Future Workplaces, towards the “Collaborative” Web

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Abstract
The knowledge-intensive information economy is upon us while at the same time existing working organisation and tools are not anymore appropriate to support remote knowledge workers collaborating together, their concurrent tasks and related information “tsunami” over flooding them. As a consequence, working organisation is shifting towards networked individuals driven simultaneously by the necessity of focusing on core competency while increasing creativity and innovation to remain competitive on the global market. These in turn push organisations to implement new ways of working and interacting among diverse competency fields that require more effective and efficient collaborative working environments. This paper presents the vision of turning the traditional information based World Wide Web into a new paradigm: the “Collaborative Web” acting as a kind of universal Collaborative Working Environment connecting not only documents but all collaborative resources and processes as well. It could be seen as a ubiquitous collaborative workplace following the worker wherever he is and connecting him instantaneously with other collaborating resources and processes as a kind of knowledge hub. The results of a community based on-line survey conducted on the MOSAIC website and dedicated to mobile collaborative workplaces is presented and analysed. An attempt is made to better characterise the mobile collaborative workplace in drafting a tentative “Workplace Effectiveness Map” considering together the four critical elements of purpose, performance, balance and networking. The paper concludes in introducing several research challenges that need to be addressed in the short, medium and long term.

Keywords
Collaboration, Collaborative Work, Collaborative Web, Collaborative Workplace, Mobile Workplace, on-line communities

Communities’ Topics addressed
Collaboration@Work: New collaboration approaches, Community based Collaborative Workplaces

1 Introduction

Ever thought too much emphasis is placed on managing individuals in the workplace as if it could be something increasing employees’ productivity. Perhaps instead we should reduce the organisational ‘sickness’ that results from rigid military inherited hierarchical way of managing employees at their workplaces in adopting a radically new management approach such as the “New Synergy” approach proposed by Gartner and MIT in their report: “The Agile Workplace: Supporting People and their Work”, Dec 2001.

As mentioned in the 2004 UK Flexible Working Survey, which canvassed the views of management and staff within a wide range of companies over one year, has produced a series of statistics about the experience of flexible working at home, on the move and in the office and attitudes to current practices, “With Technology, Mobility is the most important factor of change
in the workplace. Technological solutions for the workplace increased so dramatically that investment into new IT and ICT solutions become out of date in a matter of months and organisation have to face no or low return on investment, unless their technological choices have an impact on the performance of their staff and increase profit. A greater understanding of the complex interaction between individuals (employees and managers with all stakeholders) and the organisation within a working environment, which is today not constant, is required” [Puybaraud, 2005]. The research analysed flexible working experiences in a range of key areas, including: use of space, working patterns, the workplace as a social space, technology impact, communication, management and organisation.

Nowadays, there is still a dramatic gap between capabilities of current collaboration approaches and the needs of networked businesses, including eProfessionals, looking for adaptive, cost-effective and scalable business collaboration solutions [CE-NET, 2003]. Clearly, there is a need to develop a systematic and holistic approach to rapidly forge collaborative platform based on ubiquitous, anywhere and anytime, and affordable, easy and cheap, collaborative working environments using a secure and interoperable collaborative infrastructure within a multidisciplinary, multicultural and multilingual context. Ultimate goal is to realise the vision of turning “inside-out” people competencies as plug-and-play collaborative Internet business communities.

This paper addresses on-line collaborative workplaces and Collaborative Working Environments (CWE). Our goal is to evaluate how future innovative collaborative workplaces could enable plug-and-play collaboration capabilities among individuals and their working environments. In short, we try to give elements that enable people to answer themselves to the following question: “Is the Network becoming, soon or later, the ubiquitous global collaborative workplace shared by knowledge workers?”

