
Coordination Action in R&D in Accessible and Assistive ICT

**Grant Agreement: 248582**

# CARDIAC

# Coordination Action in R&D in Accessible and Assistive ICT

**FP7-Coordination Action**

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## D-2.1: Technology Transfer Road-Map for WP1

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

## A Structured Dialogic Design co-laboratory

**Executive Summary**

The aim of this deliverable is to report on the first Structured Dialogic Design Process (SDDP-1) of the CARDIAC Coordination Action, which was held in Pafos between the 28th-30th of October 2010 on the theme of "What mechanisms would ensure successful technology transfer in accessible and assistive ICT products and services?"

The report describes the consultation phases leading up to the event, the three-day co-laboratory itself as well as the two virtual sessions held after the meeting in Cyprus. An initial analysis of the results and road-map is presented. These results and road-map will be taken up and further analysed by WP1 and will form part of the overall analysis to be drawn up in Deliverable 1.2 "Production of Accessible and Assistive ICT systems and materials" due in month 24.

Partner CRC was responsible for the organisation of the SDDP as leader of WP1 and partner CNTI was responsible for its implementation as leader of WP2.

The CARDIAC project is funded by the European Commission under the Seventh Framework Programme. Grant Agreement number 248582.

Further information can be found at www.cardiac-eu.org and http://csiiidevelopment.wikispaces.com

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## Introduction

The main aim of the coordination action CARDIAC is to generate research agenda roadmaps and a technology transfer roadmap using the SDDP methodology.

This deliverable reports on the first such SDDP co-laboratory on the theme of technology transfer in response to the specific triggering question of "What mechanisms would ensure successful technology transfer in accessible and assistive ICT products and services?".

The consultation process held via the CARDIAC Wikispace (http://cyprus-virtual-sdd-cardiac.wikispaces.com) as well as the process for selecting the relevant stakeholders is described in Deliverable 1.1 "Report with background material needed to support SDDP-1 Meeting". This deliverable will therefore focus essentially on phase 5 of the process, i.e.:

- collection and clarification of the ideas received in response to the triggering question
- clustering of the responses
- results of the voting by participants
- structuring of the responses through exploration of the links between mechanisms
- presentation and initial analysis of the resulting roadmap.

The face-to-face part of the event lasted three days and was held between the 28-30th of October 2010 in Pafos, Cyprus. Two weeks ahead of the meeting the twenty participants were given the opportunity of submitting their initial responses to the Triggering Question via the CARDIAC Wikispace. Two remote sessions were then held after the meeting to complete the structuring using the software Elluminate Live™. The CARDIAC Wikispace was also used to gather further clarifications and analysis of the results.

A further in-depth analysis of the results will be carried out in WP1 and included in deliverable D1.2 "Production of Accessible and Assistive ICT systems and materials" due in month 24.

-Part from the SDD℠ Process (Discussion of Ideas)

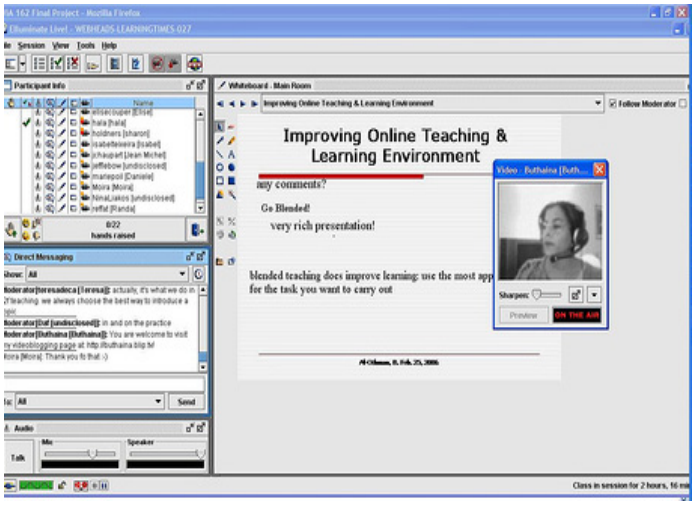
# Mechanisms that ensure successful technology transfer in accessible and assistive ICT products and services

Following the two-month consultation with the stakeholders via the Cardiac Wikispace[1], that was been put in place in order to prepare all participants about the methodology[2] and also encourage them to begin thinking about their contributions, the following Triggering Question was formulated:

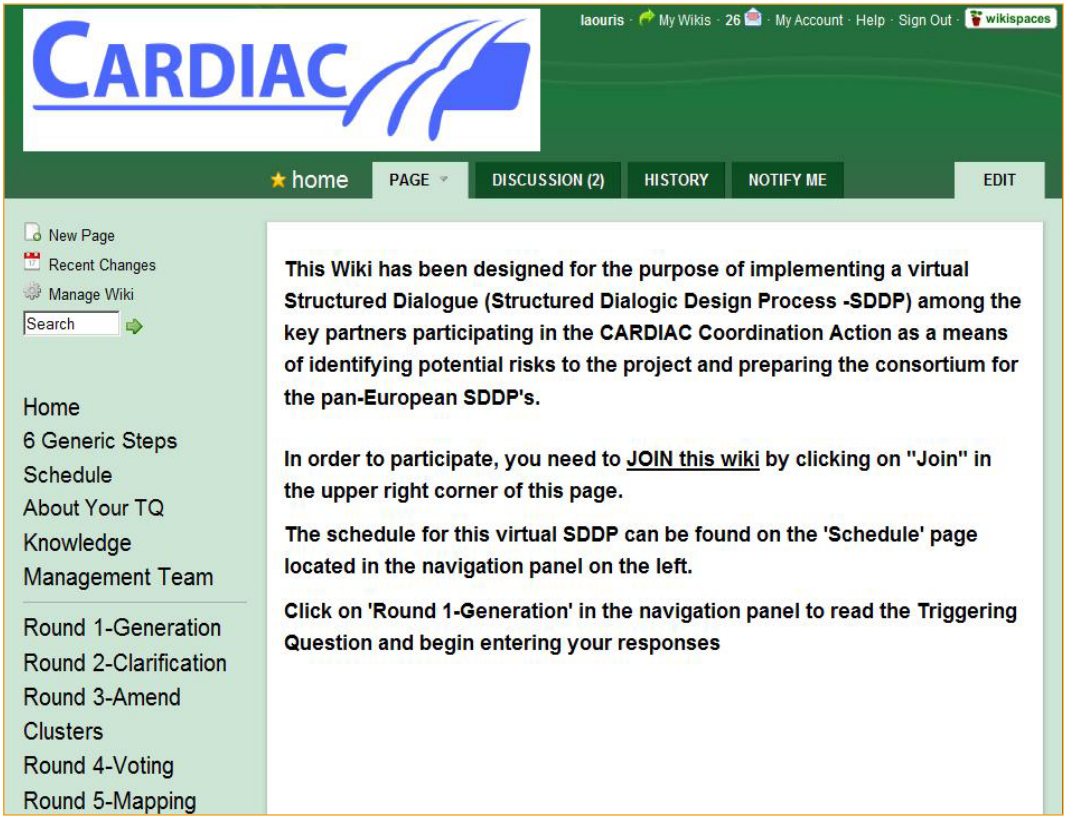
**What mechanisms would ensure successful technology transfer in accessible and assistive ICT products and services?**

During the first SDD[SM] the CARDIAC partners and participants engaged for three days in a structured dialogue focusing on the above mentioned Triggering Question. The Lead facilitator of the SDD[SM], Dr. Yiannis Laouris, served as the person coordinating the process. Cogniscope[3] Operators were Mrs. Georgina Siitta-Achilleos, Mrs. Tatjana Taraszow and Mrs. Adira Zwelling.

Two remote sessions were held after the meeting to complete the structuring using the software Elluminate Live[TM]. This web conferencing program was developed by Elluminate Inc to implement synchronous events[4]. Elluminate "rents" out virtual rooms or vSpaces where virtual schools and businesses can hold classes and meetings. This virtual space was the means by which all participants got together in order to be able to work on the virtual SDD[SM]. The image of the SDD[SM] software Cogniscope[TM] could be viewed by all remote participants; functions such as raising hand, voting "yes" or "no", video, and chatting made this virtual SDD[SM] possible. A screen-shot of this environment is shown in the next image. A video clip of the process is available on-line[5].




