FIRE

Gateway to trustworthy ICT innovations in Europe

PROJECT FULL TITLE: Facilitate Industry and Research in Europe

GRANT AGREEMENT N. 318762

DELIVERABLE D6.2

Dissemination events

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1 EXECUTIVE SUMMARY

This paper reports about the workshops which were organized to validate the deliverable D6.1: *Addressing societal concerns on legal and privacy issues in ICT-related projects.*

This deliverable presents a map of the social barriers to ICT adoption in the domain of security and privacy-related solutions. The wider goal in connection to the FIRE project is

- ⚔ To provide a better understanding of these barriers to adoption.
- ⚔ To inform the industry and the researchers about the possible reasons why some technologies may fail to enter the market.
- ⚔ To enable this knowledge to be taken into account in developing and assessing various future R&D activities.

Three workshops were hold with the aim of:

1. To validate and refine conclusions on D6.1
2. To identify opportunities and barriers of innovation policies, regional strategies, etc. in order to implement D6.1 recommendations (to be included in D4.3).
3. To create awareness and provide useful information to the industry, in order to successfully overcome social barriers for technology adoption.
4. To disseminate FIRE

Most remarkable results from the workshops indicate:

- The adequacy of the general approach of D6.1: only one new concept was identified in terms of barriers.
- This is a field of research with the necessity of including multidisciplinary views. Even if the field is not young, the continuously changing technological environment makes it very much immature. There are many current approaches with sometimes divergent positions.
- There is a significant lack of awareness in the R&D community, including ICT industry and researchers. Nevertheless, it is perceived as an interesting topic.
- Improvements could be implemented to get a more effective user involvement in R&D project.

2 INTRODUCTION

This document informs about the specific workshops that have been organized with the two main general goals of refining outcomes in D6.1 and to disseminate FIRE results.

Three workshops took place, first in Madrid, second in Brno and third in London.

The first one, in Madrid, was organized specifically to get a broader view of the topic and to evaluate the adequacy of the approach and the completeness of the scope of D6.1. The event was celebrated ad-hoc with selected invited experts in the field and some security experts from industry and academia. Experts were invited personally, most of them read the deliverable D6.1 previously and phone conversations were hold and questionnaires were circulated and collected afterwards.

The second one, in Brno, and the third in London, tried to get feedback about identified barriers from a diverse set of industries during a workshop organized in the context of a bigger event and to experiment with dissemination of FIRE outcomes in this area.

Common material was elaborated for the three of them.

3 METHODOLOGY

3.1 Workshops' Objectives

These are the general objectives of all workshops; nevertheless, every workshop concentrated and identified specific goals:

1. To validate and refine conclusions on D6.1
2. To identify opportunities and barriers of innovation policies, regional strategies, etc., in order to implement D6.1 recommendations (to be included in D4.3).
3. To create awareness and provide useful information to the industry, in order to successfully overcome social barriers for technology adoption.
4. To disseminate FIRE

3.2 Type of Attendees

The type of attendees is very much related with the specific objectives in every workshop.

1. ICT Co-design experts (Objective 1, 2 and 4)
2. Representatives of European and national ICT projects, on trustworthy ICT and FIRE strategic sectors (Objective 2, 3 and 4).
3. Representatives of best practices on user involvement and acceptance of ICT solutions (non-specific on security) (Objective 1, 2 and 4).
4. Trustworthy ICT experts, from research, development or deployment willing to increase their impact. (Objective 3 and 4).

The number of participants was limited by the specific methodology applied in every workshop. Smaller groups are more suitable for alive discussions.

3.3 Workshop's Framework

Some common material was elaborated to be used in all workshops:

- Summary of 2 pages of D6.1
- Summary of 5 pages of D6.1
- PowerPoint presentation
- Template for collecting results
- Conceptual map from D6.1

The agenda and methodology was established by every responsible in order to adapt it to the specific circumstances and objectives.

Each workshop was asked to report using an agreed form, but not all fields were always relevant.

1. Event Title
2. When and where the meeting took place
3. Objectives
4. Agenda
5. Brief description of the way the event had been disseminated (web page, email, clusters contacts, etc.)
6. Methodology

7. Type of attendees (industry, research, academia, etc.)
8. Some pictures
9. Workshop summary
10. Outcomes including feedback into a questionnaire

4 WORKSHOPS

4.1 AMETIC Workshop

Event Title

Workshop: FIRE Project conclusions: social and personal aspects in building digital security and trust.

This is an ad hoc workshop, organized independently of any other event.

When and where the meeting took place. Language.

Place: AMETIC. Calle Príncipe de Vergara, 74. 4ª. Madrid. Spain.

Date: 20 -1- 2014. 12:30h

Language: Spanish.

Objectives

- To refine FIRE conclusions and recommendations with multidisciplinary experts and get a complementary vision of the field
- To identify best practices and success factors in ICT innovations adoption, from trustworthy ICT and other ICT fields, from R&D projects and commercial developments.
- To get insights about the social impact of ICT developments.
- To get recommendations about European funded R&D instruments.

Programme

Welcome and introduction of all participants. 10'

FIRE Project conclusions. 30'
Sofía Moreno, FIRE project.

Technology solutions must be not only secure but also trusted. 5'
Pablo Pérez San-José, ICT security and trust senior (EstudNET).

People and technology: Why are they aligned or faced?.5'
Javier Herrera. Project Manager. Technology and Society Area / Security. Tecnalia.

Social impact of technology. 5'
Javier Warleta. Partner. ETICAS R&D.

How to make people adore technology.5'
Lorena Bourg. Chief of Innovation Management Department. Ariadna Servicios Informáticos.