The actual mutual interest of employers and employees for flexible working combined with the perspective of substantial productivity increase as well as being a source of more creativity and innovation are certainly the most important drivers to speed up the research and development of new collaboration approaches and technologies. Whether this actual collaboration movement will constitute the starting milestone of the “Collaborative Web” acting as the ubiquitous global workplace is another story…

2 Existing theories and work

2.1 Future Workplaces

In the 2004 UK survey on flexible working [Puybaraud, 2005], it is mentioned that “The Holy grail for any organisation is to assess employees’ productivity and increase it”. However, in this case productivity is subjective and depends on many factors such as motivation, well-being, morale, job satisfaction, and level of provided support as revealed in this survey. Other research studies are clearly showing that the pressure of business overload and bad management is strongly affecting physical, emotional, and behavioural health at work.

Interpersonal productivity and Johari Window

Within another document related to collaborative strategies it is said: “With the start of the new millennium, there has been a recognition that most of the productivity increases will come from interpersonal productivity” [Sayler, 2002]. While productivity of individual work has been considerably increased for years by Information Technology (i.e. computers and tools), very few has been done in term of collective or collaborative work and interpersonal productivity. Actual business cases of mobile work are also mainly focusing on the increase of individual productivity while mobile and collaborative technologies are sitting on huge possible gains of interpersonal productivity. All problem solving applications, trade-off management and other decision support applications are just illustrating the increasing need to speed-up multidisciplinary tasks.
A model known as the Johari Window [Luft and Ingham, 1969] illustrates the process of interpersonal communication. It is a very popular and easily understood model of communication. The Johari Window is essentially an information processing model. The model employs a four-part figure to reflect the interaction of two sources of information - self and others. The squared field, representing the "interpersonal space," is partitioned into four "regions" with each region representing particular information-processing elements that have significance for the quality of relationships.

The Arena is the portion of the total interpersonal space devoted to mutual understanding and shared information. This known by the self - known by others facet of the relationship is thought to control interpersonal productivity. The assumption is that productivity and interpersonal effectiveness are directly related to the amount of mutually-held information. Therefore, the larger the arena becomes, the more rewarding, effective, and productive the relationship is apt to be. The arena can be thought of as the place where good communication happens. One can increase the size of this region by increasing the amount of exposure and feedback seeking.

One can significantly influence the size of the Arena in relating to others by the behavioural processes you choose to use in your relationships. To the extent that you make others aware of relevant information which you have and they do not, you enlarge the Arena in a downward direction reducing the Facade. The process employed toward this end has been called by Luft and Ingham the Exposure process. It entails the open and candid expression of feelings and factual knowledge. Yet it takes two to communicate and the other party must also expose in order for communication to be productive. Therefore, active solicitation by you of the information of others must also be employed. This process is known as Feedback Solicitation. As one solicits feedback, the Arena extends to the right reducing your Blind spot. You can establish truly effective relationships if you will engage in optimum Exposure and Feedback behaviours solicitation. The fact is, you have the primary responsibility for the productivity of, and the interpersonal rewards which can be derived from, your relationships with others.

The Agile Workplace

The “Agile Workplace” study report was recommending moving beyond alignment towards work-centric agile workplaces [Gartner and MIT, 2001]. It concluded that agile workplaces were representing the next important step in workplace evolution and alignment of space and work was considered innovative, if not radical, only a decade ago but then became a mainstream practice. Though, it was also recognised in this study report that it is quite difficult to evaluate workplace performances. Gartner Group, in the 90’s made the assumption that by 2006, people will spend nearly 70 percent of their time working collaboratively — and not necessarily face to face. For years, decisions about people, systems and settings were made separately by human resources, information system and corporate real estate departments. The explosive impact of unstructured knowledge work, virtual integration and compressed time frames change all that, forcing enterprises to adopt an integrated approach to how people work, where they work and with whom.

They have also made the prediction that change will generate three paradoxes:

- The more electronically connected we become, the more organizationally and emotionally disconnected we become.
The more information we have at our fingertips, the less time we have to sift through and understand that information.

The freer and more mobile we become because of technology, the more tethered we become to that technology.