- Elluminate Live[TM] screenshot



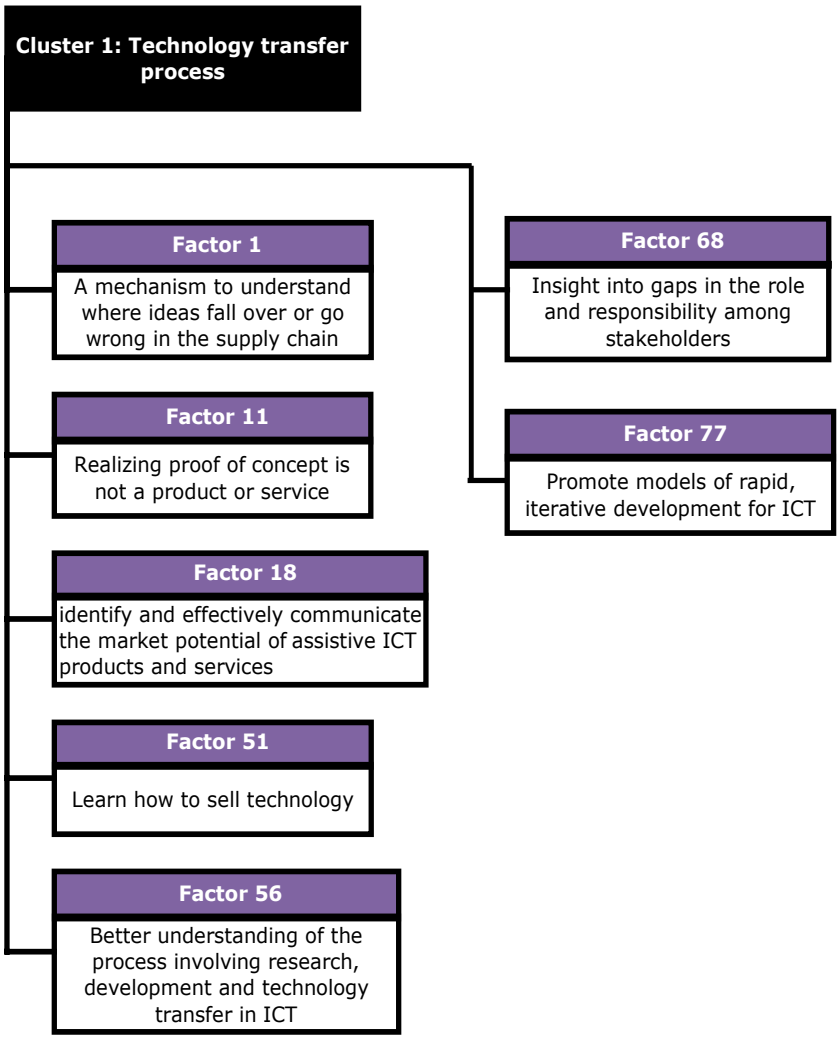

- Screenshot of CARDIAC Wikispace

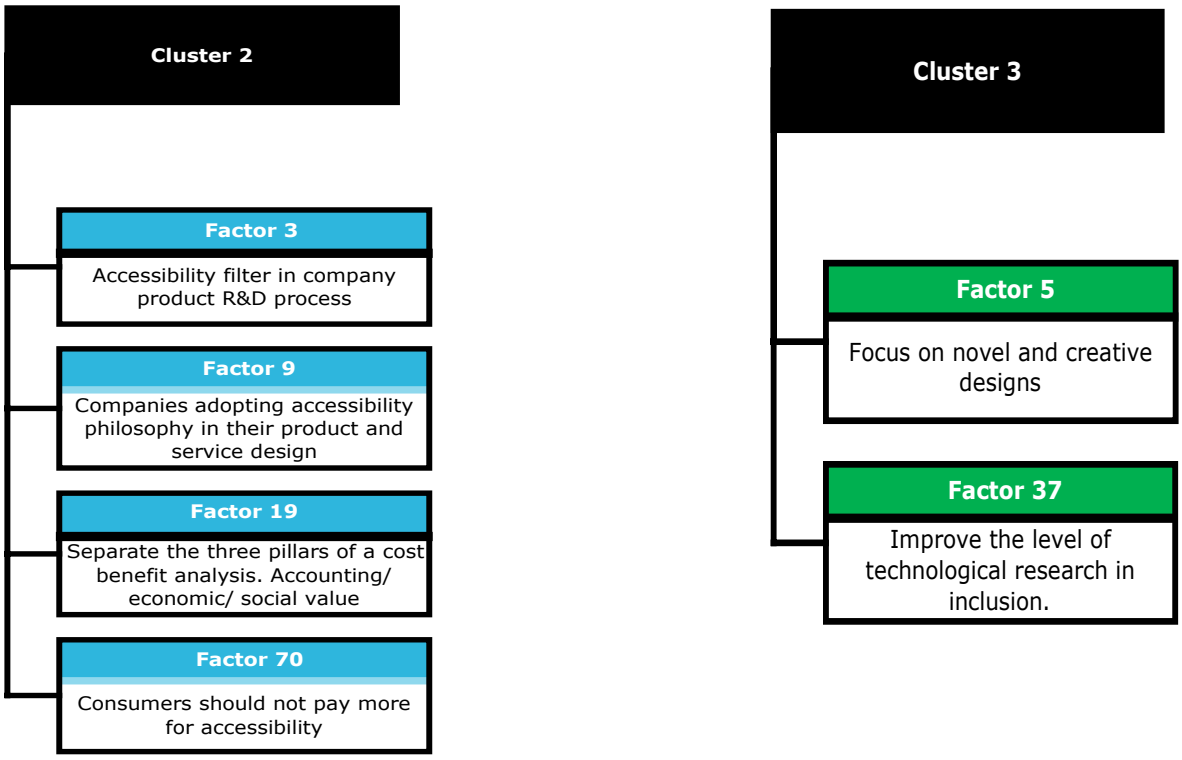
The participants of the co-laboratory shared 87 ideas/mechanisms in response to the question. Each idea appears with a detailed explanation in Table 1 - Ideas with Clarifications (p.23).

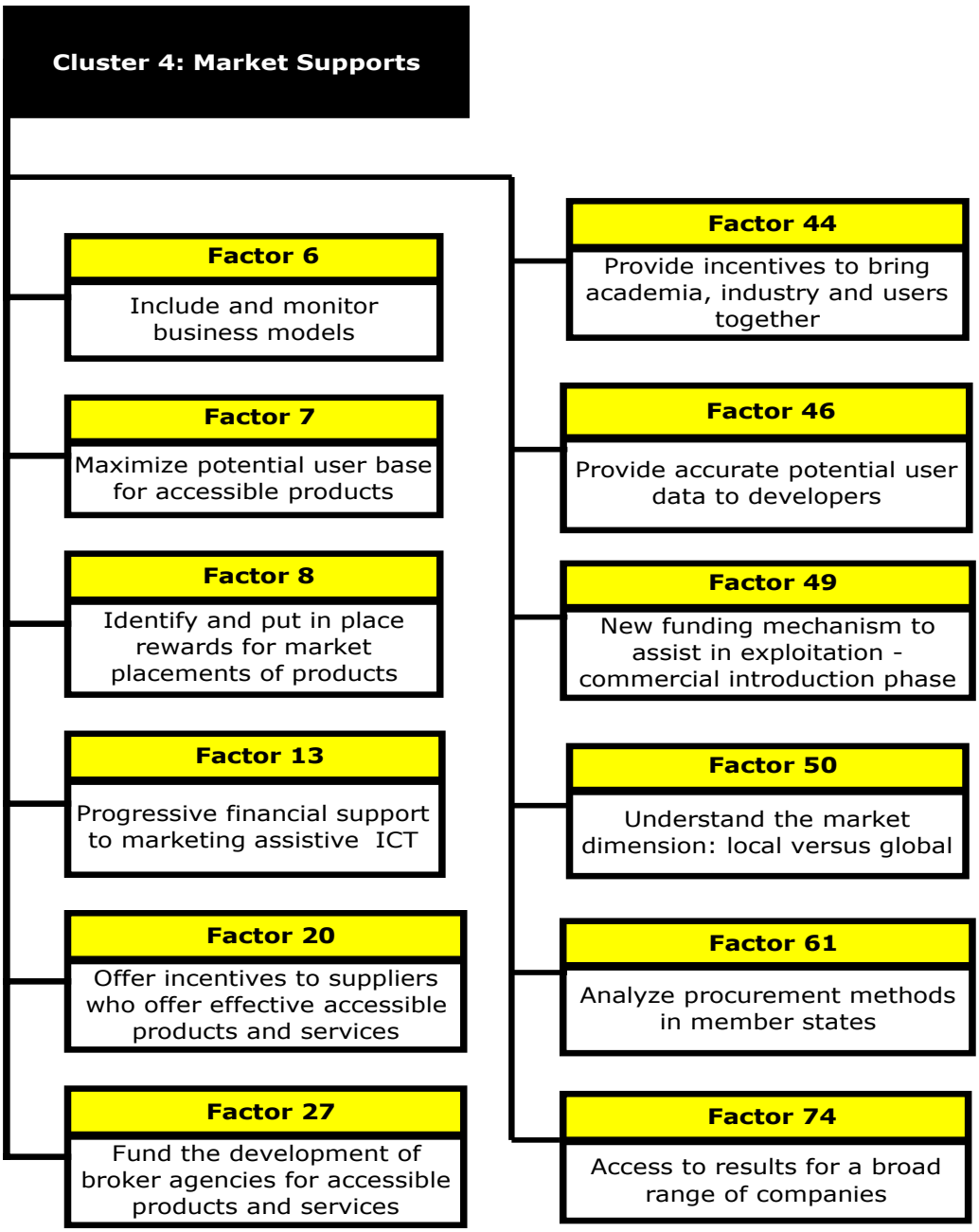
During the following stage, the participants categorized their ideas, in the following clusters:

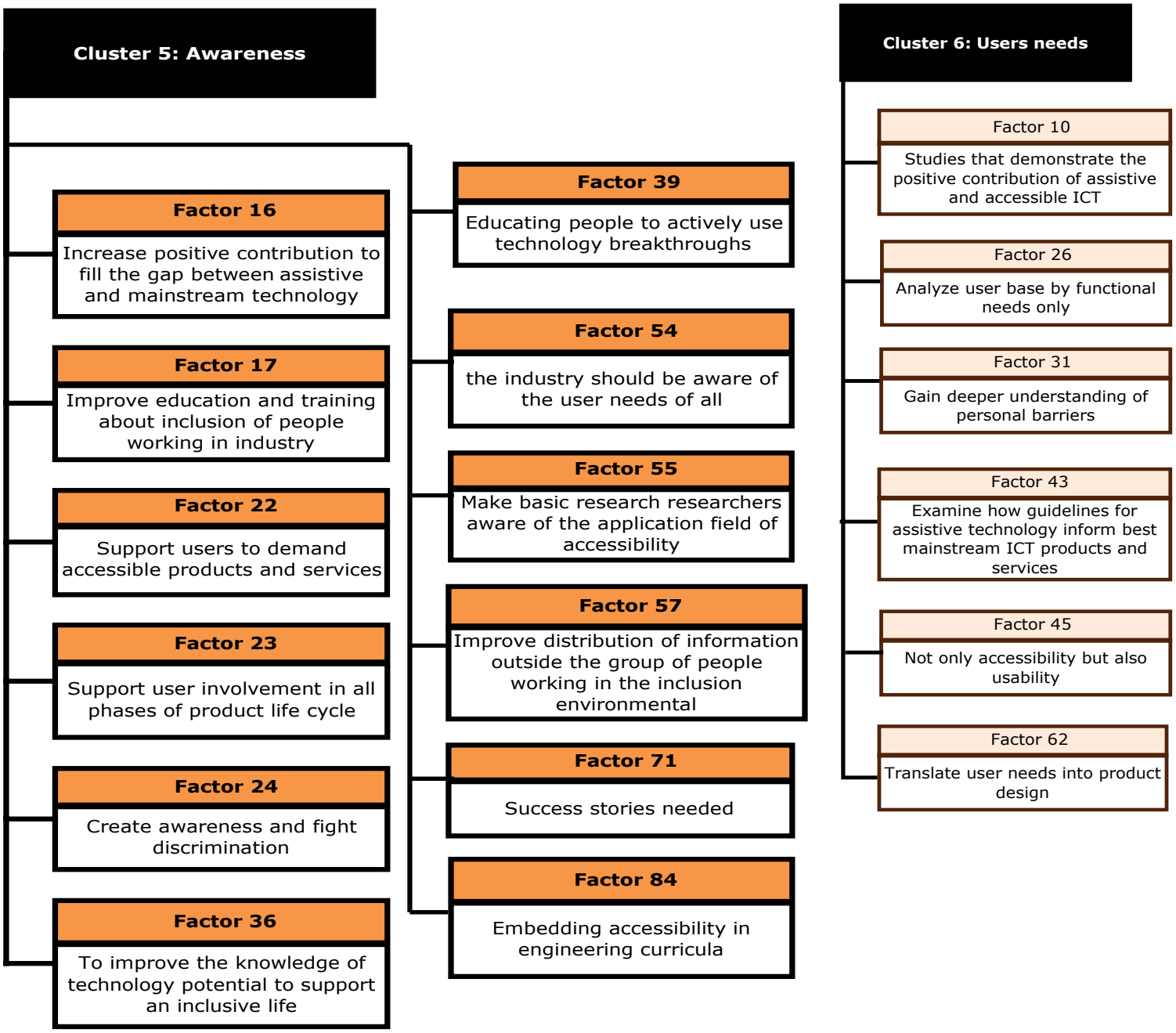
Cluster 1: Technology transfer process
Cluster 2: Consumers accessibility
Cluster 3: Future improvement
Cluster 4: Market supports
Cluster 5: Awareness
Cluster 6: User needs
Cluster 7: Technical design requirements
Cluster 8: Procedures
Cluster 9: General accessibility
Cluster 10: Target groups
Cluster 11: Policy
Cluster 12: Interconnectivity
Cluster 13: Positive monetary aspects
Cluster 14: Simplification of projects
Cluster 15: Marketing