Debate. 30'

Methodology

The workshop was planned to be highly participative, so it was limited to 12 participants. Most attendees were selected by invitation and some places were available to volunteers participant in response to dissemination.

Participants were selected to have complementary views and experiences in the topic.

Previously to the workshop the deliverable D6.1 was distributed and telephone conversations were hold with invited participants to make them aware of the objectives and put focus of the specific issues addressed by their participation. Most part of participants read the deliverable before the workshop or at least main part of the document.

The workshop started with presentation of all participants, including their interest and experience in the topic. After that Sofia Moreno, on behalf of FIRE, made the presentation of FIRE and the conclusions and recommendations of D6.1. Every participant received a paper copy of the barrier map to annotate ideas on it.

Four participants were invited to provide some key ideas from their experience in five minutes. They were chosen to be complementary and all of them with strong experience and relevant background in the field.

A debate was held afterwards.

Most participants sent their own written conclusions from the workshop few days later.

The workshop was recorded and a note taker registered all the talks for further study.

Brief description of the way the event had been disseminated (web page, email, clusters contacts, etc.)

The event was disseminated through AMETIC dissemination lists and Linkedin groups, addressing more than 2000 persons.

The biggest effort was to identify and personally invite relevant and complementary people to this first workshop.

Spontaneous interest in response to dissemination was low. Nevertheless invited people were delighted to participate, including those not available this day.

Type of attendees (industry, research, academia, etc.)

- 1 End user, financial sector
- SME association + 3 SMEs
- 1 Big industry
- 3 Researchers
- 2 Consultant

Full list of participant is included in Annex B.

Workshop summary

The workshop was chaired by Sofia Moreno, FIRE partner. She welcomed all participants and invited them to present themselves, including the reasons to be interested in the workshop. After the presentations Sofia made a 30 minutes presentation of FIRE findings and recommendations. After that, four invited speakers made a 5 minutes presentation, about 4 specific predefined topics. All these took about one hour.

Pablo Pérez focused his speech around the concept of trust. Main ideas were:

Users wary of technologies designed to provide confidence (eg electronic voting). Cultural factors have a lot of weight and can lead to the success or failure of a system.

For him the solutions needs to establish a climate of trust,
- Transparency in solutions (clear interfaces, easy to read and understand terms of use)
- Codes of conduct of suppliers validated by trusted third parties.
- User centred design,
- User empowerment
- Accepting responsibility for development mistakes
- To Guarantee the privacy and protect online dealings
- To guarantee service and business continuity

The next speaker, Javier Herrera, introduces some provocative ideas that could be summarized:

- Social media has the potential of strongly influence perception, trust and acceptability of a new device or technology.
- User acceptance and positive social impact in European projects is only the first stage. Industrialization is a longer stage where perceived (added functionality) or hidden (chip obsolescence) issues could completely change the perceived need, acceptance, etc., from people and society. The industrialization phase takes usually two thirds of time and effort in the development of a new product or service.
- A final product or service incorporates not only the original technological solution to a problem with a clear added value to the user, but also other ingredients, added in late stages of development, including superficial elements (like design) or even malicious (e.g. adding elements of addictiveness). All those changes have strong influence in users perception and acceptance.
- Technology is frequently beyond existing legal frameworks, because the evolution in much faster and the scope is broader than national regulations. There could be a lack of responsibility in new paradigms of use, like currently with data protection.
- People have a lack of empowerment to face consequences of new technology use. It happens to all, including digital natives, due to the fact that making an impact analysis of a new technology use seems to be far from most people skills and aim.
- User involvement in R&D should be based on a regulated interaction with the environment and a mature methodology, including social impact assessment.

Javier Warleta told a couple of stories to introduce his point: Technology has proven to impact our lives far beyond expectations and it becomes an enabler of deep social changes (e.g. the potential of intimacy breaches, the risk of data aggregation, etc.). People can't usually make such analysis by themselves. The potential social impact of technology must be carefully

studied and citizens and decisions makers must be informed. H2020 should include a methodological analysis of social impact and support projects with a more positive impact in a broader sense.

Lorena Bourg introduces, through an example, the Living Lab methodology based on short design cycles and key stakeholders involvement.

The debate started and it was planned for half an hour, but the conversation was so alive and interesting for participants that it lasted more than one hour.

Privacy consumed a significant share.

Lessons learnt

The topic is very broad and it was difficult to keep the focus. Not all barriers were addressed. New barriers and concept arose.

More examples are needed to make the barriers more easily understandable.

It is very much convenient to involve real experienced people in the field with complementary points of view.

Results are presented in next chapter.

4.2 NSMC Workshop

Within the seminar *Data, Documents, Finance* arranged by Agora Plus on 6th February 2014 in Brno/Czech Republic Network Security Monitoring Cluster organized workshop entitled *Main social barriers to ICT applications adoption* to present and verify the FIRE Deliverable 6.1.

The Seminar took place in Brno in the new administrative building of Agora Plus Company.

Methodology

The workshop has been organized as a part of seminar *Data, Documents, Finance,*

http://www.agoraplus.cz/novinky/detail/article/98/agora-plus-otevira-sve-nove-prostory.html.

The workshop was attended by many expert participants – from the smaller innovative companies dealing with new technologies in the cyber security field to large integrators of complex security solutions. There were companies such as Bull, Dell, Fujitsu, Microsoft, Avnet, Hitachi, DNS, Infotrend, Nikon, Nokia, Samsung, Quantum and smaller players such as Invea-Tech, Axenta, Mycroft Mind etc. There were approximately 60 attendees.

