

7.1 INNOVATION OPPORTUNITIES

Current innovations in the area of future workspaces demonstrate the potential to considerably change our way of working, affecting also our daily lives. ICTs have an important role to play in supporting mobility, collaboration, context- and location-awareness, networking and ambient interfaces to enable people to work together irrespective of constraints in location and time. A key challenge is to support efficient, intuitive, user-centric work environments where technology is aligned to the demands of people working in organisations and communities of individuals.

Mobile and collaborative technologies alone can only address some elements of workspace innovation. A holistic concept of workspace innovation and ICT solutions is needed, giving due considerations to the different viewpoints and instruments: market pressures, people issues and workspace organisation.

Traditional views on mobile working are confined to supporting the mobility of individual workers in order to increase individual productivity. This perspective should be broadened to include the mobility of the workplace and mobility of the work as well as in the view of improving collaboration among individual workers in order to increase inter-personal productivity and to stimulate creativity and innovation. The vision is that the workplace enables work to be carried out where and when it is found beneficial for the individual workers and for the collaborating groups or communities of workers, and to that end the workplace infrastructure must adapt to the demands of collaborating people.

Given the productivity gap between US and Europe in exploiting ICTs, and given the trends towards global working, it definitely constitutes a real challenge for Europe to develop innovative collaborative workplace concepts that enhance productivity and human creativity, and that integrate these concepts into smart organisations and environments such as on-line communities of eProfessionals.

7.2 DEPLOYMENT CHALLENGES

In mobile working, first success stories of supporting the mobile individual exist, in different sectors. However, the current examples are often disintegrated, lack courageous process and organisational redesigns, and are ambivalent regarding change management as they are looking mostly towards the workers performing non-collaborative activities.

A balanced change strategy should improve the flexibility of processes, organisations and regulations. The determinants of ICT competencies among employees must be addressed, to adapt faster to technological opportunities and to align opportunities and demands. ICT solutions should allow more flexible integration with adjacent systems. In the long run, the development of new working environments yields a seamless e-integration along inter-company value chains.

The transition between traditional ways of working to mobile and multi-location ways of working presents risks as well as opportunities to do things that could not be done before. It is necessary to understand the requirements for working in the new e.g. dispersed environments.

In engineering sectors, mobile and collaborative working enables companies to shorten product life cycles, to accelerate product development, select better solutions and to handle more complex design and engineering issues. A number of barriers need to be overcome in order to integrate mobile and collaborative technologies in engineering. Among the barriers are: organisational readiness for deploying mobile technologies; lack of adequate business models for guiding the collaboration between multiple partners; lack of integrated platforms, which should provide seamless access to information, tools and experts; lack of robust and reconfigurable devices to support various processes and communication.

In order to overcome the bottlenecks, the following activities must be part of a roadmap for innovation. In the short term we advocate so-called Living Labs research for concurrent user involvement, to experiment with different approaches, piloting current technologies and studying the human behaviour in simulated future scenarios. Mobile virtual reality and augmented reality environments may be studied in short term and human factor issues can be examined to develop adequate mobile devices. Mid term research would include standardisation issues among which the building blocks for a mobile and collaborative working reference architecture will be defined. In the longer term, completely interoperable and seamless services must become available along with context-aware interfaces.

In health and wellbeing, the key innovation is to establish a pan-European care service, provided by a citizen-centric network of professionals. This care service should be able to implement innovative health services scenarios, such as distributed healthcare provision, responding to major incidents, and we-centric services to the elderly. This vision can be realized by appropriate application of technologies within the larger context of managed change in the health and wellbeing sector: that is, systemic innovation. There are several preconditions to be met as part of a roadmap for innovation. These include an affordable infrastructure, trust management, including security and privacy of patient data, and suitable business models underpinning collaborative working in the sector. Large-scale trials (Living Labs) are important to accelerate the innovation cycle and to involve users at an early stage.

Regarding rural and regional areas, we expect a growing importance of implementing strategies for innovation and creation of high-quality working environments, resulting in electronic support of partnering, collaboration and doing business as well as education and learning. Regarding the current situation, there are many differences among the many geographical areas and types of rural areas in Europe. For example in the New Member States, Internet and mobile or wireless access infrastructure is a bottleneck for realisation of innovative regions. There are several challenges to be met in order to realise a roadmap of innovation. These challenges include the fostering of initiatives to support ICT education among rural workers, to set up pilots for promotion of ICT-enabled collaborative workplaces in particular to support the collaboration between SMEs, and to raise awareness of good practice regarding new forms of collaboration. Again, the setting-up of Living Labs will contribute to acceleration of innovations contributing to innovative regions.

7.3 STRATEGIC CHALLENGES AND AGENDA FOR INNOVATION

The most important lessons conveyed by our scenarios, exploring various aspects of the vision of people-centric networked workplaces, are the following. Global division of work will be a major development, but work-life balance issues could hinder its full development and undermine current social models. Mobile workplaces can support the globalisation of supply chains and work environments, but require new forms of leadership, coordination and management.

The vision of e-professionals collaborating in self-organising communities is among the promising models for the future but will require new business models, work regulations and IPR arrangements.

The key strategic challenge is to realise the potential inherent to the various innovations in the area of mobile and collaborative working, to the benefit of business, society and people. To that end a number of major directions that will drive innovation in mobile and collaborative working must be pursued. These directions include:

1. The creation of better work regulations, IPR, policies, processes, business models and applications for flexible working anytime and anywhere. Social and legal arrangements as well as adequate business models must support the implementation of flexible work environments.
2. The development of standards and infrastructure allowing for interoperable and plug-and-play mobile and collaborative work environments. There is a need for reference models, standards and ontologies enabling a seamless, ad-hoc setup of cooperation processes as well as seamless transition of the mobile worker between different working contexts, domains and locations.
3. To develop a better ability for contextualisation of teamwork environments, and for mobile team workplaces, to make collaborative workspaces responsive to external changes. For example, the development of adequate security policies for virtual and mobile team workspaces is a necessity, as well as the development of team awareness services, and the sharing of multi-dimensional work contexts (such as working simultaneously for different companies).
4. To apply the technologies to activities now clearly gaining in importance. One of these activities is collaboration across multi-disciplinary teams in handling an emergency, including immediate rescue, arranging the logistics for support, provision of support for distributed healthcare teams, restoration of basic infrastructure and beyond.
5. To realize a paradigm shift from application oriented to activity oriented collaborative systems. New working environments will be characterized by flexibility, mobility and ad-hoc communication requirements. Collaboration-aware work environments will support cooperation and interaction in terms of activities instead of technical functions.

7.4 IMPLEMENTING THE INNOVATION AGENDA

In order to implement the strategic agenda for innovation and to realise the potential that is inherent in the innovations addressed, the following actions are recommended.

1. To identify and elaborate the key domains for application of mobile and collaboration technologies and to focus on solving important business and societal problems. As an example we have mentioned the handling of emergency situations.
2. To stimulate the collaboration between various research groups and companies worldwide and communities such as Aml@Work operating across the 25 EU member states for the IST research programme dedicated to eWork, in order to cope with the new realities of global working;
3. To set up an international network of Living Labs in the area of innovative work environments, exploring and demonstrating the potential of the various mobile and collaborative working scenarios, to support the collaboration between users and developers, to create and disseminate good practices; and to understand the human and social impacts;
4. To strengthen the focus on multi-disciplinarity in mobile and collaborative workplace innovation, bringing together technical, social, organisational, behavioural and business disciplines;

5. To bring together the separated discourses related to working environments, hosted by different government departments and the different European Commission Directorates-General.