Techniques for validating socio-economic requirements of industrial ambient intelligence service infrastructures

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ABSTRACT

Ambient Intelligence solutions in the traditional Industrial Service Industry pose a range of societal questions that need to be addressed already during the development phase. The eu-DOMAIN project is using a technique referred to as European Awareness Scenario Workshops (EASW) to stimulate an external assessment through a scenario-type approach. It will also validate the quality of working life, market and social impact as well as the cultural experience of the proposed solution through a participatory method.

INTRODUCTION

The eu-DOMAIN project [1] is developing an innovative ambient intelligence service platform for automatic and context sensitive offering and contracting of mobile web services across heterogeneous networks. The eu-DOMAIN platform will be validated in applications in the Industrial Service Industry, more specifically in the area of preventive maintenance of pumps and other technical installations.

Introducing Ambient Intelligence solutions in the traditional Industrial Service Industry pose several societal and economic challenges such as:

- Ethical issues including privacy

- Societal issues

- Political issues

- Legal and regulatory frameworks

- Sustainability issues

The infrastructure, applications and services to be provided out of the project clearly have the potential to make a major contribution to solving societal problems both through support in the delivery of directly relevant services.

PROJECT OBJECTIVES

The project analyses relevant trends and changes along five generic factors: ethical topic linked with privacy issues, socio-economic drivers, user and stakeholder requirements, political drivers related to legal and regulatory frameworks and sustainability driver dealing with ICT-trends and cultural environments. It identifies and quantifies the dynamics within these five generic factors and their impact on electronic service delivery (ESD). Major trends, which generally underpin the demand for ESD, are presented by category:

- Ethical drivers: this topic will take into consideration the problems related to privacy issues, particularly relevant as far as business intelligence is concerned but also in aspects of the service worker himself. In particular, the personal fear or discomfort of being monitored would be a driver to be taken into consideration.

- Socio-economic drivers: the demographic trend towards an ageing society; the trends towards a 'mosaic society' with increased employment flexibility and new forms of work; the increased demand for service quality; the trend towards customer orientation; the search for new models to improve service productivity and reorganization of service work.

- Political drivers and legal and regulatory frameworks: the provision of electronic signature laws; the emergence of institutions safeguarding technical and legal standards.

- Sustainability driver dealing with ICT-trends and cultural trends: technology development and convergence; technology liberalization and standardization; increased efforts to adapt technology to people and work; increased access to the Internet as well as computer literacy, e-Inclusion and positive attitudes towards ICT-technologies.

Much focus will be given to multi-lingual and multi-cultural interaction for diverse collaborative groups as well as societal acceptance and regulatory and policy issues of operating the eu-DOMAIN services. Focus on usability and intelligent interfaces will aim at alleviate issues of computer illiteracy and broadly promote e-Inclusion.

THE EUROPEAN SERVICE NETWORK SCENARIO

In a world where customers are the primary driving force in shaping product characteristics, features and use of technical products and installations, combined with the existence of a sophisticated communication infrastructure, i.e. the eu-DOMAIN, the basic product function of a pump will shift from simply moving water (or fluids) to be an integral, maybe even a crucial part, of the customers solution. The value created by the "ambient intelligence" functionality of the pump becomes a major part of the customers overall value creation. The pumps are "serving you – wherever you are – whatever you do – whenever you want it". We call this scenario: "Serving your every need!" The scenario can be seen in full at www.eu-domain.eu.com.

Ethical issues

Ethical considerations are focused on privacy protection of user's data and security issues.

The fundamental right to privacy is recognized in the European Convention of Human Rights and Fundamental Freedoms which states that everyone has the right to respect for his private and family live, his home and his correspondence.

Work-related information may be gathered through electronic monitoring. The first level of assessment technically enabled pertains to aggregated work-related quantities, i.e. the time an employee spends at the computer, the number of keystrokes he makes, etc. A more specific kind of information is provided by the "traffic-data" of online and telephone communication, i.e. the names of files processed and websites visited. A further increase in information density can be achieved through tools granting access to the content of files, websites, e-mails and phone calls and to the position of the user.

The personal fear or discomfort of being monitored would be a driver to be taken into consideration and also how trade unions or cultural drivers can influence the topic of electronic monitoring of workers..