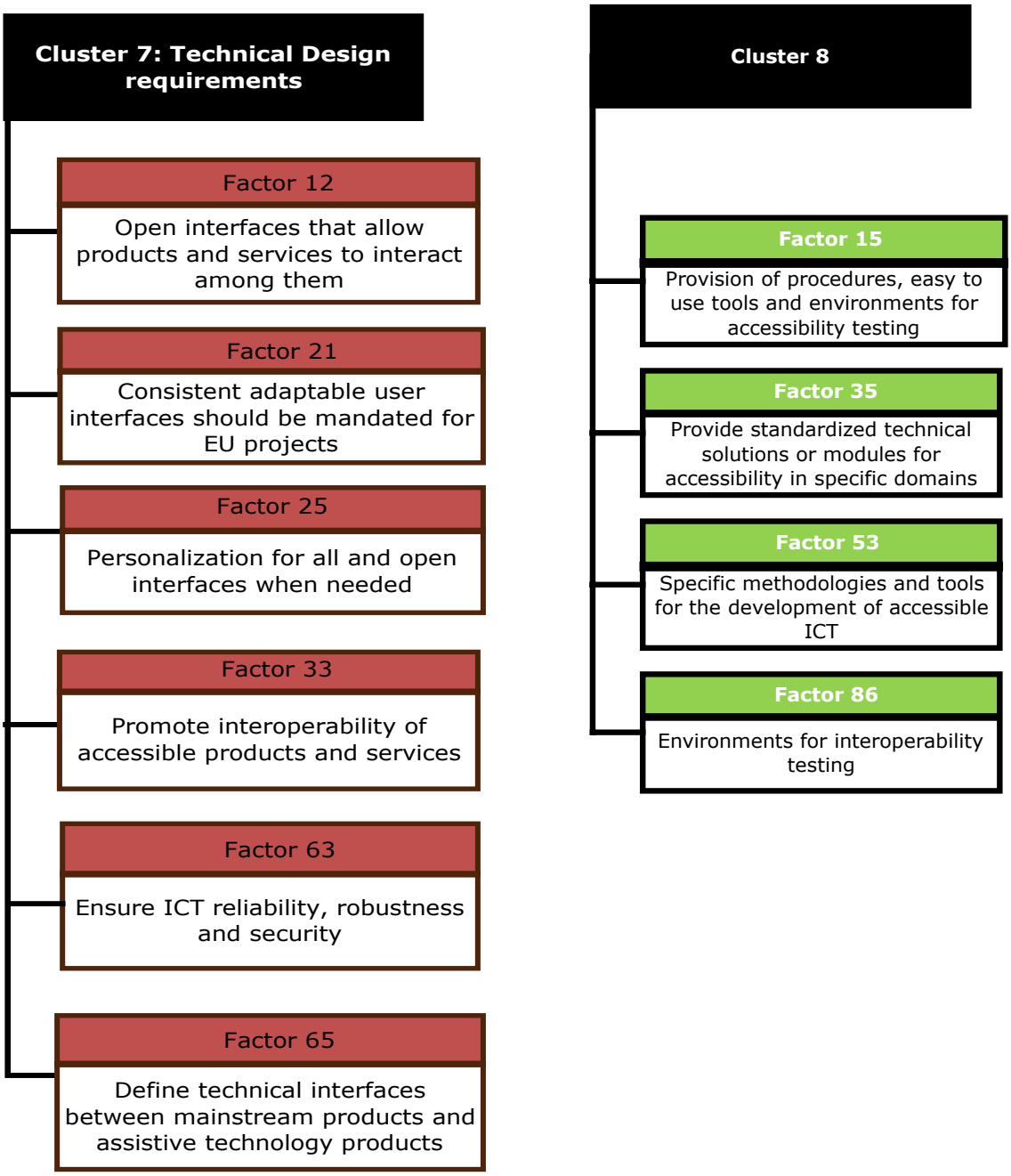
## Cluster List:

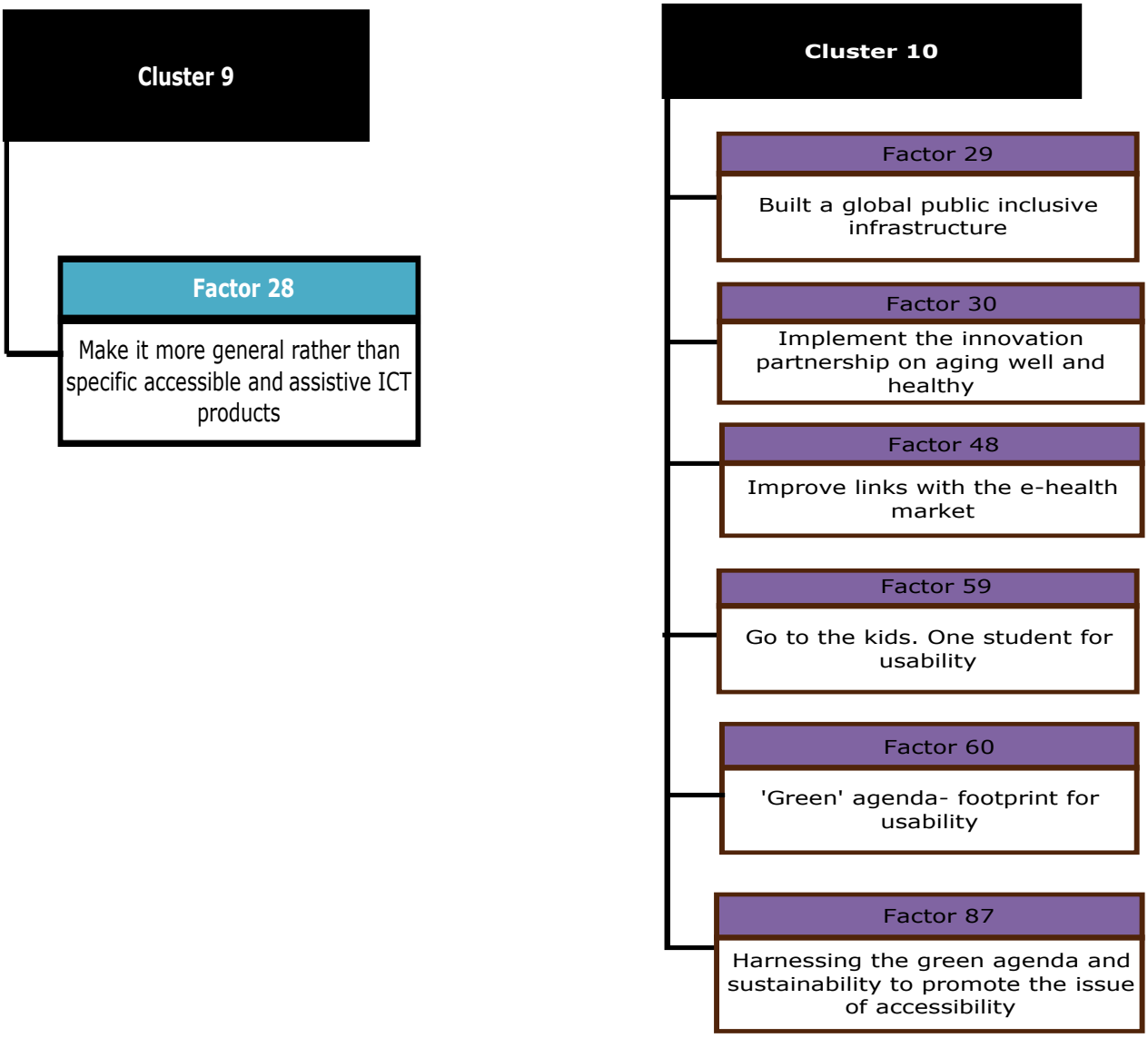


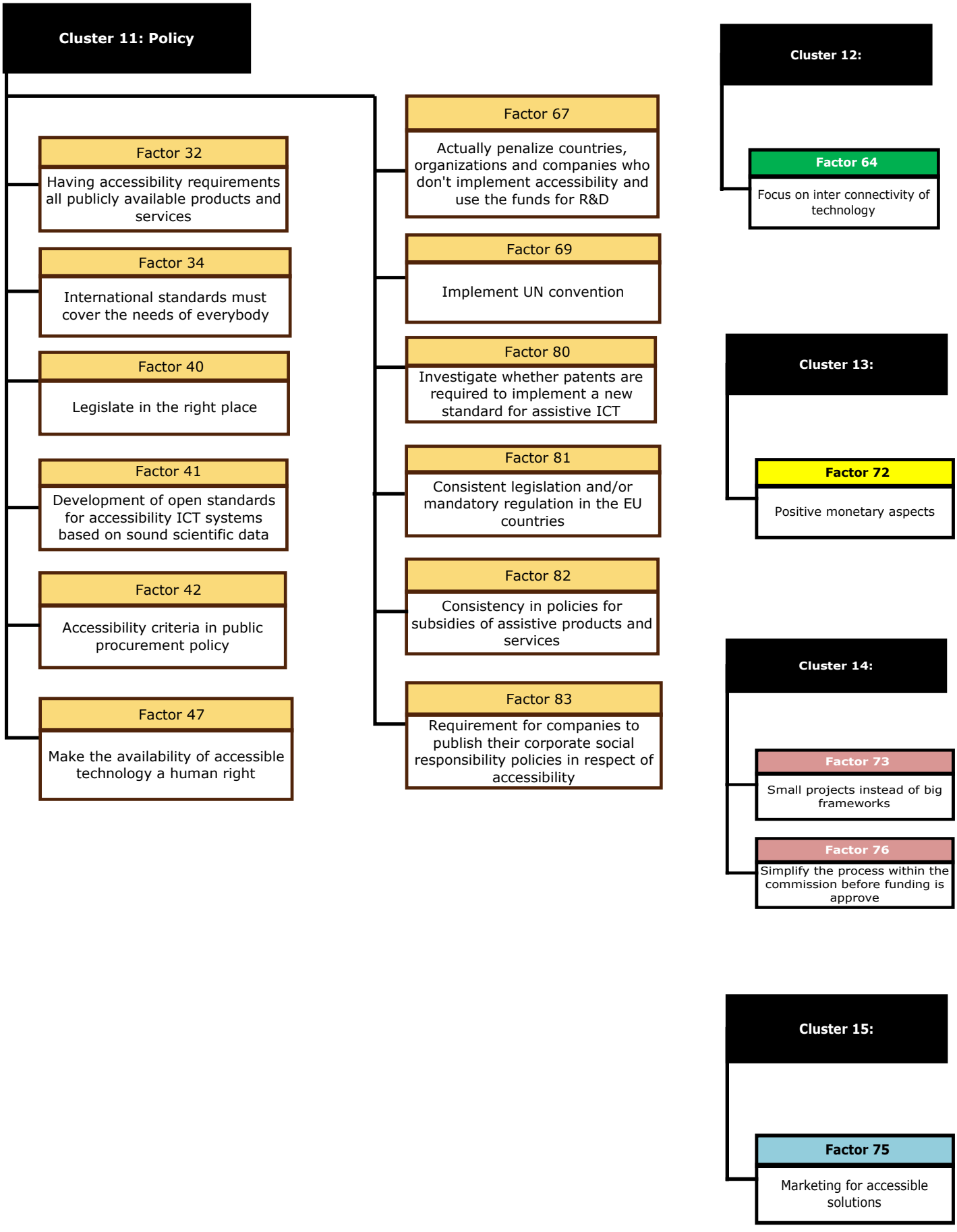




Cluster 4: Market Supports
Factor 6
Include and monitor business models
Factor 7
Maximize potential user base for accessible products
Factor 8
Identify and put in place rewards for market placements of products
Factor 13
Progressive financial support to marketing assistive ICT
Factor 20
Offer incentives to suppliers who offer effective accessible products and services
Factor 27
Fund the development of broker agencies for accessible products and services
Factor 44
Provide incentives to bring academia, industry and users together
Factor 46
Provide accurate potential user data to developers
Factor 49
New funding mechanism to assist in exploitation - commercial introduction phase
Factor 50
Understand the market dimension: local versus global
Factor 61
Analyze procurement methods in member states
Factor 74
Access to results for a broad range of companies


