

fimecc

— Finnish Metals and Engineering
Competence Cluster

UXUS

User Experience and Usability in Complex Systems

The Draft of the Program Plan
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Renewing of our industry sector starts with this program!

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Abstract

- ▶ FIMECC Research Programme User Experience & Usability in complex Systems (UXUS) supports future knowledge creation and new practices in developing the user and customer experience excellence.
- ▶ The research objectives and business benefits are:
 - Developing the broader understanding of complex systems, usability and user/customer experience
 - Creating the better collaboration and communication with user/customers through the project/process iteration
 - Broadening the idea of product related design to human-centred design approach and solution creation as well as personalized user-experience design
 - Enhancing competitiveness and differentiation through personalized user/customer experience
 - Developing and utilising user interaction tools that improve user experience and productiveness
 - Developing design methods and/or models for facilitating customer driven solutions within complex systems

The Aim of the Programme

- ▶ The target of the UXUS programme is to increase the capability and competitiveness of Finnish metals and engineering industry by developing and implementing new design and collaboration methods that produce personalized user/customer experiences.
- ▶ The program offers an opportunity to learn about the latest knowledge of user experience in the context of open innovation and complex systems, together with different parties: companies, universities, research centers and end-users

Drivers for Change

- ▶ Trends that increase complexity and challenge in user experience, usability and design:
 - Future focus on comprehensive solutions, not only technologies or end-products
 - From customised to highly personalized products and solutions
 - Towards sustainable, full life-cycle solutions (zero emission)
 - Decentralisation of knowledge monopolies: innovation competence is based on the access for knowledge networks rather than the ownership of knowledge
 - Technology, products and services are seen as an enabler or and a platform rather than interface
 - Change in the role of user; user as a content creator, increasingly also a co-creator
 - Blurring of boundaries: multi-professionalism, interdisciplinary approach
 - The new technology dilemma: the need for presenting the complexities in a user friendly, simple way

Vision

In the Future:

- *The success and competitiveness of companies are strongly related to user and human oriented, sustainable processes, products and services.*
- *Collaboration in the open innovation network (cooperation of academy, research and industry) is a must in mastering the new and emerging innovation challenges.*
- *Knowledge transformation between research and practice, academy and business will be essential for ideating and innovation processing.*

Key Terms in the Programme

- ▶ ***User Experience (UX)*** means a user's perception of a device, product, service or system during its whole life-cycle in the given context (ergonomics, design, usability, technology, process, business etc.)
- ▶ By ***Complex Systems*** we mean the transformation from one-to-one user-product systems to personalised user experience in complex systems of integrated technologies and services that could involve many users
- ▶ ***Open Innovation*** means a paradigm shift from the innovation process to innovation networks where companies are actively using not only internal but also external partnerships for ideating and innovation processing
- ▶ ***User driven design*** means an approach to design where the focus is on the user, instead of the technology, product or service itself

Research Objectives

- ▶ Developing the broader understanding of complex systems, usability and user/customer experience
- ▶ Creating the better collaboration and communication with user/customers through the project/process iteration
- ▶ Broadening the idea of product related design to human-centred design approach and solution creation as well as personalized user-experience design
- ▶ Research promotes:
 - Creating the capability of the system development in the complex environments (business-process-R&D)
 - Developing user interaction tools that improve user experience and productiveness (practices for engagement)
 - Personalizing user/customer experience (a unique customer solution)
 - Developing methods/models for testing and observing user-experience and usability (user types and user behaviour)

Business Benefits

- ▶ Enhancing competitiveness and differentiation through personalized user/customer experience
- ▶ Developing and utilising user interaction tools that improve user experience and productiveness
- ▶ Developing design methods and/or models for facilitating customer driven solutions within complex systems
- ▶ Focus on creating:
 - The ground for radical and systemic innovations in business based on human-centred design approach and personalized user-experience
 - The best practises in the user-experience and adapting & implementing them in R&D
 - The understanding the idea of user/customer driven innovation
- ▶ *Renewing of our industry sector starts with this program!*

Knowledge Transformation - From theory to practice

1. **The analysis of complexity and capabilities**; their meaning to offerings, processes and competitiveness in the long run
 - Methods: Literature reviews and analysis of everyday challenges that companies face due to the increasing complexity (interviews, case-studies)
 - Result: Understanding of which kind of capabilities are needed in order to maintain and improve competitiveness in the future
2. **The development of solutions**; to increase usability in complex systems and capabilities in designing and developing the systems
 - Methods: Case-studies focusing on a particular R&D project or end-product/service and methodological development
 - Results: Understanding of the required changes and methods for implementing
3. **The network of partnerships**, knowledge sharing and learning; intensive collaboration between different partners
 - Methods: Open innovation workshops and projects
 - Result: Strategic change based on increased skills, capabilities, understanding and collaborating

UXUS Program structure

- ▶ Work is done about 50/50 in companies and in research institutes
 - Research institutes: Understanding theory and practices and their connection
 - Companies: Implementation of theory, case studies
 - Knowledge creation and transformation between participants
 - Scientific research supports case studies with companies and vice versa
- ▶ Program contains work packages with different scopes
 - Participation in one or more work packages
 - At least two companies per WP

Work Packages and Themes

- ▶ **WP 1)** Personalized user and customer experience as a business factor
- ▶ **WP 2)** Customer and user driven open innovation practises in R&D
- ▶ **WP 3)** Human-centred design processes of complex systems
- ▶ **WP 4)** Usability and new user interaction tools

WP 1) Personalized user and customer experience as a business factor

An unique user/customer experience can be seen as one of the indicators of an ultimate design success but its impact as a business success factor is indirect, vague and difficult to measure. In this research theme, the logics of the relationships will be defined, the differences between user and customer experience analyzed and methods for measurement developed.