Conceptually, the New Synergy represents a coordinated ecosystem of people and systems and settings, all of which are so interdependent that changes to one affect all of the others. Three themes underscore the New Synergy:

- A galvanizing purpose that advances personal and professional values
- Leaders who can generate unity and purpose, thereby drawing people into communities
- Social and knowledge networks that serve as the primary connective tissue in increasingly dispersed and project-oriented organizations

The New Synergy is founded on an integrated perspective toward leadership, purpose, people, systems and settings. In other words, through a clear sense of purpose, leaders build a culture. Culture attracts a community of people. Those people use systems and tools to support and drive that purpose, and the workspace provides the setting in which leadership, purpose, people and systems play out (see Figure 2).

With people theoretically free to move wherever their brainpower takes them, they will seek identity, purpose and belonging — not from corporate logos, but from communities of meaning, which include geographical areas of economic opportunity, professional affiliations, work teams, enterprise visionaries and collective purpose. They will look to the workplace not as a destination, but rather as a way to create social bonds, tap into people’s knowledge, brainstorm, experience culture and share ideas. Indeed, the concept of “workplace” breaks through physical barriers and becomes a blend of physical, social, logical and electronic work settings.

### Figure 1: The Changing Psychology of the Workforce (Source: Gartner Research)

<table>
<thead>
<tr>
<th>Traditional Psychology</th>
<th>New-Millennium Psychology</th>
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<td>Influence through organization</td>
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<td>Employer-defined career planning</td>
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<td>Individual knowledge</td>
<td>Community of knowledge</td>
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### Figure 2: Creating the New Work Synergy (Source: Gartner Research)
For many organisations, community is a simple yet powerful concept as being “The Resonant Workplace” — people connecting with other people through common purpose, peers, goals and interests. Whether face to face or virtual, a community of likeminded people creates belonging, trust, passion, learning and relationships — all of which fuel performance, motivation and ingenuity. Community gains momentum in the knowledge workplace as people gravitate toward work, ideas and informal groups that enrich them intellectually, hasten their learning, keep them sharp and keep them informed. Equally important, many people will feel a greater commitment to their social and knowledge communities than they will to their organizational manager or even to their employers.

Operating Principles of Workplace Communities

It is suggested 10 operating principles for communities. Taken seriously, they provide a road map for successful workplace communities.

1. Communities are self-selecting and often self-forming.
2. Communities differ from organisational units.
3. Communities bonds are stronger than organisation bonds.
4. Community and hierarchy are opposing forces.
5. Community leaders emerge, they are not appointed.
6. Communities need leaders, not managers.
7. Communities do not equal to work teams.
8. Community is a recruiting and retention strategy.
9. Communities are inclusive.
10. Communities are efficient: New travels at lightning speed.

2.2 Collaboration

A multi-partner collaboration project could bring in positive effects like opportunities to improve creativity and innovation as well as reduced costs and lead-time in optimising solutions based on partners’ knowledge and core competencies [Pallot and Sandoval, 1998]. In contrast, it has been argued that increasing the number of partners, results in exponential increase in management and integration costs. This is a well-known collaboration paradox. However, trade-off and decisions should not be delayed because several parties are involved in the same business while their processes are neither compatible, nor interoperable. Furthermore, the temptation of operating solely in the group could be strong due to security, confidentiality, trust and confidence aspects, also known as the “black-box” effect [Jones et al., 1999].

Collaboration was tentatively defined as three different layers of capabilities where any organisation can easily identify its own coverage [Pallot et al., 2004]. The first layer is named “Communication” where collaboration stakeholders exchange information and data. It means that they have a collaboration partnership in which they agreed to share only pieces of the whole information, often related to interface specifications. Meanwhile, they work separately. The second layer is named “Coordination” where collaboration stakeholders synchronise tasks and related objects, such as shared workflow or agenda. They still work separately but have agreed to synchronise project tasks and documents into an overall plan. It means that the overall project plan is
under the control of a project manager or project coordinator. The third layer is named “Co-
operation” where collaboration stakeholders conduct collective work together within a shared
workspace.