Cluster 5: Awareness
Factor 16
Increase positive contribution to fill the gap between assistive and mainstream technology
Factor 17
Improve education and training about inclusion of people working in industry
Factor 22
Support users to demand accessible products and services
Factor 23
Support user involvement in all phases of product life cycle
Factor 24
Create awareness and fight discrimination
Factor 36
To improve the knowledge of technology potential to support an inclusive life
Factor 39
Educating people to actively use technology breakthroughs
Factor 54
the industry should be aware of the user needs of all
Factor 55
Make basic research researchers aware of the application field of accessibility
Factor 57
Improve distribution of information outside the group of people working in the inclusion environmental
Factor 71
Success stories needed
Factor 84
Embedding accessibility in engineering curricula
Cluster 6: Users needs
Factor 10
Studies that demonstrate the positive contribution of assistive and accessible ICT
Factor 26
Analyze user base by functional needs only
Factor 31
Gain deeper understanding of personal barriers
Factor 43
Examine how guidelines for assistive technology inform best mainstream ICT products and services
Factor 45
Not only accessibility but also usability
Factor 62
Translate user needs into product design


Cluster 7: Technical Design requirements
Factor 12
Open interfaces that allow products and services to interact among them
Factor 21
Consistent adaptable user interfaces should be mandated for EU projects
Factor 25
Personalization for all and open interfaces when needed
Factor 33
Promote interoperability of accessible products and services
Factor 63
Ensure ICT reliability, robustness and security
Factor 65
Define technical interfaces between mainstream products and assistive technology products
Cluster 8
Factor 15
Provision of procedures, easy to use tools and environments for accessibility testing
Factor 35
Provide standardized technical solutions or modules for accessibility in specific domains
Factor 53
Specific methodologies and tools for the development of accessible ICT
Factor 86
Environments for interoperability testing


Cluster 9
Factor 28
Make it more general rather than specific accessible and assistive ICT products
Cluster 10
Factor 29
Built a global public inclusive infrastructure
Factor 30
Implement the innovation partnership on aging well and healthy
Factor 48
Improve links with the e-health market
Factor 59
Go to the kids. One student for usability
Factor 60
'Green' agenda- footprint for usability
Factor 87
Harnessing the green agenda and sustainability to promote the issue of accessibility


Cluster 11: Policy
Factor 32
Having accessibility requirements all publicly available products and services
Factor 34
International standards must cover the needs of everybody
Factor 40
Legislate in the right place
Factor 41
Development of open standards for accessibility ICT systems based on sound scientific data
Factor 42
Accessibility criteria in public procurement policy
Factor 47
Make the availability of accessible technology a human right
Factor 67
Actually penalize countries, organizations and companies who don't implement accessibility and use the funds for R&D
Factor 69
Implement UN convention
Factor 80
Investigate whether patents are required to implement a new standard for assistive ICT
Factor 81
Consistent legislation and/or mandatory regulation in the EU countries
Factor 82
Consistency in policies for subsidies of assistive products and services
Factor 83
Requirement for companies to publish their corporate social responsibility policies in respect of accessibility
Cluster 12:
Factor 64
Focus on inter connectivity of technology
Cluster 13:
Factor 72
Positive monetary aspects
Cluster 14:
Factor 73
Small projects instead of big frameworks
Factor 76
Simplify the process within the commission before funding is approve
Cluster 15:
Factor 75
Marketing for accessible solutions

After having clustered all their ideas, the participants cast votes for the five ideas that they each felt were most important.

The following ideas received votes:

| | | |
|---|---|---|
| Idea #17 | (6 votes) | Improve education and training about inclusion of people working in industry dealing with mainstream |
| Idea #42 | (5 votes) | Accessibility criteria in public procurement policy |
| Idea #1 | (4 votes) | A mechanism to understand where ideas fall over or go wrong in the supply chain |
| Idea #49 | (4 votes) | New funding mechanism to assist in exploitation - commercial introduction phase |
| Idea #70 | (4 votes) | Consumers should not pay more for accessibility |
| Idea #73 | (4 votes) | Small projects instead of big frameworks |
| Idea #27 | (4 votes) | Fund the development of broker agencies for accessible products |
| Idea #15 | (3 votes) | Provision of procedures, easy to use tools and environments for accessibility testing |
| Idea #62 | (3 votes) | Translate user needs into product design |
| Idea #12 | (3 votes) | Open interfaces that allow products and services to interact among them |
| Idea #23 | (3 votes) | Support user involvement in all phases of product life cycle |
| Idea #25 | (3 votes) | Personalization for all and open interfaces when needed |
| Idea #29 | (3 votes) | Built a global public inclusive infrastructure |
| Idea #13 | (3 votes) | Progressive financial support to marketing assistive ICT |
| Idea #28 | (2 votes) | Make it more general rather than specific accessible and assistive ICT products |
| Idea #82 | (2 votes) | Consistency in policies for subsidies of assistive products and services |
| Idea #71 | (2 votes) | Success stories needed |
| Idea #21 | (2 votes) | Consistent adaptable user interfaces should be mandated for EU projects |
| Idea #33 | (2 votes) | Promote interoperability of accessible products and services |
| Idea #36 | (2 votes) | To improve the knowledge of technology potential to support an inclusive life |
| Idea #37 | (2 votes) | Improve the level of technological research in inclusion |
| Idea #7 | (2 votes) | Maximize potential user base for accessible products |
| Idea #65 | (2 votes) | Define technical interfaces between mainstream products and assistive technology products |
| Idea #44 | (2 votes) | Provide incentives to bring academia, industry and users together |
| Idea #46 | (2 votes) | Provide accurate potential user data to developers |
| Idea #20 | (2 votes) | Offer incentives to suppliers who offer effective accessible products and services |
| Idea #61 | (2 votes) | Analyze procurement methods in member states |
| Idea # 3 | (2 votes) | Accessibility filter in company product R&D process |
| Idea #56 | (2 votes) | Better understanding of the process involving research, development and technology transfer in ICT |
| Idea # 5 | (1 votes) | Focus on novel and creative designs |
| Idea #10 | (1 votes) | Studies that demonstrate the positive contribution of assistive and accessible ICT |

| | | |
|---|---|---|
| Idea #11 | (1 votes) | Realizing proof of concept is not a product or service |
| Idea #55 | (1 votes) | Make basic research researchers aware of the application field of accessibility |
| Idea #81 | (1 votes) | Consistent legislation and/or mandatory regulation in the EU countries |
| Idea #53 | (1 votes) | Specific methodologies and tools for the development of accessible ICT |
| Idea #16 | (1 votes) | Increase positive contribution to fill the gap between assistive and mainstream technology |
| Idea #18 | (1 votes) | Identify and effectively communicate the market potential of assistive ICT products and services |
| Idea #50 | (1 votes) | Understand the market dimension: local versus global |
| Idea #19 | (1 votes) | Separate the three pillars of a cost benefit analysis. Accounting/ economic/ social value |
| Idea #48 | (1 votes) | Improve links with the e-health market |
| Idea #22 | (1 votes) | Support users to demand accessible products and services |
| Idea #63 | (1 votes) | Ensure ICT reliability, robustness and security |
| Idea #31 | (1 votes) | Gain deeper understanding of personal barriers |
| Idea #64 | (1 votes) | Focus on inter connectivity of technology |
| Idea #69 | (1 votes) | Implement UN convention |
| Idea #67 | (1 votes) | Actually penalize countries, organizations and companies who don't implement accessibility and use the funds for R&D |
| Idea #41 | (1 votes) | Development of open standards for accessibility ICT systems based on sound scientific data |

Out of the population of 87 proposed ideas, 47 received one or more votes. This is described scientifically by the parameter of ***Spreadthink***[4] or divergence (ST or D respectively), whose value in this case is 51% of disagreement. According to numerous studies, the average degree of spreadthink is 40%. Spreadthink is defined as (V-5)/(N-5) where N is the total number of ideas and V is the number of ideas that received one or more votes.

Based on experience we can conclude that the participants showed divergence in their ideas regarding the issue which is higher than the average. This suggests that the participants do not yet demonstrate a high amount of consensus and they might continue to interpret the issue in a different manner.

The results of the voting procedure were used in order to select ideas for the following structural process. The participants were able to structure 34 (out of the 47 ideas which received votes), The resulting "Tree of Influences" demonstrates the most influential ideas i.e. those which could be most threatening for the project. The tree or map is constituted by 7 levels of influence.

## Tree of Influences

The 'tree of influences' or roadmap is made up of 7 different levels. Three pairs of ideas are cycled together (70 and 2, 27 and 56, 12 and 29) which means that these pairs of mechanisms were found to influence each other, to receive and to exert influences from and to the same factors. It is also interesting to note the location of the various ideas according to the amount of votes received. It is often the case that the ideas that receive the most votes find their way to the top of the roadmap. This is borne out in this case where the seven ideas that received most votes are all located towards the top of the roadmap (levels I-IV). The ideas that received the least votes are more randomly located all over the roadmap.

This can be explained by the fact that the ideas that manage to encapsulate widely-held aspirations, expressing the ultimate collective aim or vision may well receive the most votes but then require other more practical issues to be resolved before they can be achieved.

The more practical ideas, which may or may not have received the most votes, are often located towards the foot of the roadmap (level IV-VII). These ideas have the greatest degree of influence and the rest of the analysis will therefore concentrate on these ideas. This phenomenon is known as erroneous priorities effect.

The collective wisdom of the participants revealed that the following four mechanisms were probably the most influential and that the stakeholders should give these a higher priority:

Level VII: 15: Provision of procedures, easy to use tools and environments for accessibility testing

44: Provide incentives to bring academia, industry and users together

Level VI: 23: Support user involvement in all phases of product life cycle

20: Offer incentives to suppliers who offer effective accessible products and services