Societal issues

In the eu-DOMAIN the focus is on the possibility for the workforce to have remote access to information wherever it is stored and whenever it is required. For example, a technician needs to have all the information related to an installation visualized in real time and remotely on his PDA in the exact moment when he enters a plant.

eu-DOMAIN will facilitate mobility and promote nomadic workers thus sustaining the shift from manufacturing to services in the labor force and will result in an economy based on intellectual rather than machine capital.

It thus aligns with the trend of general e-Work, which in the broadest definition encompasses any work, which is carried out away from establishment and managed from that establishment using information technology and a telecommunication link for receipt or delivery of the work.

According to this definition, nearly half of all establishments in Europe are already practising some form of e-Work, as shown in Figure 1 below. Countries like Sweden, Finland and Netherlands have high levels of e-Work sometime rooted in economic systems, which favour small firms, or with large informal economy.
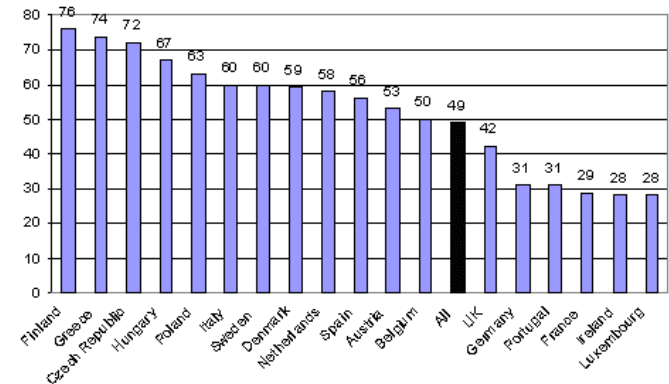

Figure 1. e-Work in Europe by country [2].

Political issues

The development of information technology and the growing need for privacy protection resulted in the EU Data Protection Directives and the Directive on Privacy and Electronic Communications. In the Industrial Service Industry that are several other important issues to be investigated such as legal interception, ownership of location data and access to and payment for content that must be solved in order to reassure content providers, service providers, customers and of course end-users.

APPROACH AND METHODOLOGY

The eu-DOMAIN project will validate user acceptance and exploitability by using, among other techniques, the European Awareness Scenario Workshop (EASW) technique. By this approach, it will be possible to:

- Measure the eu-DOMAIN exploitability and related impact.

- Analyse and throw it in the near future to assess potential socio-economic impact and immediate implementation effects.

European Awareness Scenario Workshop will be organised to stimulate an external assessment through a scenario-type approach (based on the user scenarios built) and a participatory method and validate the quality of working life, market and social impact of the proposed solution as well as the cultural experience noted by the end-uses.

Moreover, as the technical efforts for eu-DOMAIN take-up, this complementary activity is also necessary to develop the business model components required to bring the emerging eu-DOMAIN infrastructure into production and to sustain its services and operations over time.

For each user domain a principal scenario will be designed to foresee the natural evolution of the eu-DOMAIN infrastructure in its context of reference and measure the potential of the project given present conditions.

EASW description

The European Commission launched the European Awareness Scenario Workshop initiative in 1994 as a pilot action to explore new possible actions and social experiments for the promotion of a social environment favouring innovation in Europe [3].

The technique involves developing future simulation scenarios for each application by prefiguring possible extreme evolution schemes. A simulation scenario is built to compare the different possibilities of development of a technology from every point of view. Unlike traditional prognoses that basically extrapolate data and project them onto the future, great focus is placed on the behaviour of different social actors, including their conflicts and reactions to the examined project. Preparing a scenario also facilitates access to discussion of a project by the social communities.

Each laboratory will be attended by representatives of 2-4 socio-economic groups for a total of about six-eight per group. The number of groups and participants involved can change case by case according to specific projects characteristics. Possible profiles to be involved are:

- Technicians for buildings and facilities maintenance
- Facility managers, service providers
- Trade union representative
- SW and technology providers

RESULTS

The results of the EASW are:

- An analysis of the future trends for the industrial sector/technology of reference as presented by the developed scenarios.
- A common future vision.
- A set of actions describing potential intermediate activities that can bring to the selected goals.
- A wide exchange of information and a deeper understanding of mutual needs and expectations of each of the attending groups.

A report will be published illustrating the activities carried out and the outcomes in terms of preferences of different participating groups on solutions/scenarios.

ACKNOWLEDGMENTS

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