While communication and coordination layers are nowadays widely deployed, the co-operation
layer is often reduced to a shared workspace (i.e. BSCW) where collaborating people are up-
loading files instead of systematic file exchange by email attachment or File Transfer Protocol
(FTP). It means that knowledge workers are, at least, in a position to use the most up-to-date
information and do not need to manage duplicated information and related files. Nonetheless,
exchanging or even sharing files does not provide a satisfying level of support for people
collaboration. They do need to reach a shared vision and common understanding before being
able to efficiently collaborate. This “Co-operation” layer is far more complex than it was
perceived a few years ago. Figure 3 gives an overview of the three different collaboration layers
and generic activities related to the last layer of conducting collective work.

2.3 Collaborative Infrastructure and Interoperability

There are many initiatives and projects exploring the next generation of plug and play
environments, collaborative infrastructures and interoperability aspects.

The “Plug and Play” (PnP) term has been extensively used in the computer industry. This
concept represents the ability to connect either new physical devices or new software tools, or
even both on a computer network in a very simple way without any installation burden.

The Web has often been used as a collaborative infrastructure where, for example, consolidation
of partners’ data could be provided by plug and play of their internal legacy systems in order to
ensure a good level of interoperability [Pallot and Hof, 1999].

The EPICE1 project has developed a project management baseline for providing a common level
of organisation and operations through shared project management taxonomy, processes and
associated dictionary of concepts. Selected concepts were expressed in using the W3C eXtended
Mark-up Language (XML). The associated software platform, based on web technologies, was
enabling plug and play capacity and interoperability between partners’ legacy systems through
document and data publishing & subscribing services. A number of common services were
accessible to each partner depending on their respective role and profile [Pallot et al., 2000]. This
kind of web application architecture was the ancestor of the semantic web where the main goal
was to use machine processing of concepts and their meanings.

The stated goal of the semantic web is to enable machine understanding of web resources: “One
of the major obstacles [...] has been the fact that most information on the Web is designed for
human consumption [...] the structure of the data is not evident to a robot browsing the web”
[TBL, 2000]. It is almost impossible to derive meaning from contemporary HTML due to the
lack of a common meta-data framework for describing resources.

However, it is not proved that such machine readable semantic information will be ready for
human interpretation. The hyper-linked structure of the web presents the user with a totally fluid
and dynamic relationship between context and content, which makes it hard to get an overview
of the conceptual context within which the information is presented. As soon as you click on a
hyperlink, you are transferred, helplessly, to a new and often unfamiliar context. This results in
the all too well-known “surfing-sickness” on the web, which could be summarized as “Within
what context am I viewing this, and how did I get here?” The conclusion we draw is that
extracting usable meaning from web pages is often as difficult for a human reader as it is for a
machine [Nilsson et al., 2002]. This strongly suggests that there is a need for a human-understandable semantics for web resources as well.

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1 Electronic commerce for sharing Program management Information in the virtual Concurrent Enterprise, ESPRIT
funded project
In order to solve this problem, we are working on ideas to extend the semantic web in order to provide not only semantic information for the machine, but also conceptual information for the human user. This form of extended semantic web is named the Conceptual Web [Nilsson et al., 2002]. The fundamental building block of the conceptual web is conceptual modelling, which provides a human understandable semantics for both abstract ideas and concrete resources. One of the fundamental tools of the conceptual web is a new type of knowledge management tool which we call a concept browser. This tool allows the user to browse conceptual contexts in the form of concept maps. An added benefit of using the semantic web as a basis for the conceptual web is application-independence. While the semantic web confers to computers and applications a new dimension about the meaning of web resources, the conceptual web provides to users a new dimension (named by Nilsson the “sixth sense”) about the conceptual context and the underlying meaning of the current situation, which is independent of the currently used application.