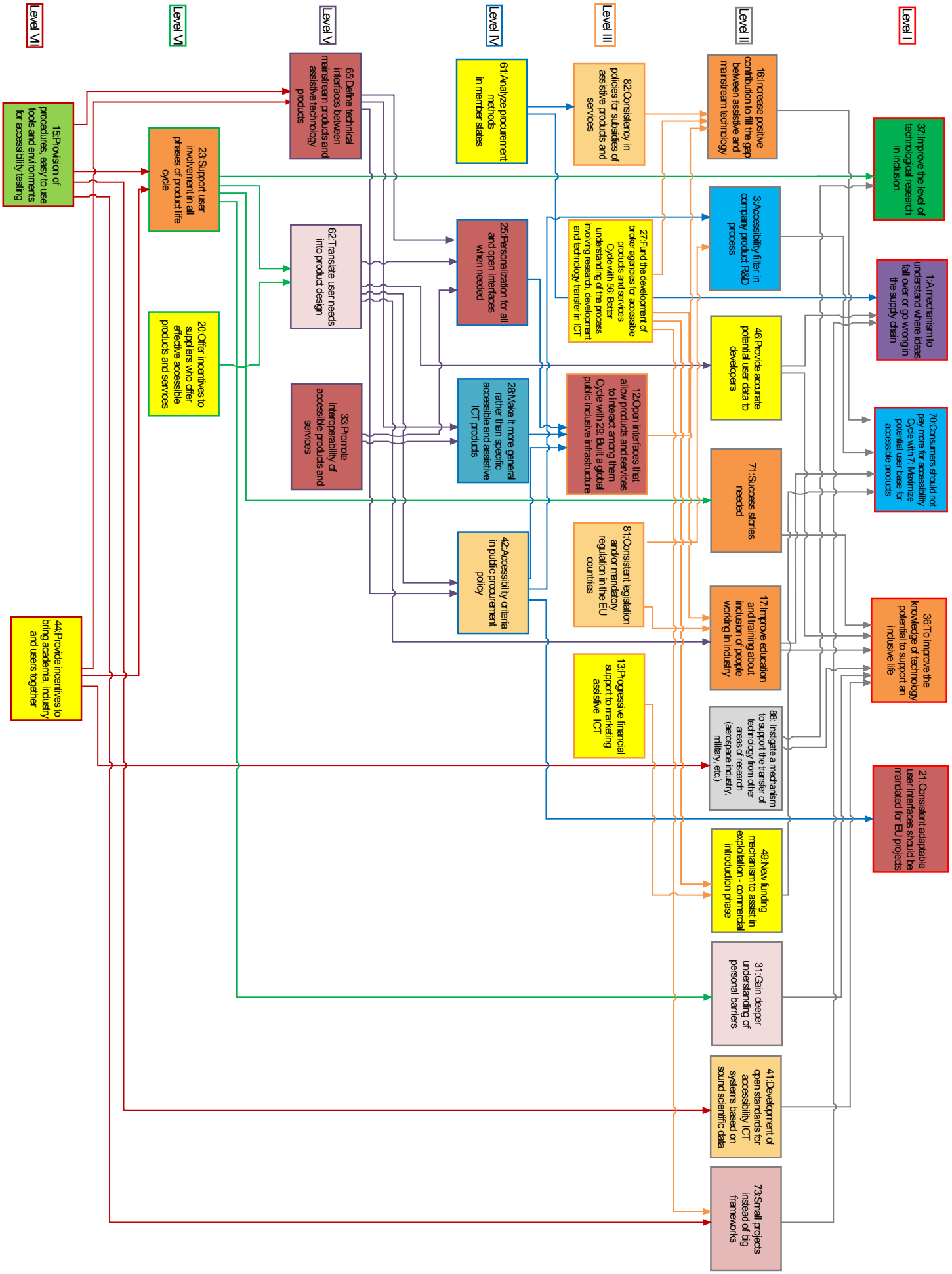
The way this tree should be interpreted is that the actions which aim to support these four mechanisms will have the greatest influence in achieving large-scale organisational change. Progress made in these four mechanisms will create a positive chain of facilitation because they are influencing directly or indirectly practically all mechanisms that lie above them.

The two mechanisms that lie at the root of the roadmap address improvements, which can take place within the 'environments' in which products are being envisioned and designed. Mechanism 15 calls for the need to have in place procedures and easy-to-use tools for testing products for accessibility.

Many companies lack the specialist skills to evaluate designs with disabled users. There is a need to provide methodologies, tools and test environments which companies can access to test their prototypes. Also they may need advice on whether their design meets any mandatory guidelines applicable in their target market. There may also be a requirement to have access to appropriate testing facilities at reasonable cost.

All too often evaluation is seen by companies as obtaining a product endorsement from a user organisation, whereas it should be seen as a method of obtaining information on how to improve the design of the product.

The problem can be broken down into three aspects. First of all the 'Accessibility' of a product/service is not a feature in its own. Instead it can be regarded in relation to the person who uses the product/service, with his intentions, capabilities and his assistive tools etc., and the conditions, environment and circumstances under which the persons uses the product/service. Therefore it is practically impossible to achieve a 100% accessibility or to make a 'complete' check or proof of accessibility. Secondly, sets of "accessibility criteria" are typically abstract descriptions of certain product/service features. The more concrete they are, the more limited or incomplete they are. However, in order to be testable or checkable the criteria need to be concrete. Usually general (requirements) criteria need to be "translated" to checkable or measurable (test) criteria. Thirdly, the test criteria tend to focus on product features, neglecting the user and the application conditions.


Level I
Level II
Level III
Level IV
Level V
Level VI
Level VII
37:Improve the level of technological research in inclusion.
16:Increase positive contribution to fill the gap between assistive and mainstream technology
82:Consistency in policies for subsidies of assistive products and services
61:Analyze procurement methods in member states
65:Define technical interfaces between mainstream products and assistive technology products
15:Provision of procedures, easy to use tools and environments for accessibility testing
23:Support user involvement in all phases of product life cycle
3:Accessibility filter in company product R&D process
1:A mechanism to understand where ideas fall over or go wrong in the supply chain
27:Fund the development of broker agencies for accessible products and services Cycle with 56: Better understanding of the process involving research, development and technology transfer in ICT
25:Personalization for all and open interfaces when needed
62:Translate user needs into produd design
46:Provide accurate potential user data to developers
70:Consumers should not pay more for accessibility Cycle with 7: Maximize potential user base for accessible products
20:Offer incentives to suppliers who offer effective accessible products and services
12:Open interfaces that allow products and services to interact among them Cycle with 29: Built a global public inclusive infrastructure
28:Make it more general rather than specific accessible and assistive ICT products
33:Promote interoperability of accessible products and services
71:Success stories needed
81:Consistent legislation and/or mandatory regulation in the EU countries
42:Accessibility criteria in public procurement policy
36:To improve the knowledge of technology potential to support an inclusive life
17:Improve education and training about inclusion of people working in industry
13:Progressive financial support to marketing asssitive ICT
88: Instigate a mechanism to support the transfer of technology from other areas of research (aerospace industry, military, etc.)
21:Consistent adaptable user interfaces should be mandated for EU projects
44:Provide incentives to bring academia, industry and users together
49:New funding mechanism to assist in exploitation - commercial introduction phase
31:Gain deeper understanding of personal barriers
41:Development of open standards for accessibility ICT systems based on sound scientific data
73:Small projects instead of big frameworks

Part of the solution could lie in:

- The provision of knowledge of test criteria (associated to requirements criteria) as well as of methodologies and procedures for testing.
- The provision of tools that support such methodologies or that directly check product features against test criteria. Ideally, some product features can be checked automatically.
- The development of test environments that could provide a suite of test tools or automated test procedures, and could simulate various environmental conditions.

The establishment of competence centres for accessibility which could provide a variety of trained test users and human accessibility experts having the methodological knowledge, the necessary test tools and test environments.

An example is the area of web accessibility, where already much work has been done, on voluntary or commercial basis, where detailed requirements and test procedures have been elaborated, where legislative actions in the EU and in many countries were taken, where a number of automated tools have been developed, and where competence centres (companies, at universities, at user organizations) have been established.

This mechanism is related to "technology transfer" through the fact that the provision of the above mentioned methods and tools is a technology transfer from accessibility experts to the mainstream ICT and vice versa: new technical developments in ICT may require new accessibility test criteria, methods and tools. It is important to include the possibility to not only check final or almost final designs but to use the facility as validation tools within the iterative design process. Here a connection can be made with the activities from mechanism 23 on user involvement.

Another important point is to have procedures, easy to use tools and environments for accessibility testing that are directed also to the actors in mainstream markets. It should be easy for the actors on the mainstream markets to realize that these tools are for them and not only for a small "bubble" of assistive technology companies.

The necessity for the simultaneous involvement and collaboration of the academia is highlighted in mechanism 44. Strengthening the education of students and increasing their awareness to this field is a crucial mechanism for success. This could be promoted through the organisation of seminars and invited lectures with end users, mostly in relevant faculties such as architecture, industrial design, bioengineering, computer sciences and with the participation of people with disabilities. Bridging the gap between industry and users could be achieved by not only providing really strong incentives necessary to attract the industry but also by creating an environment highlighting possibilities to make profits, by implementing a first step and building on it over time. Another approach could be to implement an IPR policy that provides clear rules and guidelines for the commercial exploitation of IP generated either within a university or research institution or by an industry stakeholder. Establishing ownership criteria and rules for income-sharing and defining responsibilities and obligations for all stakeholders could ensure the protection of intellectual property and safeguard work of each stakeholder organisation. A further possibility would be to strengthen a variety of -in many cases already available- financial incentives ensuring equal participation of all stakeholders but also aiming to empower weaker parties in the equation (i.e. user groups in contrast to large corporations, etc).

Mechanism 23 calls for the importance of engaging the end-users in all phases of the product life cycle. This issue is already being addressed. For example, there have been a number of EU projects dealing with methods of user requirements analysis and user evaluation, guidelines for user involvement in R&D projects, training of users for an active involvement in R&D projects, training of users for an active involvement in standardization processes.

Various methods for simulating disabilities have also been developed; these have been useful despite their limitations but they are not the complete solution. Having direct contact with a range of people with disabilities is a better, even if time consuming, approach. Working with people with intellectual impairments may require members of the design team to learn new communication skills.

There is also still a need to educate organisations representing people with disabilities as to what can be technologically achieved and the related costs. This is a particular problem in the area of fast changing mainstream technology such as smart phones and cloud computing. Also these organisations seldom participate in discussions on priorities for future research since they lack people with the skills to understand the potential of new developments to help people with disabilities.

Knowledge therefore continues to be one of the important factors. It seems that there is already much knowledge on user involvement, but is there enough meta-knowledge (knowledge on knowledge) concerning user involvement and are all the stakeholders aware of the existing knowledge, do they know where to find it and do they know how to apply it? Another issue is how important are the issues of "user involvement" and "design-for-all" in European ICT projects outside the AT-related R&D projects? Training and mentoring is also an important aspect and should be part of the package.

The fact that this mechanism figures prominently at the foot of the roadmap indicates that this continues to be a key issue and that there is an ongoing need for measures to support the generation, provision and inter-disciplinary exchange on user knowledge and experience in the product development life cycle. If some of the previous attempts have not been wholly successful this doesn't mean that it won't work in future. It is necessary to re-evaluate the methodologies and try again.

Mechanism 20 expresses the need to offer incentives to suppliers who offer effective accessible products and services. Experience has shown that it is often difficult to attract large enterprises to collaborate in funded projects as they are often see it as a distraction from direct project work, they often have to contribute a large amount, either in cash or in-kind and they often have to licence the technology to take to market as the SMEs often hold the new IPR. There is also a perception that funded projects are a non-direct route to market which is an additional disincentive.

It may be useful, therefore, to offer other incentives such as tax breaks, tax/innovation credits, reduced VAT on items purchased as part of an R&D project, lower National Insurance contributions for the work carried out by staff on R&D projects, etc. However, this could be an administrative nightmare to implement in a manner that companies do not find loopholes to claim the benefit while not investing in accessibility.

Other incentives could include "Grants for Research and Development" which could help SMEs to develop ideas and sub-contract Universities and other research institutes to carry out research on their behalf. Such grants could be given as a "loan" at very favourable rates or non-refundable payments if certain criteria are met, e.g. the company proving that they have made their products and/or services more accessible.

The next level in the roadmap that exerts great influence is Level V with the 3 mechanisms:

62: Translate user needs into product design

65: Define technical interfaces between mainstream products and assistive technology products

33: Promote interoperability of accessible products and services

Idea 62 is somewhat related to idea 23 below it. Nevertheless, it addresses a slightly different perspective. Experience teaches us that the mere involvement of end-users in the phases of production is not sufficient. Users are not always able to articulate their needs or to know what is readily available that could improve a proposed product or what is in principle possible. Moreover, users find it difficult to imagine how their input could be taken into account and how it will be translated into a real product feature.

This underlines an inherent difficulty for designers to capture user needs and turn them into a set of meaningful design specifications that can be readily implemented and checked by the industrial design team.

An example could be the raised dot on the 5-key of mobile phones. From the user requirement of being able to identifying the various keys on a mobile phone, it was possible to define the specifications of a raised dot on the 5-key. However, such examples are relatively hard to find and this mechanism is therefore considered to be far from being resolved.