In the first part – during a day, there was a time to introduce the FIRE project to all the participants. The FIRE project was briefly presented to the participants at the beginning and then they were given information about FIRE project D6.1 findings related to research of main social barriers to ICT applications adoption and the wider goals in connection to the FIRE project:

- o To provide a better understanding of barriers to ICT applications adoption

- o To inform the industry and the researchers about the possible reasons why some technologies may fail to enter to market

    ○ To enable this knowledge to be taken into account in developing and accessing various future R&D activities

Workshop attendees were asked to give their feedback to the relevant conclusions regarding on the main barriers to adoption of ICT technologies identified within FIRE project.

Fruitful discussion was opened after lunch, in the afternoon and late afternoon in small groups, maximum of 6 people at round tables. The talk has characteristics of non-formal discussion and brings interesting ideas. Around 5 round tables were managed with different participants. The moderator from NSMC was present at all of them and recorded the most important ideas.

Many of the participants found this topic interesting, useful and asked for more information and presentation materials.

Results are presented in next chapter.

4.3 ADS Workshops

ADS attended a meeting of the Malvern Cyber Security Cluster on 12th February 2014 in the UK to present and validate the FIRE findings on societal barriers to adoption of Trustworthy ICT technologies (D6.1) produced in May 2013[1]. The Malvern Cyber Security Cluster is an influential group of more than 50 small cyber security companies centred around Malvern in Worcestershire, and plays an active part in national initiatives, representing the views of SMEs in the cyber security and information assurance sector. The Cluster members cooperate on a range of initiatives to grow these cyber security businesses, improve the cyber security of local enterprises, and also raise awareness of cyber security amongst young people.

The Cluster meeting was held in the Wyche Innovation Centre in Malvern and attended by 19 SME representatives and four academic participants from the UK Royal Society and the University of Bristol. This meeting lasted 2 hours and then after, the D6.1 was presented followed by a round-table discussion and some follow-up one-one discussions afterwards. It lasted 45 minutes.

Main outcomes are described in next chapter of this document.

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[1] FIRE Deliverable 6.1: Addressing societal concerns on legal and privacy issues in ICT-related projects, dated 31st May 2013.

5 MAIN OUTCOMES FROM WORKSHOPS

5.1 AMETIC Workshop

This table includes different opinions, in some cases conflicting, for every topic. These opinions have been collected from the debate, from phone conversations and from written answers made few days after the workshop. They have been synthesized and similar opinions have been compiled.

Few people scores priority. The mean was not calculated because the dispersion is high.

Barrier	Comment/experience (good practice/lessons learnt, …) How to solve it? Refinement of recommendation. Suggestion?	PRIORITY 0 low 10 high
1.- **Exclusion of end-users from development**	Good Practice: http://www.people-project.eu/portal/ Living labs allow identifying real needs and problems from people. User involvement is used all along the design cycle. Living-Labs: User centric design based on short iterative design cycles. Mature technology. Emphasis on making technology easily accepted and properly used. Key success factors: - Committed support from key stakeholders and decisions makers. - All stakeholders groups were represented in the project. - Decisions about designs, characteristics and validation of the system were made including all stakeholders in periodic meetings - Citizens were involved in validation Question: *How can be ensured that solutions developed by living labs are valid in another context? In another culture? Solutions are not biased to the participant's opinions.*	6,5,9,5
	Some reasons for users exclusion: - Lack of clear market target for the final result. - The fast evolution of technology forces a continuous revision of initial user needs and market targets. - Solutions should been able to go beyond user's expectations and the differential added value should be clear enough to motivate investment and adoption	

Barrier	Comment/experience (good practice/lessons learnt, …) How to solve it? Refinement of recommendation. Suggestion?	PRIORITY 0 low 10 high
	efforts Solution could be to use user's profiling adding some degree of uncertainty, for example including profiles not directly targeted to explore non-foreseen uses and reactions.	
	Users involvement should be faced from a business perspective. Failures in achieving the market (and consequently satisfying user's needs) could be due to: - There is no appropriately informed exploitation plan (e.g. the solution satisfies user's needs but not affordability priorities) - The performance has not been adequate. When a market failure is identified but still the solution is considered valid for the end-users or for the progress of the technology, provisions must be taken to keep chances of success. Convenient training of end-users in the new techniques could smooth the adoption curve.	
	The type of users involvement, the moment and decisiveness of it, makes a difference. Sometimes end-users are there, even as full partners, but their activity is not conducive to any conclusions, neither in terms of technology decisions, nor in test and demonstration. It is noticeable too that the involvement of some individual members of an end-users organization may not mean that the entity as a whole is keen to participate or collect the results for further implementation. Users must be qualified to participate in a project development. There must be a system of innovation management able to - Enable regulated interactions with the environment - Analytic for impact assessment. The recommendation consists in the presentation in the proposal phase of an exploitation plan based on actual data of current practices and an elaboration in business terms of the expectable results. This data collection must include open source data, but also data gathered by the proponents for the purpose of the project.	