3 Research Approach

In our research work, “mobile work” is considered as “flexible working”, meaning that people have to carry out tasks and to collaborate with other people, wherever they are and whenever they need depending on priorities and work/learning/life balance consideration.

Our research approach, beside the traditional literature review, starts with the development of vision scenarios for identifying innovative vision elements which are then compared with the state-of-the-art elements in order to identify the resulting gaps to be addressed to reach the vision. State-of-the-art and vision elements have been grouped into different complementary perspectives in order to reduce the overall complexity of the process. Through a gap analysis, we have developed time specific foreseen alternative solutions. From this, we have derived research challenges enabling the development of the foreseen solutions.

In parallel to this roadmapping process, we have drafted a tentative “workplace effectiveness map” for both measuring the whole work community and prescribing ways to improve the workplace. Concurrently to the drafting of this map, an on-line community survey, dedicated to “Future Mobile Workplaces”, was conducted within an innovative way of consulting the MOSAIC project Network and AMI@Work research communities through the combination of complementary polls posted on the MOSAIC website. The main objective of this on-line survey, as well as numbers of workshops organised by the MOSAIC project, was to validate the emerging vision elements and deducted research challenges.

We have used other existing surveys and reports such as the 2003 and 2004 surveys dedicated to flexible working in order to better understand drivers for change and both employers and employees expectations as well as challenges to be addressed in the light of these changes and expectations. The 2004 report on new working environments and practices illustrating developments towards new information and communication technology supported working environments and processes. This report provided us with a view on collaboration in the working environment, across Europe and around the world.

4 Findings

The Future of Mobile Collaborative Workplaces – The MOSAIC Project

The “Agile Workplace” study report was recommending moving beyond alignment towards work-centric agile workplaces. It concluded that agile workplaces were representing the next important step in workplace evolution and alignment of space and work was considered innovative, if not radical, only a decade ago but then became a mainstream practice. Though, it was also recognised in this study report that evaluating workplace performance is a difficult
proposition. Simply because there are as many possible answers as existing experts and models for workplace effectiveness.

Our MOSAIC research activity along 2004, in term of vision, is showing new emerging collaborative or shared workspace approaches such as the “People and Network” or “people-networking”-centric approach, which is also related to the so-called on-line communities as well as social networks, and the “process-centric” approach. These new approaches are intended to bridge the gap between performance, purpose, balance and networking within an inclusive, innovative and interconnected workplace. This combination of inclusive, innovative and interconnected is named in short the i3Workplace [Pallot, 2005].

The i3Workplace approach is based on three main capabilities for the mobile collaborative workplace:

- Inclusive: Communities flat and open structure allows including new comers at any time when needed.
- Innovative: Multiple interactions among multidisciplinary competencies at the crossroads of experiences are dramatically increasing the creativity potential.
- Inter-connected: Permanent wireless connection established anywhere at anytime provide much more flexibility and adaptability to any situation.

It means that you don’t need to go to your office to be at your workplace but rather the workplace is following you wherever you are. In fact, the network becomes the ‘global’ workplace and provides the ability to interact with communities’ peers and any other collaborative resources wherever they are and whenever there is a need.

![Figure 4: the Workplace Effectiveness Map or i3Workplace Map](image)

The i3Workplace serves the Purpose of mobile collaborative working, enables Networking among multidisciplinary individuals’ competencies, and supports the overall Performance of the knowledge workers while preserving work-learning-life Balance. For this purpose, a “workplace effectiveness map” (see figure 4), also named the i3Workplace map, has been tentatively drafted. It is constituted of two complementary levels looking both outwards at organisational behaviour and inwards at individual support needs. This map is intended to both measures the whole work community and prescribes ways to improve the workplace. This map builds on four complementary domains of working environments: Purpose, Performance, Balance and Networking. Each domain is constituted of four ability elements aligned with four organisational elements. It is constituted of sixteen ability elements corresponding to sixteen organisational elements used throughout the transition from traditional workplaces towards “On Demand” collaborative workplaces.
Concurrently to the drafting of this map, an on-line community survey dedicated to “Future Mobile Workplaces” has been conducted within an innovative way of consulting the MOSAIC project Network and AMI@Work research communities through the combination of complementary polls posted on the MOSAIC website. All complementary polls are related to six different perspectives as shown in figure 5.