A typical problem is the designer of a new smart mobile phone wanting detailed specifications of what he should do to make it 'accessible' (this includes the hardware, resident software as well as downloadable applications). Typically there is no complete prototype before it goes into production (but there is a computer simulation). Defining what is 'accessible' for someone with a mild intellectual impairment is far from trivial.

One important point when translating user needs into product design is to set up guides that do not hinder further design development over time. User needs change in a changing society and new technical possibilities makes it possible to meet the needs in a more useful and intuitive way with good design.

One way of achieving this could be through a set of "best practices" that could change over time. It cannot be limited to present "best practice". If someone wants to base a design on new thinking that is promising it should also be a way to translate user needs into design.

It is also important that the users are heavily involved in testing out new products before they are taken to the marketplace. Thus, many potential problems may be identified and corrected at an early stage.

The other two mechanisms in Level V address the need to make products and services more compatible and interoperable with each other. For publicly available systems and services consumers expect the user interface to work in a consistent manner. For example a card used for ticketing on public transport may also have the capability of being used to pay for low value purchases; the consumer expects the process of using the card for the two services to be similar (including the audio signals relied on by the blind users).

The ability to adapt the user interface to suit individual preferences would make terminals easier to use by a significant number of people. These preferences could be coded on the user's card or stored in the network. For example, the European standard EN 1332-4 specifies how to code user preferences.

One limitation is the reluctance of designers to provide standard interfaces to permit disabled users to connect an assistive device to a mainstream product. This reluctance seems to come from the lack of a business case for the increase in cost of providing such an interface if it is perceived to be solely for use by disabled people. However a number of companies are developing systems to permit customers to use a mobile phone handset to access a terminal; this is primarily perceived as increasing the potential number of customers even though it could significantly help some disabled users.

For reasons of space it is not possible to continue the analysis right up to the top of the roadmap. The analysis will therefore conclude with a discussion relating to two of the mechanisms on Level IV, mechanism 28 and 42.

Mechanism 28 addresses the issue of designing accessible and assistive ICT products and services as more general mainstream technology rather than technology that is specifically for elderly people or people with disabilities. The idea behind this mechanism is that in order to improve image, increase market and enhance technology transfer and to avoid any 'Gerontophobia', assistive ICT products and services should be established as part of a general concept such as 'smart technologies', 'smart home', 'smart environment', etc, rather than as a discrete sector (technology) that is aimed at the elderly population or people with disabilities.

Another possibility would be to incorporate assistive ICT as part of the growing sector of E-healthcare services and technology. A third possibility would be to integrate it as part of developing approach of personalized medicine/ personalized services. Current trends in medicine, science and even design are moving towards the concept of tailoring to specific needs of special populations. This includes children and adolescents, women (e.g. pregnant women), people with extraordinary ergonomics, and naturally elderly people and people with disabilities would fall within these subgroups.

Mechanism 42 addresses the issue of accessibility criteria in public procurement. There are two particular ways in which policies on public procurement can be expected to influence the availability of goods and services that are accessible to people with disabilities and older people. Firstly, there is the direct result when the required accessibility features are demanded by the purchasing authority within the terms of contract. Secondly, there is an indirect effect through which the purchasing practices of public bodies have an influence on wider product design in the relevant industries. The magnitude of this indirect effect will vary because of differences in national purchasing approaches.

Public bodies that need to buy goods and services, whether it is for general purposes or specifically to make provision for people with disabilities, will tender for their supply. The tender documents will usually be accompanied by a technical specification that describes the required product and forms the basis for the ensuing contract. Any accessibility features that are needed will be detailed in the specification, using published standards where they exist. In the European Union, there is a clear obligation to use European Standards where these are available, and there is also a clear requirement to consider accessibility in all public forms of tendering. When tendering for ICT equipment, to take one example, it is common practice to buy a service package rather than just the hardware, so that maintenance and updating is included in the same contract. Nevertheless, the accessibility requirements can still be set out in the contract, although this may mean that they are provided to specific need rather than being incorporated in all of the equipment delivered. This customised approach may be particularly valuable in respect of telephone extensions on private branch exchanges.

Some purchasing bodies, particularly the FCC in the USA, have a policy of purchasing only standard commercially available items, but at bulk prices. This has the effect upon the market of encouraging all manufacturers to incorporate all the required accessibility features in their products, for otherwise they would not be eligible for that purchaser's contracts. In other instances suppliers are free to design and manufacture to the contract specification, or to modify a production design by adding or removing features so as to meet the specification at a competitive price. In these cases the public purchasing will have less influence on the general availability of accessibility features and it is not unknown for a product that incorporates certain features for one market-place to have them removed in another. The rationale for this is presumably to make savings in cost, weight or power consumption.

These comments upon public procurement may be applicable beyond the public sector. Large private sector organisations which operate a central procurement facility can achieve similar results in creating awareness and influencing behaviour among suppliers. If these organisations find that they need accessibility features to enable recruitment and retention of employees with disabilities, especially where that is a feature of national equality legislation, their purchasing practices will be a powerful influence upon the design of equipment and services.

An inherent problem with this approach is to define what is 'accessible'. In practice some features which make a product or service accessible for one group are detrimental for another group of potential users. Procurers and suppliers are looking for simple measurable features which deem a product to be 'accessible'. Section 508 attempts to do this, but we need a better way of specifying the 'accessibility criteria'. Once this is done, procurement policy would significantly influence the technology transfer process.


- Part of the SDD[SM] process (Idea Generation)

## Conclusions

In the following paragraphs the conclusions are discussed from three different perspectives: (a) conclusions with respect to the identification of the mechanisms that ensure successful technology transfer in accessible and assistive ICT products and services; (b) conclusions related to the applicability of the SDD[SM] process; and (c) conclusions regarding the outcomes of the implementation of the SDD[SM] process.

The application of a virtual SDD[SM] used after the meeting in Pafos (some phases implemented face-to-face and some virtually using IT communication tools) is relatively new in the literature. The authors have some experience from previous applications[5,6,7,8,9] and what can be said is that these additional remote structuring sessions proved very helpful and constructive in completing the structuring of the roadmap. However, it has to be said that it would be more difficult to run these remote sessions without the participants having had a face-to-face session first or at least being familiar with the methodology. It is definitely a tool that could be used for the drafting of the next two research agenda roadmaps.

With respect to the goals of the co-laboratory from the perspective of the implementation of the SDD[SM] process, the following is noted:

1. A list of 87 ideas was generated in response to the Triggering Question. This is considered satisfactory, since the average reported in the literature is 64.

2. The ideas were clarified and discussed throughout the SDD[SM], thus enabling participants to achieve a better understanding of the views of other members and greatly expand their own and others';

3. The ideas were clustered in 15 categories in an interactive manner, thus providing opportunities for further and deeper clarifications of salient distinctions between separate ideas. The process is crucial for what we call "evolutionary learning" (i.e., during the process participants "lose" connection to their own personal ideas and stereotypes in favour of a collective, and shared thinking);

4. Participants voted for 47 of the ideas that they considered most important. They subsequently managed to "structure" 34 of these ideas and produce an influence map;

5. The influence map produced in response to the Triggering Question, containing 34 ideas in the form of the Tree of Influence or roadmap comprised of 7 levels;

6. The participants had time to discuss and reflect on the influence map and in general agreed that the arrows in the map made sense to them;

7. More importantly, the structured dialogue process empowered the consortium team to identify the most influential mechanisms in the technology transfer process and to assign to different members the role of carrying the discussions forward via the CARDIAC Wikispace and starting the analysis of how implement the various mechanisms.

In sum, the application of the SDD[SM] process supported the Consortium to identify potential mechanisms that ensure successful technology transfer in accessible and assistive ICT products and services.

The issue itself of technology transfer in the field of accessible and assistive ICT product and services is a very complex issue involving a wide range of stakeholders from many different areas. The results show that the SDD[SM] methodology is well suited to this kind of multi facet problem with interconnected issues where it can be a useful tool to harness the collective wisdom of a wide range of stakeholders and bring new perspectives and approaches to a given problem. Of course the methodology itself will only generate the raw data in the form an 'Influence Tree" or roadmap and further input and analysis is needed from the participants to find a way forward. The possibilities of using such a tool with a complex triggering question and the initial analysis can form a basis for the continuing discussion of how to improve technology transfer in the area of accessible and assistive ICT product and services.

## Table 1: Ideas with Clarifications

**Cluster 1: Technology transfer process**

1: A mechanism to understand where ideas fall over or go wrong in the supply chain
A mechanism to understand where ideas fall over or go wrong in the supply chain interested in understanding why great ideas fail. I drew up a mini supply chain: is it user driven in user needs? Is there a common set or rules to apply in the supply in the chain? Procurement= User need/requirement, market pull/push it, supply chain (LE takes idea to market?), manufacture, development/prototyping, R&D. Identical to Idea #79.

11: Realizing proof of concept is not a product or service
At the start of the technology transfer process often only proof of concept is available. For some people this might be the end point but it is actually a beginning. There must be a clear approach on how to move forward from the initial idea to a product/service. 'Don't stop when the baby is born'.

18: Consistent legislation and/or mandatory regulation in the EU countries
Very often, mainstream industry does not realize the real market potential and the wide user base of accessible and assistive ICT products and services. If this is identified and communicated to the industry, it will increase their active involvement in the process of turning a concept/research prototype to a successful product/service.

51: Learn how to sell the technology
If you are able to see the benefit, how to use it will be easier o reach the end users. A different mindset is needed. Developing something and selling something are two different types of expertise. Articulating the (added) value of what is available can positively influence the technology transfer.

56: Better understanding of the process involving research, development and technology transfer in ICT
To pay more attention to transition phases between them research development and technology transfer which are in many cases critical issues, sometimes not observed by the same perspective by all people involved. A better description of the process is needed in order to identify critical issues.

68: Insight into gaps in the role and responsibility among stakeholders.
Not one single stakeholder can do it all cooperation is necessary. More complex than a blue-ray player and a disk that can be played on that.

This area is far more complex, dynamic group of stakeholders with different interests.

77: Promote models of rapid, iterative development for ICT

**Cluster 2: Consumers accessibility**

3: Accessibility filter in company product R&D process
An accessibility filter based on international guidelines and standards, will assist designers and product specialists to firstly understand accessibility and secondly guide them to develop more accessible products and services.

9: Companies adopting accessibility philosophy in their product and service design.
If more companies were to integrate an accessibility philosophy in their product design if there would be a greater choice of more accessible and assistive products reaching the market.

19: Separate the three pillars of a cost benefit analysis
Separate the three areas that are crucial before we are the launch a new product or service for the people belonging to a special interests group. Accounting - economic - social value convinces authorities in EU of the last pillar-its value could be more important after all.

70: Consumers should not pay more for accessibility.
Regardless of development/manufacturing costs etc., accessible products and services should be priced at the same level and non accessible products, so that they can complete on the basis of fundamentally etc. rather than by price.

**Cluster 3: Future improvement**

5: Focus on novel and creative designs

Stop re-inventing the wheel (as an opportunity for future generation) instead focus on identifying new, smart and creative solutions.

37: Improve the level of technological research in inclusion

Interest in technology transfer is created by the emergence of new technological solutions of relevant problems. Presently, many projects are based on incremental improvements of available technology and produce only marginal advantages for end users, which do not justify the implementation of new equipment and/or services. It is therefore necessary to aim to the selection of research project that are based of real technological innovations and produce significant advantages for users.