Barrier	Comment/experience (good practice/lessons learnt, …) How to solve it? Refinement of recommendation. Suggestion?	PRIORITY 0 low 10 high
	On the side of the end-users, some credible implementation plan must be established reflecting existing gaps and how the proposed technology or system is expected to meet the expectations. Those gaps should be tagged in their degree of generality, i.e., indicating whether it is a general gap in the sector or just express a particular need.	
2.- **Incompatibility with the existing user context**	Standard and interoperability	6,7, 8, 8
	It is not enough identifying a user's need, it is necessary to evaluate the impact of the proposed solution in all aspect of the user's life and compare them with current solutions. Users' needs could be similar but their context could be so different that the same solution could not be valid. MSS: Make it simple stupid!!! Users involved in R&D have a precise context. This is a limitation that must be addressed.	
3.- **The adoption entails too much uncertainty**	Standard and interoperability	7,6,6, 8
	The industrialization phase takes usually two thirds of time and effort in the development of a new product or service. A final product or service incorporates not only the original technological solution to a problem with a clear added value to the user, but also other ingredients, added in late stages of development, including superficial elements (like design) or even malicious (e.g. adding elements of addictiveness). All those changes have strong influence in users perception and acceptance. Technology is frequently beyond existing legal frameworks, because the evolution in much faster and the scope is broader than national regulations. There could be a lack of responsibility in new paradigms of use, like currently with data protection. User acceptance and positive social impact in European projects is only the first stage. Industrialization is a longer stage where perceived (added functionality) or hidden (chip obsolescence) issues could completely change the perceived need, acceptance, etc from people and society.	
4.- **No perceived need for the technology**	People is saturated of technology and innovations Solved needs are increasingly superfluous	9,9,9,7
	Make product/services extremely desirable.	

Barrier	Comment/experience (good practice/lessons learnt, …) How to solve it? Refinement of recommendation. Suggestion?	PRIORITY 0 low 10 high
	Make communication and training efforts to highlight the benefits compared with existing ones	
5.- **Insufficient communication**	People is overloaded of offers of any kind and technologically saturated of options. It is extremely difficult to get the attention of anybody. There is much rumour, noise, poor information. For the end user it is difficult to distinguish. Social media has the potential of strongly influence perception, trust and acceptability of a new device or technology. Before any development marketing efforts should be carefully analysed and its feasibility evaluated.	8,8,6
	In general, communication and dissemination have to be progressive. Metrics must be implemented to guarantee that the objectives in dissemination and communication procedures are being met, that actions are taken in case of risk detection, and that the PO is aware of the evolution of it all. The funding institution must have the nerve of interrupting a project that is not meeting the D&C objectives, presented in an evolving way and with adequate metrics. This could also be weighed up by independent parties and will save money at the end, as a project with recognisable impact has no use at all.	
6.- **Lack of usability**	Usability makes a huge difference in users acceptance and adoption. Nowadays the time that users need to invest in adopting a new product of services is a critical element of market success	9,9,9,9
	This is part of the need of hands-on experimentation or demonstration during the project. In any case, all the projects must envision training procedures implemented by training experts, normally not the same developers of technology, that include accessibility, ergonomics, and other similar knowledge. This entirely depends of the evaluation process. Evaluators must identify partners able to perform training and to help with the demonstrations. As a general rule, the work package containing the demonstrations must be operationalized by an organization	

Barrier	Comment/experience (good practice/lessons learnt, …) How to solve it? Refinement of recommendation. Suggestion?	PRIORITY 0 low 10 high
	or individual with due expertise, if possible, not participating in the developing process so that this creates a certain tension and antagonism. Loops of refining or reformulating the solution must be complementary to this exercise of validation.	
7.- Lack of trust	Users wary of technologies designed to provide confidence (eg electronic voting). Cultural factors have a lot of weight and can lead to the success or failure of a system. Establish a climate of trust - Transparency in solutions (clear interfaces, easy to read and understand terms of use, …) - Codes of conduct of suppliers validated by trusted third parties. - User centred design, - User empowerment - Accepting responsibility for development mistakes - Guarantee the privacy and protect online dealings To guarantee service and business continuity	10,8,6,7
	This is difficult because we need high moral values to balance the need of selling versus the need of buying. What is really a success start by being honest, useful and equitable with people. If this is not so, at the end the technology or the product will be no longer used. I.e. The need for PET privacy enhanced technologies to prevent privacy being "stolen" Trust need to be provided by technology itself to defend us against this same technology. If Vendors and users do not share a common vision that respect human rights at high and low levels avoiding the so called "devil in the details" that always seek your purse.	
	This is entirely a marketing issue and must be considered in the dissemination section of the proposal. There are techniques to include users' sensibility in the external presentation of a proposal. Most of them are profusely employed to market consumer goods, and can be transposed to technology issues with some effort. In general, lack of trust is also related to aversion to change and the stability caused by the status quo, so considerations about change management in the procedures of innovation management at the end-users are pertinent here too.	

Barrier	Comment/experience (good practice/lessons learnt, …) How to solve it? Refinement of recommendation. Suggestion?	PRIORITY 0 low 10 high
	In generic terms, the consortium must be prepared to help the end-users overcome their initial fears to change, unless the adoption of technology is completely unacceptable. A marketing campaign deserving the name must be associated to the dissemination plan. Analysis of current practices stagnation and captive market must accompany the overall dissemination perspective, without disregard of correcting potential unbalances in the consortium (for example, that a final supplier is missing).	
8.- Other barriers	Privacy is a main concern for technology adoption. People is not yet aware of the consequences of making public too much personal information because there are not yet so many people affected by the consequences of this habit, like being fired from job. Privacy by design is not the solution. It could only fix known problems but the real problems are those coming with the continuous evolution of technology and its use. The real problem with privacy is that small amount of big companies has got all the information. They are so powerful that can influence laws and governments in countries and they are against data protection. The evolution of these companies related with data protection is continuously going further. The trade-off between loss of privacy and perceived benefits keeps the population in a continuous process of loss of privacy. It is increasingly necessary to elect to resign the privacy of your data or be excluded from the digital society It would be needed a change of paradigm in society, more based on a long term vision of society than in short term incomes of companies. The danger of the current (and growing) situation of lack of privacy could be easily understood if a totalitarian regime takes over the power in Europe. Very probably we could see how easy is to suppress political enemies just having a look to comments on Facebook, relationships on WhatsUp or favourite twits Both identified barrier are relevant enough to be addressed specifically.	10, 8, 7-8