- ▶ What is user experience (UX) in complex systems?
- ▶ What is customer experience (CX) in complex systems?
 - Which factors affect UX and CX
 - How UX/CX affect as business factors
 - How UX/CX can be measured

WP 2) Customer and user driven open innovation practises in R&D

The customer/user-oriented innovation has created growth and profit for companies through empowerment and engagement of users. In this research theme, best (incl. global perspective) practices for customer/ user driven innovation in complex systems will be identified; applied and further developed in case studies. The research theme will include international collaboration with world class companies and research institutes.

- ▶ What strategies for customer/user driven innovation are most effective for each particular participating company?
- ▶ What technologies can best enable the implementation of specific customer/user driven strategies by each particular company?
- ▶ What strategies and technologies can together provide the companies with global competitive advantage in customer/user driven innovation?
- ▶ How to take into account different cultures?

WP 3) Human-centred design processes of complex systems (human-technology-service)

Human-centred design is increasingly utilised to ensure easy usability, reliability and efficiency of highly-automated production, machines and control systems. The growth in industrial service business calls for new methods and processes. In this research theme new integrated approaches and methods to design complex systems (human-technology-service as a functional unity) will be developed; the best approaches, practices and solutions will be indentified; applied and further developed in case studies.

- ▶ Analysis of available approaches to model and design complex systems and ensure their usability
- ▶ Case studies with companies
 - Identification of main challenges
 - Applying available approaches
- ▶ Developing new design methods
- ▶ Identification of best practices

WP 4) Usability and new user interaction tools

Complex systems can be seen as cognitive entities constituting of different technical solutions with users in different roles. Usability, user experience and work efficiency in these environments can be improved with new user interaction tools that create e.g. realistic feeling of (virtual) presence and versatile ways to control the system.

- ▶ Interaction tools that utilise virtual and augmented reality
 - to facilitate new kinds of control rooms with feeling of presence, broad co-operation possibilities, realistic feeling of control
- ▶ Interaction tools for remote operation.
 - Important user experience factors: presence, being in control, trust.
 - Virtual modelling can be utilised in design and early user studies
- ▶ Interaction tools that facilitate users customising their own solutions
- ▶ Interaction tools solutions for learning user (novice – expert interfaces)
- ▶ Distributed and multimodal interaction tools

Possible projects ideas (Examples)

- ▶ Leading concepts of usability in complex systems
- ▶ The Ultimate UX Lab
- ▶ Tuning development organisation into UX-mode
- ▶ Open innovation in striving for an unique user experience
- ▶ Customer involvement in open innovation
- ▶ Developing organisational innovation capability for the future
- ▶ Utilising open innovation on-line communities in business
- ▶ Roadmap as a framework for user-driven open innovation methodology development
- ▶ Defining automation level - a challenge for a flexible factory concept
- ▶ Remote operated machine -systems and user-centered design
- ▶ Managing Open Innovation - A Learning Model
- ▶ User-centred design in complex systems - challenges of sustainable development in industry
- ▶ A cross-cultural method for user-experience modelling and testing

Participation to the UXUS program

- ▶ All Finnish companies and research institutes can participate
 - Share holders and non share holders of Fimecc
- ▶ The program content and the work packages will be agreed together
 - Fimecc steering group defines scope of the program and then prepares program plan with participants
- ▶ The program results will be shared among participants
 - All results, created within the program, can be utilized free of charge by all program participants
- ▶ Efficiency of the research work
 - Companies get more work and results with same money than in Tekes-programs
 - Basic things are studied and developed together

Budget and funding rules of the program

- ▶ Program budget 1 – 3 M€/a and duration 3 – 5 years
- ▶ Companies have to create 50 % of costs at program level
 - Accepted costs are same as in Tekes-funded projects generally
 - ▶ Own personal costs (salary + added costs)
 - ▶ Subcontracting costs (from other companies, research institutes)
- ▶ Public funding **at program level** can be up to 60% or 75% depending of publicity level
 - 60%: Publication of company results as in Tekes-programs
 - 75%: Publication of company results: Same requirements as for research institutes
- ▶ Funding at participant level, depending on the participant
 - Company specific Tekes-funding limits as today (company size)
 - Research institutes: 70% Tekes-funding

Schedule

- ▶ Project planning and network building 2009-2010
 - *Now is the time to have an impact on the program: bring forth a project idea together with resources related to the program work packages!*
- ▶ Execution of first projects:
 - target year 2010-12
- ▶ New projects:
 - target year 2011-13 and
 - 2012-14

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