**Cluster 4: Market support**

6: Include and monitor business models we initiate development projects.

The aim is to reach a market, sometimes we show possibilities. Good ideas come to some type of prototype and stop there. Which project to finance is to already then evaluate how it can reach the market in the future so that from the beginning one can see that e.g. it's too expensive or doesn't meet the user needs. Find a model of evaluating projects in an early stage

7: Maximize potential user base for accessible products

I want to produce products that help people with disabilities. To work with developers to help look at the widest range as possible. Developers often see their potential market as defined disability groups whereas in reality there are many other 'non disabled' possible benefactors. There need to be identified and qualified.

8: Identify and put in place rewards for market placements of products

Funding mechanisms should be amended to only apply financial support to organizations or companies after they have successfully placed an accessible/assistive product on the market for a defined period of time, with defined measures of success. Similarly other incentives should be put in place, such as tax credits, etc, to support companies after they have successfully brought products to market. This is relevant particularly for SMES.

13: Progressive financial support to marketing assistive ICT

Progressive financial support to marketing assistive ICT. Put the stress on the last part. The idea is to be progressive in financial support. Emphasize on financial support. Financial support should be progressive.

20: Offer incentives to suppliers who offer effective accessible products and services tax incentives, etc to companies who don't currently offer these products.

27: Fund the development of broker agencies for accessible products

Funding should be made available to 'kick-start' an industry sector that would specifically provide support to companies/organizations engaged in technology transfer of accessible and assistive ICT. These specialist agencies could bring stakeholders together, guide marketing identify markets, customers, etc. They could be based as a similar model to the Rehabilitation Engineering resource centers in the US.

44: Provide incentives to bring academia, industry and users together

Same technology designed by different groups in isolation. Robust methodologies for design should drive technology design. User at the center of design.

46: Provide accurate potential user data to developers

Directly aimed to marketing; what kind of marketing info; put it in that form; why should we develop this product. Organize market data into meaningful form. Make clear the potential market if the product is truly accessible.

49: New funding mechanism to assist in exploitation - commercial introduction phase
The idea is how the transfer to the market of an exciting product breaks down at the end of the project when all exciting potential are demonstrated. The product dies. We need a new mechanism to look at that phase; within same instrument or innovation partnerships; auction of ideas. Cluster of projects finished and open them up for industries to come in and take them.

50: Understand the market dimension: local versus global
At the moment, the market for assistive ICT in Europe is rather a local than a global one. None of the (presumably three) enterprises with a perspective to reach out for global markets (Tunstall, Philips, Bosch) has been successful in doing so – and this is due to the fragmented market. Fragmentation occurs in regional responsibilities for health care that leads to regional regulation or regional reimbursement and business models; except the UK where the NHS is a monopoly health insurance that invested in a major roll out of Tunstall telemonitoring devices. Taking the example of tele-monitoring, it can be said that technology successfully operating in the US market fails a successful introduction in Germany. Due to the fact that telemonitoring devices are not refunded by the social health insurances. The market dimension for health technologies has a crucial impact on the successful implementation, and as we do not have a sufficient understanding of all influential factors, we need to have more evidence on the market dimension, we need to analyze barriers as to understand the market.

61: Analyze procurement methods in member states

74: Access to results for a broad range of companies.
Many European and national R&D projects yield results or knowhow related to accessibility. However, especially for small ICT companies it is a big problem to get an overview or even to become aware of such new findings. An open repository of findings of projects concerning accessibility, but also of technical solutions could support the TT from (EU) projects to those companies.

**Cluster 5: Awareness**

16: Increase positive contribution to fill the gap between assistive and mainstream technology
Nowadays we still have a generalized opinion that assistive technology and mainstream technology are 2 separate worlds that cannot be addressed simultaneously and be part of the solution of technology transfer and of disabled people inclusion.

17: Improve education and training about inclusion of people working in industry dealing with mainstream.

22: Support users to demand accessible products and services
If user organizations are funded to train and support their users to better understand how to demand accessible products and services, companies will more likely meet the market.

23: Support user involvement in all phases of product life cycle
Usually when goes to industry it leaves out particular issue (probably due to cost) that are small but vital for accessibility. Involving users in the whole procedure will eliminate the danger of losing accessibility at the final stages.

24: Create awareness and fight discrimination
As a means for increasing acceptability adoption of these technologies

36: To improve the knowledge of technology potential to support an inclusive life
If there is more information about how technology may contribute to participation mainstream and inclusive life styles it will be possible to have more demands concerning technology transfer serving those aims and a more positive look to the users, who may also support it because the accent is not on the a lack of competencies but on contribution to do / to perform better.

39: Educating people to actively use technology breakthroughs
Educating people with special needs to actively use technology breakthrough
Trying to make public to groups of people with special needs of the accessibility of technological developments in their area of interest – lobbying to EU relevant bodies.

54: The industry should be aware of the user needs of all
Work is going on within ISO/IEC Joint Technical Committee no. 1 (ISO/IEC JTC1) on the user needs which have to be taken into account when specifying products and services enabling accessibility for all. The Special Working Group on Accessibility of JTC1 has specified a Technical Report stating user needs for people with some reduced functionality. The industry should consult this list when designing their products.

55: Make basic research researchers aware of the application field of accessibility
One step of TT is the step from basic research to applied research. According to our observation, basic researches have low awareness and little understanding of 'accessibility'. Basic researches could: (1) do more work in accessibility related issues of their basic research and (2) consider 'accessibility' as an application field of their research results.

57: Improve distribution of information outside the group of people working in the inclusion environment
Mechanism for knowledge accumulated in EU projects to be distributed to all interested parties In Europe many SMEs exist, who produce equipment and services and cold take care of inclusion problems, if they would be aware of the problems themselves and could have access to the available results aimed to solve them. Therefore, mechanisms for a wide and specific distribution of information about problems and possible solutions should be envisaged.

71: Success stories needed

84: Embedding accessibility in engineering curricula. Many accessibility issues are related to lack of awareness/knowledge by the product/service design team. Embedding accessibility/DfA in the engineering curricula would improve this situation.

**Cluster 6: User needs**

10: Studies that demonstrate the positive contribution of assistive and accessible ICT
Stakeholders in assistive or accessible ICT often don't know the answer to the question: What is in it for me? Enterprises don't have clear answers on the business models that they must develop: they don't know the future development and perspectives of the area. Thus, more studies are needed that contribute to the potential of using assistive ICT and shift decision making from educated guesses to evidence based. The studies should deliver proofs of positive contributions of using assistive and accessible ICT for users regarding the increase of self-determinism and independence, entrepreneurs regarding economic advantages in order to reduce the risk of market failure and encompass investigations on the reliability/robustness of the ICT based solutions.

26: Analyze user base by functional needs only
Situations where looking at requirements, needs have been presented by persons who have some sort of disability themselves. We need a broader application. Example: working in a group he realized that what those with disabilities need applies to many other people with similar needs.

31: Gain deeper understanding of personal barriers
Point of view to be able to personalize, quite difficult, one person might not be willing to admit he needs special device or cannot buy. It should be clear I can use technology available but to find guidance to the process. To be able to personalize ICT products and services., for example a barrier for one person could be that he is mentally not ready to admit needing help (solution could focus on community) another person might not be able to acquire a service at a local provider. Knowing the exact problem is needed to solve it, and what technology transfer is needed to focus the transfer and to know the ultimate goal.

43: Examine how guidelines for assistive technology inform best mainstream ICT products and services. The idea is to use knowledge from the development of particular and personalized assistive technology products and services, to the development of more general and mainstream accessible ICT. Coming from the specific to the more general, that will aim to a greater number of users, not specific to particular disabilities.

45: Not only accessibility but also usability
Often we use the word accessibility which has man different meanings; things can be accessible but not being used; I want to make sure we also mean we use them.

62. Translate user needs into product design. This relates to the difficulty for industry and designers to translate a set of user needs into meaningful design specifications.

**Cluster 7: Technical Design Requirements**

12: Open interfaces that allow products and services to interact
Mainstream products and services should provide interfaces that let them interact in a seamless way with other products and services including AT.

21: Consistent adaptable user interfaces should be mandated for EU projects.
Older and disabled users would benefit from consistent user interfaces which can be personalized to meet their individual needs (which may change with time or circumstances). Implies funding for scientific research to develop the specifications for such interfaces.

25: Personalization for all and open interfaces when needed
Today the markets for assistive ICT and mainstream products and services are very separate. It is a gap between the two types of markets and these results in specific solutions even in cases when general solutions would help a number of users. Assistive ICT do not interest the large majority of people in society. If the market for mainstream products and services focus more on the possibility to personalize the settings for all users it will lead to more accessible solutions. For instance a business man in a noisy environment could prefer a information in text instead of audio at certain times. It is not possible to include all functionality in mainstream products and services. It would lead to much more expensive solutions. When a mainstream product or service do not offer needed functionality for all user groups it is vital that the mainstream ICT solutions include open interfaces to offer interaction with assistive ICT. For instance it should be possible for vision impaired people to connect a Braille keyboard to a mainstream product.

33: Promote interoperability of accessible products and services
Standards and guidelines to promote interoperability; reduce the cost; existing technology could be used; Similar to Idea# 12.

63: Ensure ICT reliability, robustness and security

65: Define technical interfaces between mainstream products and assistive technology products.
Besides accessible HMIs applicable for the great majority of the users, there are some users who may be dependent on their customized assistive technology HW to operate various applications. Technical interfaces to AT products could make mainstream products and services accessible even to those who are dependent on such special HCI HW; e.g. a powered wheelchair user could operate also public terminal systems with the joystick of his wheelchair. A prerequisite would be that such technical interfaces are agreed (standard) between the mainstream ICT providers and the AT providers.

**Cluster 8: Procedures**

15: Provision of procedures, easy to use tools and environments for accessibility testing
The provision of methodologies, procedures, easy to use tools, and test environments, including human experts, for the purpose of testing the accessibility of ICT products and/or services would support developers of such products/services in checking for accessibility features of their developments already during the development process; users, user organizations, or public bodies (public procurement) to check whether their requirements related to the accessibility of a given product or service are met, or to proof in an objective way that the requirements are not met.

35: Provide standardized technical solutions or modules for accessibility in specific domains
Available technical solutions (including SW modules, technical descriptions, guidelines, technical knowhow) developed and provided by accessibility experts make it easier for companies, who have no special expertise in accessibility, to achieve accessibility of their products or services.

53: Specific methodologies and tools for the development of accessible ICT
One of the reasons for tech transfer is because there are not adequate methodologies and tools

86: Environments for interoperability testing

**Cluster 9: General accessibility**

28: Make it more general rather than specific accessible and assistive
ICT products should be incorporated into e.g. smart home, therefore market will be bigger, everybody will benefit. Making it more general technology rather than specific for elderly and disabled. Make the accessible assistive ICT products and services part of general technology e.g. 'smart home'. To increase market improve image and enhance technology transfer.

**Cluster 10: Target groups**

29: Build a global public inclusive infrastructure
Building such an international infrastructure could help the AT industry to reach their market this refers to the GPII initiative.

30: Implement the innovation partnership on active and healthy aging
Communication COM(2010) 546 final, published by the European Commission, presents the Europe 2020 flagship initiative "Innovation Union". Annex III of this communication introduces "Aims and scope of a pilot European Innovation Partnership in the field of active and healthy ageing. This innovation partnership aims to overcome deficits in the current set-up of the technology transfer process, as it will be a top level coordination structure that the EC wants to create by beginning of next year. EC is now developing more ideas on how to identify all relevant stakeholders. The innovation partnership follows quite broad objectives, as it includes questions of funding R&D, public procurement, standardization issues and also intends to intervene in the current set-up of business models in the health area. DG Infso and Sanco together stand behind this innovativion partnership.

