1 Publishable summary

Trustworthy ICT research in Europe lacks a strong link with the information security industry, especially with European SME activities in the domain of trustworthy ICT. Information security SMEs in Europe find it difficult to derive benefits from trustworthy ICT research, in terms of learning about the state-of-the-art research and applying research results; focusing the research according to market needs; and using research results to improve competitiveness in the global market of information security products and technologies.

Europe is also very fragmented in research in the domain of information security and trustworthy ICT. Currently there does not exist any comprehensive or representative overview of all of the European research organizations and their respective levels of expertise and research activities in IT security or trustworthy ICT, which would be a useful reference for industry and other research organizations.

FIRE (acronym of "Facilitate Industry and Research in Europe") is a collaboration between leading clusters and associations of Information Security companies in Spain, United Kingdom, Germany, Belgium, Czech Republic and Estonia, covering six major parts of Europe. The objective of FIRE is to improve European industrial competitiveness in markets of trustworthy ICT, by taking into account of the needs of the Security industry in this domain, building on the unique combination of the international participant clusters in information security technologies.

The gap between the IT security industry roadmaps and the research activities performed in institutes and academia is currently too wide. FIRE aims to reduce this gap. To achieve this goal FIRE partners:
- Engage with end-users in the industry sectors of Health, Financial, Mobile, Energy and Government, with supplier industries and researchers, to identify their needs and the barriers between them,
- define a Strategic Research Agenda compiling all this information and experiences;
- generate a trustworthy ICT community in Europe through social media and ad-hoc tools;
- study previous projects to get best practice or identify barriers;
- compile experience from clusters and regional/national initiatives and benchmark them, analyse research policies and instruments and their impact in the field
- Build recommendations for EC that contributes to improve the impact of European research on trustworthy ICT.

These activities will strengthen the link between researchers and the needs of the industry, and will contribute to raising the European industrial competitiveness in the markets of trustworthy ICT.

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During the second year of the project, the main pillars have been consolidated and the following achievements have been made:

Maintenance and extension of different stakeholder groups

The FIRE project links different stake-holder groups represented in the next figure:
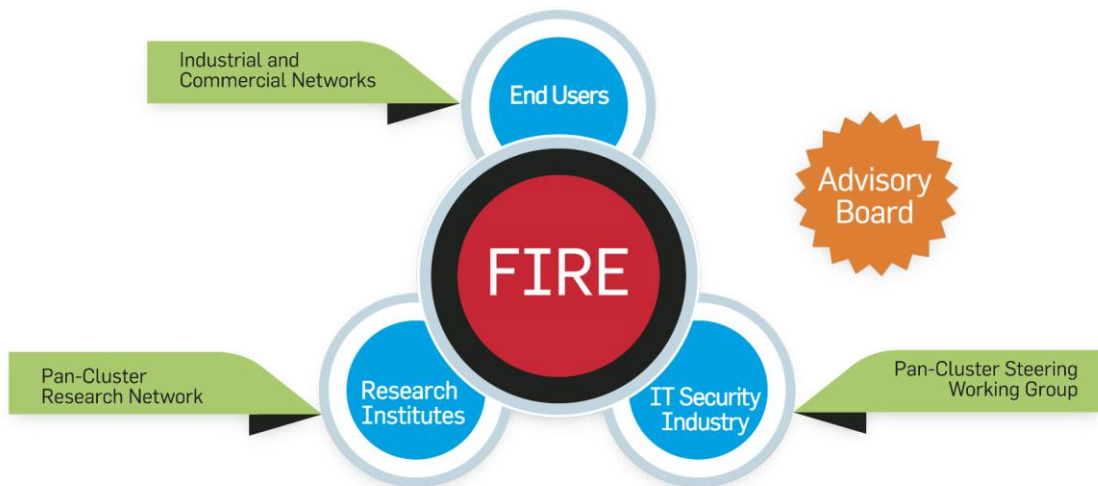
Figure 1: FIRE stakeholder community

- Pan-Cluster Steering Working Group

A group of key individuals from different clusters was identified to form the Pan-Cluster Steering Group. This group coordinates the activities between the clusters, and works with IT Security companies to capture their views.

During the second year, the Pan-Cluster Steering Working Group held four meetings in Gelsenkirchen, Brussels, Madrid and Jarandilla.

- Research Network

The Research Network was established including key members of the academic community from partner regions. The Research Network (RN) operated as a virtual network and was extended in some partner countries to include a wider list of academic members and IT industry researchers. Individual partners used their RN members for feedback on the user needs and to identify technical challenges.

- Industrial and Commercial Networks

Industrial and Commercial Networks have been formed to identify and propose Industry End-User Challenges for research organisations to be addressed. These have been based on five Industry Sector Themes: Energy, Finance, Health, Mobile Communications and Government.

- Advisory Board

An Advisory Board was set up to ensure that the project took into account the end-user needs in the alignment and prioritisation of the research programme. This board also contributed to future policy recommendations.

These groups are the basis of the FIRE community.

Research inventory/database for industry and researchers

A database was set up to include a complete directory of research in Trustworthy ICT offer and demand, based on the information gathered by the partners.

It is available for partners and website visitors to input data, via the website front-end and via password directly into the Content Management System.

Cluster data collection

A significant body of data on state of the art technology, research, programmes, etc. has been collected by the partners covering the status of the Trustworthy ICT industry and research in their countries and a SWOT analysis produced. The analysis highlighted common issues and gaps and synergies between the regions, forming a good basis for the development of the pan-cluster Research Agenda.

