers

Research Line 14: Market, service delivery & public procurement

Research line 14: The market, service delivery and public procurement

RA 14.6
Analysis of models and processes of Service Delivery and procurement

RA 14.5
Analyse supply chain and usage of existing assistive and accessible ICT inclusive failures from the users' point of view

RA 14.7
How to support / train people with disabilities to effectively demand, customize and use accessible and assistive ICT products and services

RA 14.3
Business benefits and business models for eInclusion

RA 14.1
Analysis of market potential of accessible ICT

RA 14.2
Analysis of market potential of assistive ICT

RA 14.4
Research on the marketing and branding for facilitating the use of eInclusion

RA 14.1: The Market

Analysis of market potential of accessible ICT

- Rationale
 - The potential of “design for all” approach in ICT development for industry needs to be proved from a business perspective.
- Focus
 - Accurate potential end-user data, including end-user needs, potential size of market demand, marketing requirements, service provision requirements, public procurement etc. in EU states
 - Market potential by improved accessibility of mainstream ICT
 - Human factors barriers to demand accessible ICT
 - Alternative ways of financing (e.g. from purchase to lease or renting) accessibility technology.

RA 14.3: The Business

Business benefits & business models for eInclusion

- Rationale
 - from market potential to business opportunities
- Focus
 - Business models for e-inclusion and commercial introduction of innovative accessible mainstream ICT products.
 - Models of market developments
 - Research on how to make accessibility simpler to deliver, apply, configure, support and use
 - Case studies (successful eInclusion products)
 - Increased quality and acceptability of new technology by all users, when incorporating features of interest in the eInclusion area

RA 14.7: The Consumer

How to support and train people with disabilities to effectively demand, customize and use accessible and assistive ICT products and services

- Rationale

- Strengthen the end-user to take an active role in the service delivery process, e.g. market overview, rights, application knowledge

- Focus

Mechanisms and methods – as integral part of the service delivery / procurement process – to train / inform end-users :

- to better understand/express their accessibility requirements
- about the potential and availability of assistive and accessible ICT
- to adapt and use innovative assistive/accessible ICT products

RA 14.5: Supply and Usage

Analyse supply chain and usage of existing assistive and accessible ICT incl. failures, from the users' point of view

- Rationale
 - Lack of understanding where and why ideas fall over or go wrong
 - Why are products and services not used as originally intended?
- Focus
 - User acceptance and real usage of delivered ICT aids & services and of accessible ICT-based mainstream products & services
 - Do available / delivered technical aids meet the intended purpose for the user or the user's expectations, respectively?
 - Mechanisms to assess customer satisfaction with the service delivery process
 - Effective ways to achieve the "well-informed" customer

PRIORITIES QUESTIONNAIRE

Questionnaire relating to 14 Research Lines

- **IMPACT**
- **PROBABILITY** of public funding being required
- **FEASIBILITY**

(see reference at <https://ec.europa.eu/digital-agenda/en/digital-futures-objectives-and-scope>)

More information

<http://www.cardiac-eu.org/index.htm>

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Thank you