Barrier	Comment/experience (good practice/lessons learnt, …) How to solve it? Refinement of recommendation. Suggestion?	PRIORITY 0 low 10 high
	Ethical issues in vendors Ethical certified software and processes should be a must	
	The project management and the funding institutions must be honest enough to stop a development where impingement of civil rights is anticipated, unless there is an apparent re-elaboration overcoming those problems. Normally, easily anticipated problems tend to be well covered by the proposal. It should be established that in case of foreseen ethical issues, a section of the risk management consistently deals with them. A good practice is to have a dedicated partner to ethical issues, but doubts still remain on whether this partner will act as a project party or an independent party in case of the emergence of compromising questions. One solution could be that the selection of the project developers be split in two by the funding institutions, namely one sub consortium devoted to technology issues, and the other one as a contrast for delicate issues, with different funding and different established objectives, but over the same topic.	9
OTHERS **Lack of empowerment**	People have a lack of empowerment to face consequences of new technology use. It happens to all, including digital natives, due to the fact that technology evolve fast and making an impact analysis of the use of a new technology is far from most people skills and aim.	

Recommendations and other thoughts:

- There is a paradox about security: buying security makes people feel unsecure. Selling security creates anti-technological resistance and reduces trust. The key is to change the concept: from security to resilience.
- Technology has proven to impact our lives far beyond expectations and it becomes an enabler of deep social changes (e.g. the potential of intimacy breaches, the risk of data aggregation …). People can't usually make such analysis by themselves. The potential social impact of technology must be carefully studied and citizens and decisions makers must be informed. H2020 should include a methodological analysis of social impact and support those more positive in a broad sense.
- There is a lack of digital skills and a great gap of awareness in the population, also due to:
  - The current online risk is limited for people and mostly unperceived. Illegal business models are in continuous evolution over the digital world and they are skimming most obviously profitable schemes of attack, like identities thieve in banking. But personal advertising based on profiling could evolve to other practices more dangerous. Profiling under non-democratic government could also be a social threat.
  - It is probable that the online risk for every citizen will continuously grow up, as soon as more business models appear and get mature based on illegal actions against people's devices.

- The main motivation of companies is greed. No useful information about privacy concerns is easily available. No real desire to educate users and make them aware. A paradigm change is needed.
- There is a perversion of the R + D system: There is no real intent on the part of many participants to put the results to market.
- All the expressed problems are coming out of an inadequate market analysis in the first place (in proposal time) and of an insufficient marketing plan or dissemination approach in the second (in project time). In principle, dissemination is a two-way channel and, as the sales function in any organization, must be receptive to signals from the potential market that the R&D&I is missing the point. Unfortunately, there is also the possibility that the problems were detected but the project didn't envisaged suitable mechanisms of change management and correction, either by inability, or lack of willingness.
- Simple endorsement of the proposal by the end-users is not enough. A good starting could be that all the proposals had organized a workshop with several end-users before writing them, or at least, had employed some tools of remote debate. The results of the debate must be explicit in the proposal, with the least elaboration by the proponents.
- End-users participating in a project have to have their voice guaranteed, including the opportunity of autonomously communicate with the funding institutions about occasional malpractice in the project. End-users' satisfaction must be separately evaluated by third parties (reviewers) and justification of their recommendation, be them adopted by the developing team or not, clearly argued. Instead of asking for simple letters of commitment, end-users must commit through one, at least drafted, exploitation plan. Operational and organizational barriers should appear in that plan and counterparts in the risk management of the proposal should be stipulated.
- Some of those barriers are rooted in the same deficiency, i.e., the inexistence of a good command of the innovation methodologies on the part of the end-users involvement and the unwillingness of considering all the elements of a business plan on the part of the industry. Regular innovation management procedures and standardized market plans should be inevitable at the time of presenting a proposal. Innovation management systems must be explicit in order to recognise the end-user as a valid one. Otherwise, just being a good wishing but inappropriate partner won't be of any help.
- Considerations about the innovation mechanisms in the end-users must appear in the evaluation of the proposal. A section must be devoted to that and third party expert appointed to the evaluation, in the same vein that ethical or gender issues are (or should be) evaluated. Equally, business experts must evaluate exploitation plans.
- It is important to emphasize that technology doesn't solve problems: technology solutions do. And technology solutions are more complex that a mere development of a prototype or pre-prototype. Thus, any development project must include some demonstration exercise and perhaps that exercise might take place within different end-users than the ones participating in the project, as to test everything without interferences and preconceptions. If there are such perceptions in the users, they must be detected beforehand and be covered by credible, feasible and verifiable risk management countermeasures.
- Although the study of social and personal barriers to adoption of technology and social impact is a science that takes years running, the fact is that the professionals involved in it provide a vision that highlights the high degree of dispersion and the low level of maturity. Moreover, the continuing rapid evolution of technology necessitates continuous updating in this area and a multidisciplinary approach.
- There is a remarkable lack of awareness among design teams. On the one hand the concept of "user experience" has become a competitive advantage for some successful

brands and many people become aware of it. However this is only one of the elements in the field and often is not taken into account in R & D. It is easy to find companies and developers whose position in front of to the lack of acceptance of the services or devices, or the inappropriate use of them, is just thinking in increasing user training.