Elements of those perspectives and related polls are translated into questions to which community researchers are requested to respond whether they think it will happen before 2010 or it still remain uncertain or even it will not happen at all. For sure, there may be elements that respondents would like to have but will not happen because the actual research effort deployed on this element in not sufficient to get it before 2010.

The website approach of using complementary polls provides a lot of flexibility to respondents as they can start with one poll and stop before to come back and continue with another poll or vote for several polls during the same visit to the website. Furthermore, there is the fascinating possibility to look at the actual resulting figures which constitutes another motivation to vote and therefore contribute to the shaping of the vision from which will emerge the overall community opinion. An example of poll for human aspects in mobility is shown in the figure 6.

Actual resulting polls’ figures are showing that only very few elements did not get a majority of the vote saying it will probably happen. Only 5 of the overall 31 elements did not get the majority of votes on “Probable”. No element gets the majority of votes on “Unlikely”. Two elements, in the legal perspective, got the majority on “Uncertain” which means that 3 elements were balanced between “Probable” and “Uncertain”.

This polling approach could also be used to assess barriers to mobile collaborative workplaces as well as enablers and drivers. However, it should be noticed that the most interesting added-value of conducting on-line survey through community website polls is the quite immediate resulting figures to oversee what the community overall opinion is regarding a dedicated aspect. In this case, ‘immediate’ means days or weeks compared to one or more years when using a traditional way of carrying out surveys. This is really something fully appreciated especially when researchers conducting a survey are trying to figure out eventual impacts of vision elements on future research challenges.

This type of ‘instantaneous’ on-line survey through the combination of different complementary polls where visitors do not need to spend a lot of time to respond could also be used in other businesses to assess for example customers satisfaction. It would contribute to provide a much higher level of
confidence to website visitors when seeing for example that more than 90% of customers are globally satisfied by the offered services.

Evaluate the vision elements for Future Mobile Workplaces
The social perspective (Human aspects in Mobility)

It appears very clearly that most of the respondents, more than 80%, are already convinced about the implementation of flexible work arrangements before 2010. In fact, it has already started based often on the motivation of costs cutting and increases of productivity (less wasted time) as a benefit for the organisation and on gaining more freedom for employees in becoming self-organised. Surprisingly, a majority, more than 60%, do believe that future mobile workspaces will better integrate social, learning and work activities. Even more surprisingly, remote socialising is seen, by 50% of the voters, as something that could happen before 2010. It seems there is strong wish to get some kind of conviviality space, like the coffee machine area, where employees could have unplanned public or private discussions. Collaboration among distributed competencies is also predicted as something that will happen while it is already becoming a reality. Recruit ‘on demand’ independent experts is gaining 56% of the votes, as part of the heavily required flexibility by organisations. This is something that could considerably reduce recruitment head hack as the contracted worker is not really recruited as a full time employee but rather for specific task duration.

Develop career within professional communities did not reach the majority but 41% while 53% of voters are thinking it is still uncertain to anticipate whether it will happen before 2010. It is interesting to notice that only 4% do believe it will not happen at all. It means certainly that people are seeing communities are a new motivating and stimulating form of organisation that is going to replace the traditional hierarchical management by control inherited from the army organisation. All resulting figures about the different perspectives’ vision elements are available in the on-line vision survey at www.mosaic-network.org

As presented in the figure 6, the largest groups of vision elements, respectively 6 vision elements are coincident with the Mobility area of the Performance domain and 5 vision elements in the Connectivity area of the Networking domain. This is not really a big surprise to find Mobility and Connectivity areas grouping 1/3 of the total vision elements as the main theme of the survey is “Future Mobile Workplaces”. Other leading map areas are Creativity, Adaptability, Community Movement and Interoperability with 3 vision elements for each. Again, this is not very surprising as the Mobile Workplace should bring creativity, adaptability and interoperability capacities as well as being connected to communities for knowledge sharing and to provide openness and opportunities of socialising on the network.
The red surface in the figure 6 represents the average vote obtained for each area. On the 16 areas, there are only 3 of them that do not have any corresponding survey element so far and are not covered by the red surface.