48: Improve links with the e-health market
The e-healthcare services are becoming a great market worldwide. Therefore incorporating it into the healthcare sector it will improve technology transfer.

59: Go to the kids. One student one laptop
Blue sky idea with practical value. For all the kids in the public sector in Cyprus, over 14, we offer them for free one lap top. If this happens across all countries it will be a major breakthrough.

60: 'Green' agenda - footprint for usability
How can we use the analogous agenda we have for the environment to make it an agenda.

87: Harnessing the green agenda and sustainability to promote the issue of accessibility.
Finding a way to get leverage from the green/sustainability agenda could be a way to enforce technology transfer.

**Cluster 11: Policy**

32: Having accessibility requirements on all publicly available products and services
Legislation for requirements not enough; choose requirements whenever they are meaningful. If a private organization provides a service, it should also have accessibility requirements across all member states. The idea is to include accessibility requirements in publicly available services and specially in publicly supported services whenever this is meaningful.

34: International standards must cover the needs of everybody
Many products will be based on international standards. Therefore standards makers should clearly state whether their standards meet the accessibility needs of all people including disabled people.

40: Legislate in the right place
I proposed because I listened to some conversations and occurred to me that across Europe we legislate at different places at different times. We need to decide where to legislate.

41: Development of open standards for accessible ICT systems based on sound scientific data
The present set of standards is often inconsistent, fragmentary and out of date (e.g. based on superseded technology). Often the accessibility aspects are superficial and do not reflect the unmet needs of the unmet user population.

42: Accessibility criteria in public procurement policy
Basically having accessibility criteria means companies are given incentives to develop accessible products. Companies are given an incentive to develop accessible products if they believe they will win government contracts.

47: Make the availability of accessible technology a human right
In line with the recently published UN convention on Human rights, I feel that this single factor would cause a 'tsunami' of new accessible ICT products onto the market immediately. It would create a new model of technology transfer- namely 'technology rush'!

67: Actually penalize countries, organizations and companies who don't implement accessibility and use the funds for R&D

69: Implement UN convention. Implementation of the UN convention that refers to e-accessibility and that has been signed by all the member states could be an opportunity to reinforce obligations and requirements on industry and public bodies. This could be a driver of technology transfer.

80: Investigate whether patents are required to implement a new standard for assistive ICT.

81: Consistent legislation and/or mandatory regulation in the EU countries. At present different countries have different requirements for accessible ICT systems for public use. This means that manufacturers have to produce different countries, hence increasing their costs. Government procurement policies vary from country to country.

82: Consistency in policies for subsidies of assistive products and services. There are various mechanisms for subsidizing the cost to the end user for purchasing and running assistive devices. Even within one country, the same device may attract different levels of subsidy in different circumstances. For instance there may be a state subsidy for aids for employment which may not be available to disabled people currently unemployed but seeking employment. There is also inconsistency in who pays for the cost of training the disabled person in the use of the assistive device. All this variability means that marketing departments of mainstream companies are reluctant to market assistive products and services.

83: Requirement for companies to publish their corporate social responsibility policies in respect of accessibility. Currently many CPR policies reflect to what the company aspires. Making CPR policies in the public domain gives the possibility of outside organizations exerting pressure on companies to implement policies.

**Cluster 12: Interconnectivity**

64: Focus on interconnectivity of technology. Cooperation is needed. Open your mind, think out of the box, try to strengthen by working together don't think your field of expertise is more important than another. Focus on how we can benefit from each others expertise.

**Cluster 13: Positive monetary aspects**

72: Positive monetary aspects

**Cluster 14: Simplification of projects**

73: Small projects instead of big frameworks. Start somewhere through a pilot project to monitor easy to evaluate.

76: Simplify the process within the commission before funding is approved

**Cluster 15: Marketing**

75: Marketing for accessible solutions

## Facilitator Team

## Main Facilitator

**Dr. Yiannis Laouris** is a Senior Scientist and President of the Cyprus Neuroscience and Technology Institute. He heads the "New Media Lab". Neuroscientist (MD, PhD) and Systems engineer (MS) trained in Germany and the US. Publishes in the area of neuroscience, learning through computers, the web and mobile phones and about the potential role of IT to bridge the gaps (economic, gender, disabilities etc.) in our society. He is a senior SDD[SM] Facilitator and has several publications about the theory of the science of dialogic design also together with its Founder Prof. (emeritus) Aleco Christakis. He collaborated with Prof. Patrick Roe to implement SDD[SM] co-laboratories for COST219ter and COST298. He also collaborates with the EDEAN and DfA projects.

## Assistant Facilitators

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- Part of the SDD[SM] process (Voting)

## Methodology: The Process of Structured Dialogic Design

The term "Structured Dialogue" is sometimes used to simply denote a dialogue more organised than the simple "talking" and exchange of ideas. In contrast the Structured Dialogic Design[10] (SDD[SM]) process is a methodology, which supports the generation of truly democratic and structured dialogue amongst teams of stakeholders with diverse views and perspectives. It is particularly effective in the resolution of complex conflicts, interests, and values, and in achieving consensus based on a common understanding and strategy. It is grounded on 6 complex systems and cybernetics axioms and 7 laws from systems science; it has been grounded both scientifically and empirically in hundreds of settings on a global scale for the past 30 years. Scientists and practitioners worldwide are guided by the Institute of 21st Century Agoras[11].

The Cyprus team has extensive experience in the application of the methodology. They have utilized it in many public debates in order to facilitate organizational and societal change. For example, they have utilized it in many European networks of experts. The COST219ter[12] is a network of scientists from 20 countries (18 European, the USA, and Australia) who were interested in exploring the question of how new technologies ambient intelligence and next generation networks can make their services more useful to people with special needs. The COST298[13] network also aims to make broadband technologies more accessible to the wider public. The scientific communities of Cost219ter and Cost298 utilized SDD in order to outline the obstacles, which inhibit the application of the above technologies on a wider scale. Based on the results of the SDDs, they designed corresponding strategies for the next 3 years. Insafe[14] is a European network of 27 Safer Internet Centers who used SDDs in many meetings in order to identify the inhibitors, produce a vision of the future, and agree on a plan of action. More information is available on the CyberEthics Cyprus Safer Internet website[15].

The UCYVROK[16] network utilized SDD[SM] in order to determine the reasons for which young people in Europe do not participate in European programs. The results were presented to the European Parliament. The SDD[SM] methodology was also used in order to ease the dialogue between Greek-Cypriots and Turkish-Cypriots since 1994. This dialogue culminated in the creation of a peace movement. Many reports are still being utilized by the network, and are available on the program's page[17].

SDD[SM] was designed especially so that it can assist non-homogenous groups in tackling complex problems within a reasonable and restricted time frame. It facilitates the annexation of contributions by individuals with vastly different views, contexts, and aspirations, through a process that is structured, conclusive, and the product of cooperation.

A team of participants who are knowledgeable of a particular situation, generate together a common outline of ideas based on a common understanding of the current problematic situation and a future ideal one. SDD[SM] promotes the focused communication between participants and supports their ownership of the solution as well as their actions towards implementing it.

## Structure and Process in a typical SDD Co-Laboratory

When facing any complex problem the stakeholders can ideally approach it in the following way:

1. Develop a shared vision of an ideal future situation. This ideal ***vision map*** serves as a ***magnet*** to help the social system transcend into its future state.
2. Define the ***problematique***, also known as the wall of inhibitors i.e., develop a common and shared understanding of what are the obstacles that prevent the stakeholders' system from reaching its ideal state.
3. Define ***actions/options*** and produce a roadmap to achieve the goals.

The three phases are implemented using exactly the same dialogue technique. Each phase leads to similar products:

1. A ***list*** of all ideas and their clarifications [SDD℠ is a self-documenting process].
2. A ***cluster*** of all ideas categorized according to their common attributes [using a bottom-up approach].
3. A document with the ***voting results*** in which participants are asked to choose ideas they consider most important [erroneous priority effect = most popular ideas do not prove to be the most influential!]
4. A ***map*** of influences. This is the most important product of the methodology. Ideas are related according to the influence they exert on each other. If we are dealing with problems, then the most influential ideas are the *root causes*. Addressing those will be most efficient. If we deal with factors that describe a future ideal state, then working on the most influential factors means that achieving the final goal will be easier/faster/more economic, etc.

In the following, the process of a typical SDD℠ session, with its phases, is described in more detail.

First — The breadth of the dialogue is constrained and sharpened with the help of a ***Triggering Question***. This is formulated by a core group of people, who are the Knowledge Management Team (KMT) and is composed by the owners of the complex problem and SDD℠ experts. This question can be emailed to all participants, who are requested to respond with at least three contributions before the meeting either through email or wikis.

Second — All contributions/responses to the triggering question are recorded in the *Cogniscope II*™ software. They must be short and concise: one idea in one sentence! The authors may clarify their ideas in a few additional sentences.

Third — The ideas are clustered into categories based on similarities and common attributes. If time is short, a smaller team can do this process to reduce time (e.g., between plenary sessions).

Fourth — All participants get five votes and are asked to choose ideas that are most important to them. Only ideas that receive votes go to the next and most important phase.

Fifth — In this phase, participants are asked to explore influences of one idea on another. They are asked to *decide whether solving one problem will make solving another problem easier*. If the answer is a great majority an influence is established on the map of ideas. The way to read that influence is that items at the bottom are root causes (if what is being discussed are obstacles), or most influential factors (if what is being discussed are descriptors of an ideal situation or actions to take). Those root factors must be given priority.

Sixth — Using the root factors, stakeholders develop an efficient strategy and come up with a road map to implement it.

## Further Information on the science SDD[SM]

The interested reader who might want to find out more about the underlying science of structured dialogic design may begin by researching the terms “Lovers of Democracy”, “Hasan Ozbekhan”, “Aleco Christakis”, “Club of Rome”, “Structured Dialogic Design”, “Cyprus Civil Society Dialogue”, etc. Available are also two books co-authored by the Father of the science:[18, 19]. A number of wikis are aslo dedicated to the science: [20, 21, 22]. Selected publications include a Description of the technology of Democracy[23].

There are several publications of the Cyprus group, which describe the application of SDD[SM] in the Cyprus peace-building process:[24, 25, 26].

Furthermore, two recent publications provide an easy-to-comprehend introduction to the methodology and the ethical considerations associated with its application[27, 28].


- Part of the SDD[SM] process (Mapping)

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- Part of the SDD$^{SM}$ process (Mapping)

## Leading Partner

ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (EPFL) Switzerland

## CARDIAC Consortium

| No | Name | Country |
|---|---|---|
| 1 | ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (EPFL) | Switzerland |
| 2 | CENTRAL REMEDIAL CLINIC (CRC) | Ireland |
| 3 | Cyprus Neuroscience and Technology Institute (CNTI) | Cyprus |
| 4 | UNIVERSIDAD DEL PAIS VASCO (UPV/EHU) | Spain |
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| 11 | FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS (ICS-FORTH) | Greece |
| 12 | UNIVERSIDAD DE SEVILLA (USE) | Spain |
| 13 | FACULDADE DE MOTRICIDADE HUMANA (FMH) | Portugal |

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# CARDIAC

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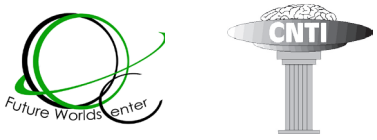


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