5.2 NSMC Workshop

During the discussion on the topic emerged these comments:

- o   Adoption is too uncertain

    - •   Typical situations in which there is a demand for a new solution, but users are concerned about changes and possible barriers and problems that occur in connection with the adoption of the new technology

- o   Exclusion of end users from development

    - •   The overall benefits of a solution depends how effectively end-user works with it. The development must operate in synergy with the end users which can give valuable inputs

    - •   Must be clear requirements and shared understanding between users and developers

- o   Incompatibility with existing user context

    - •   Solutions must be provided with respect to existing solutions the user has.

    - •   "Too simple for current needs" - sometimes it can be counterproductive, the solution should be as simple as possible

- o   Lack of trust

    - •   The problem of attitude. For example the monitoring of users can be understood as some kind of spying them.

- o   Lack of usability

    - •   The solutions must be understandable and functional, otherwise it can bring rather than usage problems – e.g. bad orientation in the data collected.

    - •   New technology leads the users to new habits.

    - •   New technology will have certain level of faults before (because it is new).

- o   Insufficient communication

    - •   The solution must be easy to run, understand and work with. This is extremely important, because this is main reason of increasing willingness of potential users to use and adopt the solution.

- o   No perceived need

    - •   Should be seen concrete problems of existing systems and find their solutions

where there is a demand

Missing barriers

- o Costs

- o Documentation & user training

Conclusions

The following suggestions were formulated by common discussion:

- o Adoption is too uncertain

    - Example use-case and clear business case is crucial for successful adoption

- o Exclusion of end users from development

    - Shared understanding between users and developers

- o Incompatibility with existing user context

    - Remove: "Too simple for current needs" - sometimes it can be counterproductive, the solution should be as simple as possible

- o Lack of trust

    - Add: Private information/privacy protection – big issue today

- o Lack of usability

    - Key aspect, great importance

5.3 ADS Workshops

The Cluster representatives were given a presentation on the FIRE project findings in D6.1 and asked for comments on the barriers to adoption of Trustworthy ICT technologies identified by the FIRE project, including whether anything was missing from the analysis. Attendees were interested in the analysis and thought it was useful, took copies of the results summary leaflet provided for reference, and requested electronic copies of the material.

Attendees made the following comments on the main barriers identified:

- No perceived need.
    - o Need to start from what the perceived problems with current systems are, and the motivation for wanting a new solution.
- Adoption is too uncertain.
    - o It is also the case that if (large) customers specify that the supply chain must adopt such technologies they will be forced to do so.
- Exclusion of end users from development.
    - o This really means 'Does not meet user requirements'.

- Users are not normally closely involved in development, though they can have a role in providing inputs to market research and testing of prototype solutions.
- Incompatibility with existing user context.
  - The business strategy of buyer organisations must also be compatible with such solutions. For example some large companies (e.g. utilities) and public sector organisations have legacy systems using insecure architectures based on Window NT/ XP and security improvements would negatively impact on their operations.
  - Lack of competence in the buyer organisations is also a problem. If key decision makers do not have the expertise to assess such solutions and relate them to their needs adoption is harder. This is one reason why some buyers buy from Large Companies rather than SMEs as they judge this to be a lower risk approach.
- Lack of trust
  - Cultural/ attitudinal barriers are important e.g. IT Department managers being reluctant to adopt new security technologies because of previous bad experiences, or concerns about their impact on day-to-day operations.
- Lack of usability.
  - Agreed to be a key issue.
- Insufficient communication.
  - Overlaps with 'Exclusion of end users from development'.

The following barriers were felt to be missing:

- Insecure User Behaviours.
  - Most major companies in the UK are dependent on IT. Many organisations have adopted ICT systems without properly considering cyber security and privacy issues, and are sometimes choosing to use this IT in ways that are not properly secure (e.g. not using encryption) and do not appropriately address privacy.
  - Some young people choose to use technologies in ways that are not properly secure and do not appropriately address privacy, for reasons of convenience and because they are not fully aware of the dangers.
  - Some parts of the IT Industry make it hard for users to make informed choices about software they buy/ install/ use (e.g. non-transparent terms and conditions, complex user interfaces), making it harder to use buyer power to drive improvements in software quality, security and privacy.
- Cost.
- Training and documentation requirements.

Conclusions

The workshop attendees endorsed the main findings of FIRE Deliverable D6.1. Suggested changes to the current barriers identified in Deliverable D6.1 are:

- No perceived need.
  - Add the following issue:
    - No perceived problems with current systems. No motivation for wanting a new solution.

- Exclusion of end users from development – change title to 'Does not meet user requirements'.
  - Overlaps with 'Insufficient communication'. Add the following issues (taken from 'Insufficient communication' barrier):
    - The product is not distinctive enough.
    - User needs under-represented.
- Incompatibility with existing user context.
  - Add the following issues:
    - Incompatible with business strategy of buyer organisations.
    - Lack of (technical) competence in buyer organisations.
- Lack of trust
  - Add the following issue:
    - Cultural/ attitudinal barriers.
- Lack of usability.
  - No changes suggested.
- Insufficient communication.
  - Remove the following issues:
    - The product is not distinctive enough.
    - User needs under-represented.

The following barriers were felt to be missing and should be added:

- Insecure User Behaviours.
- Cost.
- Training and documentation requirements.

6 RESULTS

The previous results have been compared with the original document. Many of them were already present there.

Some comments come from different workshops but share a common approach and have been reworded to comprise them.