Within the Agile Workplace study report, four distinct workplace styles have been identified, namely: “Siloed” Work style, Nomadic work style, Huddled Work style, and “Repertory” Work style [Gartner and MIT, 2001]. They came to the conclusion that different work styles require different workplace services. Each of the work styles formed by the workplace framework dictates the need for a different blend of workplace services. As enterprises shift more to higher degrees of mobility and collaborative work styles, demands on integrative workplace services become even more complex and demanding. The shifts in workplace style have resulted in different workplace organisational structures. Within their research, they have identified three new workplace models in addition to the traditional functional or departmental models: Integrated Model, Governance Model, and Hybrid Model.

Nowadays, their approach of workplace organisational models corresponding to different work styles seems to be still appropriate. Nevertheless, there are new emerging practices introducing a new work style, named the “Networked” work style, where knowledge workers are more or less permanently wireless connected with their peers and belongs to several communities of practice or knowledge communities or even communities of professionals to serve either business or social purposes. They could be working from their home, from a customer or supplier’s site, on the move in the plane (actually Lufthansa provide broadband Internet connection to its passengers), in the train, at their hotel, at the station, at the airport or anywhere else…

The main actual problem, beside organisational and social aspects, is to carry on various heavy equipments while they can lose suddenly connection. Our survey on Future Mobile Workplace did reflect perfectly these different points. About 90% of respondents are willing to get a new wearable computing device that integrate multimedia, telephony and computing in consumer's applications. More than 70% predict convergence of networks and IP connectivity anywhere at anytime as well as collaborative and context-aware applications, and “on-demand” collaborative workspaces. A large majority requires more interactions among multidisciplinary competencies and plug&play capabilities as well as mobile access to experts. More than 80% of respondents predict the implementation of flexible working and the integration of social, learning and work activities.

In term of workplace organisational model, the emerging vision is on “External Global Model” which means that knowledge workers workplace is hosted by a service provider ensuring and guarantying permanent wireless connection to the network and shared applications anywhere at anytime. It is a dream made by all knowledge workers to walk their hands in their pockets...
without to have to worry that much about their collaborative workspaces and tools as their workplace will follow them wherever they have to go and whenever they need it.

Another concluding remark is that there isn’t any “universal” mobile workplace organisational model so far due to the diversity of various legacy situations. Prediction is always a very difficult game because one needs to foresee and integrate together all the “small” signals to be able to figure out what could be tomorrow. However, we can predict for sure, due to cost-to-use and time-to-market pressure, that, soon or later, the Network will become the Collaborative Workplace for every knowledge-worker….

Nevertheless, it has been demonstrated that collaboration is almost impossible when there isn’t a common or mutual understanding and shared knowledge among collaborative resources. This could be enabled in enhancing the Johari window model into a universal exposure and feedback solicitation which have to be carried out through the network (in fact, the Internet). It means in fact across the web as an on-line universal community and social networking in order to connect people through the concepts they are using. It is deducted a need for a universal collaborative infrastructure where to plug&play collaborative workspaces and other collaborative tools through a dedicated protocol enabling a certain level of common understanding among collaborative agents. While the next step in the web architecture, as thought by Tim Berners-Lee (inventor of the WWW, URI, HTTP, and HTML), after the Semantic layer (known as the semantic web), is the trust and proof layer, very little is written about this layer. Our prediction is the potential emergence of a new web layer dedicated to collaboration language that could be named “the collaborative web” whose main goal could be to ensure collaborative services forming the universal collaborative infrastructure. In our view, the World Wide Web constitutes actually the only existing candidate for building-up the iWorkplace as a Universal Collaborative Infrastructure (UCI) enabling plug&play of collaborative resources, mutual understanding and shared knowledge among stakeholders.