Barriers to research pull-trough and innovation

Analysis of the barriers to research pull-through and innovation and the solutions developed by high-performing clusters has highlighted recommendations to clusters and their management to achieve greater impact. In some cases the analysis has also highlighted recommendations to policy makers and Universities / Research Institutes to tackle issues that are outside the control of clusters. Recommendations to Industry are not considered, as individual companies should make their own decisions on engaging with other organisations to fit their commercial interests and it may not be appropriate for them to do so under some circumstances. In contrast, Clusters, Policy Makers and Universities / Research Institutes are specifically encouraged to collaborate with other organisations and there are incentives for them to do so.

Social barriers to ICT adoption in the domain of security- and privacy-related solutions

Existing EU projects related with security-privacy issues have been analyzed to understand the societal barriers to ICT adoption. In order to generate business opportunities one needs to avoid or otherwise address these barriers. Seven main barriers have been identified and six suggestions are made to reduce social barriers to privacy/ security-related ICT adoption in medium and long term.

Industry needs for Energy, Finance, Health, Mobile Communications and Government sectors

User needs have been captured during plenary gatherings, one-to-one meetings, e-mail and by an examination of the international literature. Of equal importance, preliminary drafts of this document have been reviewed by the ICNs, by the IT supply industry and by academia.

These users needs have been used as a primary input to the draft research agenda which has been shared and/or reviewed with the industry and academia.

59 itemised user requirements from the five domains of Energy, Finance, Health, Mobile Communications and Government sectors were identified. Of these, 32 have been identified as key user needs by users. These itemised user needs are seen a valuable source, in their own right, in contributing topics to the Research Agenda.

Research and industry challenges

Extensive interactions have been held with stakeholders from the academic community and the IT security industry to validate the user needs and identify key research challenges. Key research themes have been developed based on the user needs to highlight major areas of research to address them.

FIRE's Final Conference

The FIRE's final conference has been held in the MCE Center in Brussels under the title:

"Industrial & Research Challenges arising from User Requirements in Trustworthy ICT"

The objectives of the FIRE conference were outlined:

- The analysis of the existing gaps between IT Security research and industry.
- The pan-European analysis of IT Security requirements from Finance, Healthcare, Energy, Mobility and Government sectors.
- The key research challenges arising from user needs in Trustworthy ICT.
- The opportunities for the IT Security Industry and Research communities and clusters.
- The suitable strategies to match research activities with industry needs.

The event, in which the results of the projects were presented, gathered the key stakeholders in Europe from the field of cybersecurity.

The conference presented FIRE's major results on the analysis of the existing gaps between IT Security research and industry, the pan-European analysis of IT Security requirements from Finance, Healthcare, Energy, Mobility and Government sectors, the key research challenges arising from user needs in Trustworthy ICT and the opportunities for the IT Security Industry and Research communities and clusters. High level panellists gave presentations in 9 dynamic panel sessions, in which the audience had the opportunity of posting questions and sharing concerns about the Trustworthy ICT field. The discussions and final conclusions of the event were gathered in a public report.

In addition, the conclusions of the event were presented during the first day ISSE, on 14th October, embedded in a specific session of two hours.

Research Agenda

We anticipate that the Strategic Research Agenda will be one of the most useful outputs from FIRE project.

The Research Agenda draws on contributions from a large number of sources. It has used materials created from many other deliverables produced in the FIRE project. In addition, it also draws on other published material mainly from Europe and the United States.

In proposing a candidate Research Agenda, there is the danger of repetition and overlapping with other ones. So, in order to propose a complementary Research Agenda that is consistent with the existing ones where possible, partners have reviewed different Research Agendas and roadmaps.

The methodology followed to produce the Agenda is based on the ENISA Practical Guide on Development and Execution of National Cyber Security Strategies and the US DHS and I3P strategies and roadmaps. It was designed to be consistent and complementary with other EC work, and brings the views of the stakeholders together. This methodology focuses on the following "problem areas":

a) Vision: What is the vision for the Trustworthy ICT sector as a whole and for national / regional economies?

b) Environment (context): What are the significant influences/ change factors affecting Trustworthy ICT?

c) Baseline: What is the current situation in Trustworthy ICT?

d) Threats and challenges: provided by the Industrial and Commercial Networks giving the customer perspective, and the Research Network giving the technical perspective.

e) User needs: provided by the Industrial and Commercial Networks with contributions from the Research Network on longer-term needs.

f) Gap analysis: highlights a mix of short and longer-term problem issues, some strategic and some tactical.

g) Research Agenda: it draws together inputs from the three stakeholder groups and contains:

- Definition of a small number of "Key problem areas"
- Detailed R&D questions to be posed to researchers in these areas
- Outline of delivery mechanisms to ensure timeliness and relevance of research outputs.

The Research Agenda makes recommendations for 38 prioritised research topics which are grouped into 6, enduring, problem areas called themes.

Finally, the Advisory Board acts as an independent advisor to the project. They have reviewed the Trustworthy ICT research agenda as it developed, to ensure that findings are effectively disseminated to appropriate stakeholders and that changes that might require revision to the agenda are taken into account for later iterations.

Dissemination

Dissemination activities have been performed through a wide range of actions: project website, leaflets, social networks, presentations at events, etc. All the partners are strongly involved in this crucial activity.