6.1 SUMMARY OF COMMENTS ON INDIVIDUAL BARRIERS

1- **Exclusion of end-users from development**

Some reasons for users exclusion from development or inefficient inclusion:

- Lack of clear market target for the final result.
- The fast evolution of technology forces a continuous revision of initial user needs and market targets.
- Solutions should be able to go beyond user's expectations and the differential added value should be clear enough to motivate investment and adoption efforts
- Users involvement should be faced from a business perspective to be effective. It should include prizes, distribution channels, production costs, etc.

Good Practices and recommendations:

- Living labs allow identifying real needs and problems from people.
    - User involvement is used all along the design cycle.
    - Living-Labs: User centric design based on short iterative design cycles. Mature technology. Emphasis on making technology easily accepted and properly used.
    - Example: http://www.people-project.eu/portal/
- Users must be qualified to participate in a project development. There must be a system of innovation management able to:
    - Enable regulated interactions with the environment
    - Analytic for impact assessment.
- Solution could improve by adding some degree of uncertainty to use user's profiling, for example including profiles not directly targeted to explore non-foreseen uses and reactions.

2- **Incompatibility with the existing user context**

- Incompatible with business strategy or technical competence of buyer organisations.
- User's need not have been adequately identified, non including context of target.
- Users' needs could be similar but their context could be too different through potential customer.
- Users involved in R&D have a precise context, like in the living labs approach. This is a limitation that must be addressed.
- Cost is confirmed to be an important context factor.

3- **The adoption entails too much uncertainty**

- The industrialization phase takes usually two thirds of time and effort in the development of a new product or service. It includes changes with potential strong influence in users perception and acceptance.
- Companies (and individual) are reluctant to invest in technologies when the standard and interoperability scenario is not well defined. This is an advantage for big companies.

4- **No perceived need for the technology**

- People are saturated of technology and innovations. It is increasingly difficult to have the chance of being just considered.
- Solved needs are increasingly superfluous.
- No perceived problems with current systems. No motivation for wanting a new solution.

5- **Insufficient communication**

- People are overloaded of offers and multimedia multichannel messages. It is extremely difficult to get the attention of anybody.
- There is much rumour, noise and poor information. For the end user it is difficult to distinguish.
- Social media has the potential of strongly influence perception, trust and acceptability of a new device or technology. Before any development, marketing efforts should be carefully analysed and its feasibility evaluated.
- Training and documentation requirements.

6- **Lack of usability**

- Usability makes a huge difference in users acceptance and adoption.
- Nowadays the **time that users need to invest** in adopting a new product of services is a critical element of market success
- New technology **leads the users to new habits**
- Project **should include experts in usability and training** that usually are not the same people who develop the technology. It is necessary to include expertise in accessibility, ergonomics, and other similar knowledge. Evaluation should pay attention to this in R&D projects.

7- **Lack of trust**

- Cultural factors have a lot of weight and can lead to the success or failure of a system.
- Honesty is needed from business to generate trust in people. Ethical issues in vendors like ethical certified software and processes should be a must.
- The loss of trust affect to the full ecosystem (i.e. online banking).
- Dual technologies (i.e. monitoring is suitable for surveillance) can create an understandable rejection.
- In general, lack of trust is also related to aversion to change, so considerations about change management are pertinent here too.

- Technological evolution is problematic for many businesses and individuals. This can reinforce the attitude of rejection to change.

As a recommendation, establishing a climate of trust implies:

- Transparency in solutions (clear interfaces, easy to read and understand terms of use)
- Codes of conduct of suppliers validated by trusted third parties.
- User centred design,
- User empowerment
- Accepting responsibility for development mistakes
- Guarantee the privacy and protect online dealings
- To guarantee service and business continuity

8- **Other barriers**

- Privacy is a growing concern for technology adoption.
- For many people there is a too low awareness about consequences of sharing personal data.
- Privacy by design is a partial solution. It could only fix known problems but the real problems are those coming with the continuous evolution of technology and its use.
- People are increasingly pressed to choose to resign the privacy of their data or be excluded from the digital society

6.2 Suggested changes in the current barrier definition

Both identified barriers included in point 8 are relevant enough to be addressed specifically

6.3 New identified barriers

Lack of empowerment

It happens to all, including digital natives, due to the fact that technology evolves fast. It is not the same being able to use the technology than doing it secure and adequately.

The lack of empowerment motivates insecure User Behaviours, from companies and from citizens.

Lack of competence in the buyer organisations is also a problem. It could benefit large companies instead of SMEs.

6.4 Recommendations to overcome and understand barriers

There is a paradox about security: buying security makes people feel unsecure. Selling security creates anti-technological resistance and reduces trust. The key is to change the concept: from security to resilience.

Technology has proven to impact our lives far beyond expectations and it becomes an enabler of deep social changes (e.g. the potential of intimacy breaches, the risk of data aggregation,…). People can't usually make such analysis by themselves. The potential social impact of

technology must be carefully studied and citizens and decisions makers must be informed. H2020 should include a methodological analysis of social impact and support those more positive in a broad sense.

Although the study of social and personal barriers to adoption of technology and social impact is a science that takes years running, it is in a low level of maturity. Moreover, the continuing rapid evolution of technology necessitates continuous updating in this area and a multidisciplinary approach.

There is a remarkable lack of awareness among design and development teams. On the one hand the concept of "user experience" has become a competitive advantage for some successful brands and many people become aware of it. However this is only one of the elements in the field and often is not taken into account in R & D. It is easy to find companies and developers whose position in front of the lack of acceptance of the services or devices, or the inappropriate use of them, is just thinking in increasing user training.