The following considerations are leading to the collaborative web:

- The Web has been developed to better support collaboration among researchers;
- Publication on the Web is accessible to everyone. It means that anyone can expose and share concepts to increase the size of the collaboration space (known as the “arena” in the Johari window model);
- Weblogs and WiKis are already in use (i.e. WiKipedia) by individuals and on-line communities to expose themselves, define concepts and share their semantic description;
- The semantic Web provide the ability to describe concepts that are machine processable, which means that connections among concepts, as well as connecting people through the concepts they use, could be established automatically;
- On-line communities and social networks have already millions of users and the web of people, also known as the social web, is more and more becoming a reality;

5 Conclusion and future work

Beside the fact that during our research work we have used proved methods and techniques, such as survey, vision scenarios and roadmapping, one should remember that prediction is not an exact science. Sometime, our prediction may appear quite enthusiastic and idealistic especially within the vision scenario entitled “Towards Community based Collaborative Workplaces” where positive aspects are explored rather than potential negative ones [Pallot, 2004]. For sure, as soon as anyone is more or less permanently connected to the Network then the famous nightmare scenario entitled “Big brother is watching us” could come up at any time.

The tentative Workplace Effectiveness Map needs to be further validated through different complementary experimentations of improved business cases. This is something that could be
done within the AMI@Work Communities linked to business areas, such as Engineering@Work, Well-Being-Services@Work, Rural@Work, Logistics@Work and Media@Work, in the near future [AMI, 2004].

Regarding future work, there are several emerging innovative ideas that could be further explored within future research activities, such as:

- Explore the feasibility of a “universal” CWE in terms of plug and play concepts, layered Service Oriented Architecture (SOA), protocol(s) and related services enabling “on-demand” collaborative workspaces and interoperability among collaborative resources and services.

- Identify and experiment new forms of self-identifying and self-organising collaborating agents and evaluate their impact on trust and confidence level.

- Explore new innovative approaches to complement the existing “document-centric” approach with people and community centric approaches to support a more efficient collaboration.

- Evaluate new innovative collaborative applications and their impacts on people collaborative attitude, creativity and innovation potential and people behaviour when confronted with new ways of browsing collective information, as well as measuring individual and collective productivity and centrality through a generic CWE testbed or living lab.

- Turn the semantic web and web services into the “Collaborative Web” as a UCI relying on open public information model enabling plug&play capacity. It further means that the Network, in fact the Internet, becomes the ubiquitous collaborative workplace where everyone can openly collaborate with others.

- Define, implement and experiment new innovative “people-networking-centric” approach and “process-centric” approach to be implemented into existing collaborative workspaces (integrating diverse collaborative tools such as shared workspaces, Internet conferencing tools, shared calendars, instant messaging, community polling, instant learning) operating on the web in order to progressively define a new generation of CSCW that will not rely solely on a “document-centric” approach.

- Develop a new task and process-context oriented view on the use of collaboration technologies that goes beyond the current application oriented view. This will require a semantic layer on top of the current cooperation’s tools (email, IM, chat, Shared WS, etc.) that hides the technical functionalities and that integrates these into a task and activity-oriented environment.

- Develop and explore an on-demand CWE composition framework where users can assemble collaborative tools and services according to their evolving collaboration needs along specific business processes.

- Identify and explore new ways of organising and interacting within multidisciplinary, multicultural and multilingual environments (i.e. on-line communities and social networks).

- Define, implement and experiment new user interfaces dedicated to collaborative work based on new innovative “people-networking-centric” approach and “process-centric” approach.

- Develop and experiment a new innovative way of modelling and sharing concepts within a multidisciplinary group of collaborating people.

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Short biography

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