We should talk not only about barrier for adoption but we should worry instead about secure adoption and consciousness, as ICT become so mainstreamed. There is a lack of digital skills and a great gap of awareness in the population, also due to:

-   The current online risk is not so evident for people because the impact is not so broad.
-   It is probable that the online risk for every citizen will continuously grow up, as soon as more business models appear and get mature, based on illegal actions against people's devices.
-   The main motivation of companies is greed. No useful information about privacy concerns is easily available. No real desire to educate users and make them aware.

6.5 Recommendations to improve the impact in public funded research

-   Most of the expressed problems are coming out of an inadequate market analysis in the first place (in proposal time) and of an insufficient marketing plan or dissemination approach in the second (in project time). In principle, dissemination is a two-way channel and, as the sales function in any organization, must be receptive to signals from the potential market, and the R&D&I is missing this point. Unfortunately, there is also the possibility that the problems were detected but the project didn't envisaged suitable mechanisms of change management and correction, either by inability, or lack of willingness.

-   Simple endorsement of the proposal by the end-users is not enough. A good starting could be that all the proposals had organized a workshop with several end-users before writing them, or at least, had employed some tools of remote debate. The results of the debate must be explicit in the proposal, with the least elaboration by the proponents.

-   End-users participating in a project have to have their voice guaranteed, including the opportunity of autonomously communicate with the funding institutions about occasional malpractice in the project. End-users' satisfaction must be separately evaluated by third parties (reviewers) and justification of their recommendation, be them adopted by the developing team or not, clearly argued. Instead of asking for simple letters of commitment, end-users must commit through one, at least drafted, exploitation plan. Operational and

organizational barriers should appear in that plan and counterparts in the risk management of the proposal should be stipulated.

- Some of those barriers are rooted in the same deficiency, i.e., the inexistence of a good command of the innovation methodologies on the part of the end-users involvement and the unwillingness of considering all the elements of a business plan on the part of the industry. Regular innovation management procedures and standardized market plans should be inevitable at the time of presenting a proposal. Innovation management systems must be explicit in order to recognise the end-user as a valid one. Otherwise, just being a good wishing but inappropriate partner won't be of any help.

- Considerations about the innovation mechanisms in the end-users must appear in the evaluation of the proposal. A section must be devoted to that and third party expert appointed to the evaluation, in the same vein that ethical or gender issues are (or should be) evaluated. Equally, business experts must evaluate exploitation plans.

- It is important to emphasize that technology doesn't solve problems: technology solutions do. And technology solutions are more complex that a mere development of a prototype or pre-prototype. Thus, any development project must include some demonstration exercise and perhaps that exercise might take place within different end-users than the ones participating in the project, as to test everything without interferences and preconceptions. If there are such perceptions in the users, they must be detected beforehand and be covered by credible, feasible and verifiable risk management countermeasures.

  In many cases there is no real intent on the part of many participants to put the results to market.

7 CONCLUSIONS AND NEXT STEPS

7.1 Conclusions

The adequacy of the general approach of D6.1: only one new concept was identified in terms of barriers.

Most of the comments made along the workshops about the barriers were already included in the original barrier definitions.

There is a new barrier that comes out from the three workshops with different approaches, but sharing a same umbrella.

This is a field of research with the necessity to include multidisciplinary views. Even if the field is not young, the continuously changing technological environment makes it very much immature. There are many current approaches with sometimes divergent positions.

During the workshops of Madrid some speakers were invited to present success stories or approaches to user involvement. It is remarkable the diversity of views, some of them opposite, and the amplitude of the field.

Societal concern is a concept far beyond user involvement, acceptance or adoption. It should include also the social impact of technology. Specific methodologies should be developed for all of these.

There is a significant lack of awareness in the R&D community, including ICT industry and researchers. Nevertheless, it is perceived as an interesting topic when introduced.

Some of the answers and comments from the research community suggest a lack of awareness about the social barriers and implications of technology development.

It was also remarkable the unusual low answer from several dissemination lists of AMETIC (more than 2000 people) and on the contrary, the high involvement of the selected participants, during, before and after the workshop.

Improvements could be implemented to get a more effective user involvement in R&D project.

None of the current methodologies for user involvement are suitable for all circumstances. And none of them seem to be enough developed. But in any case, the adequate use of existing and emerging approaches could be promoted in R&D projects through some of the recommendations included.

7.2 Next Steps

This is a field of research with a broad and growing area to cover, as far as ICT systems grows in complexity and penetration in all areas of personal life, society, economy, etc.

At the same time there is yet a remarkable lack of awareness about the need to include social views in ICT deployment.

Within the FIRE project time framework, Dissemination of these main findings should keep going on from now, using several ways:

- In the context of general trustworthy ICT events, to create awareness in the R&D community.

- Including posts in distribution lists, highlighting recommendations for positive impact in the industry competitiveness.

It would be desirable to generate new dissemination material including main D6.1 outcomes and some feedback from this document in an integrated manner.

8 ANNEX A

Madrid workshop

9 ANNEX B

Participants in Madrid workshop:

Name	Company	Type of assistant
Jorge Sánchez	I4S	End user, financial sector
Gloria Díaz	CONETIC	SME association
Jose Fernando Carvajal	INDRA	Big industry
Javier Warleta	ETICAS R&D	SME specialized on social impact of technology
Javier Herrera	TECNALIA	Researcher, security and social innovation
Lorena Bourg	ARIADNA	SME, specialist in Living Labs
Juan Perete	IDN	SME
Juan Miguel Santos	UPM	Researcher
Belen Fernandez	UC3M	Researcher, security and privacy
Pablo Pérez	ESTUDNET	Senior consultant in Security and Trust
Sofía Moreno Pérez	FIRE	Consultant. CHAIR