

IMPACTS OF INFORMATION TECHNOLOGY USE IN BUSINESS SUPPORT AGENCIES SERVICES

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Abstract: New technologies like the Internet offer many possibilities of work and life, e.g. new knowledge-based applications in economy. Beside the advantages of applications of the new technologies also negative consequences appear when using the Internet and different "virtual forms" of work, learning and social life. This paper deals with aspects of the Internet use and with a project about the development of new integrated concepts for (regional and local) economic development, by Internet-based knowledge processing and learning in business support agencies (BSA) in Germany. *Copyright @2002 IFAC*

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1. INTRODUCTION

Nowadays, there is an invasion of information and communication technologies, which permeate all domains of the society be it at work, at home or in public places. The new technologies promise to offer a host of possibilities, e.g. new knowledge-based applications in economy (e-business) or in politics (e-government).

Analyses show that the direction of changes due to the Internet and its consequences for the use and processing of knowledge are still uncertain. They have to be further investigated in order to be discovered in their full range (Brödner et al., 1999).

It seems feasible, however, that based upon the possibilities of these technologies, digital experiments can be undertaken. Creating new kinds of virtual places and virtual communities, where people can meet, work, learn and play without ever seeing each other in the physical world are already in an experimental phase. Also, new knowledge-based-services and learning in the socio-economic sphere can be developed by using the Internet.

Next to the advantages of applications of the new technologies negative consequences appear when using the Internet and different "virtual forms" of work, learning and social life. It is undeniable, for instance, that the social aspects of "face to face" communication as an essential component of every social activity is missing. The cooperation, which in traditional spaces happens instantaneously, has to be introduced in a conscious effort of all participants of a virtual community.

This paper describes aspects of the Internet use applied and tested in a project dealing with the development of new, integrated concepts for regional and local economic development. In this project it is planned, on the one hand, to fully exploit the technological possibilities of Internet-based knowledge processing and learning without, however, neglecting, on the other hand, the possible social deficiencies which arise from working in a virtual environment.

After a short general discussion of aspects of the use of the Internet in managing knowledge and learning in economic and social developments we give a more detailed description of the conceptual framework of our example: the on-going project "Wirtschaftsförderung als wissensbasierte Dienstleistung" (Economic development as knowledge-based service) co-ordinated by the IAT in Gelsenkirchen, Germany and supported by the Federal Ministry of Economy and Technology BMWT.

2. THE USE OF ADVANCED INFORMATION TECHNOLOGIES AND KNOWLEDGE

Unlike any other technologies the arising of the Internet has changed the structure of the global information society in immediate and far-reaching ways. If it is available it is prone to affect the lives of individuals and of collectives directly or indirectly by drastical shifting the way how human interaction takes place.

Some properties of the Internet which determine such changes are the following:

- The Internet (unlike broadcasting media) allows two-way communications, e.g. audience as well as the possibility of feedback;
- the Internet is a many-to-many medium and supports both asynchronous (e.g. e-mail) as well as synchronous communication (like video conferences);
- the Internet is built around open standards (e.g. TCP/IP) which means interoperability, the advantage of a large market and the possibility to integrate one product or process with another;
- the Internet facilitates the building of closed, organisational virtual networks like Intranets (e.g. for the communication with customers).

The most popular client-server based service of the Internet, the Web, is able to support images as well as many other file types, including hypermedia documents containing sound and videos. This aspect makes computer-mediated cooperation and communication user-friendly.

The Internet and the Web can be used also in learning processes to:

- create, foster, deliver and facilitate learning anytime and anywhere,
- deliver individualised, comprehensive and dynamic learning content in real time,
- support individuals and organisations to keep up with rapid changes in the production and processing of knowledge.

Referring to the last aspect, it is a well-known fact today, that innovation as well as the creation of new

knowledge define an organisation position in the competitive market. A number of reasons support the view that knowledge and its use in the economic process becomes more important. One of the reasons is that the competitive situation has been aggravated by liberalisation of trade. This made innovation in products, processes and organisations more salient and product cycles have accelerated. Another reason lies in the character of knowledge itself (Beer, et al., 2001; the overall body of knowledge has enlarged and specialised in terms of topics and topography and led to a "division of knowledge" (Helmstädter, 2000) which brings along the need for organisation and co-ordination. Within the process of globalisation, no organisation that surpasses a critical size is able to extract, to filter and to combine available information only through its own employees and, vice versa, make newly created knowledge accessible to the world. Here lies the strategic potential of tools based on Internet and the Web which facilitate effective and fast acquisition, dissemination and use of knowledge needed to successfully perform in the economic process.

Finally, as an important application of the Internet and the Web, we discuss the building of virtual communities in this part of the paper. Rheingold (1994) gives the following definition: "Virtual communities are social aggregations that emerge from the Net when enough people carry out those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace. This is the conceptual space where words, human relationships, data, wealth and power are manifested by people using computer mediated technology".

It is important to understand the nature of Internet-based communication, of the cyberspace and of virtual communities in every context: politically, economically, socially, cognitively. An example of virtual communities are Web-based learning communities. Building learning communities in cyberspace which connect tutors, experts and participants from the organisation or even the world in a common course by using the Internet creates a sense of synergy and passion for learning and supports the process of knowledge acquisition.

3. IMPACTS OF THE INTERNET USE

Due to properties and applications as listed in part 2, the Internet can have positive impacts on the society and economy, e.g., by facilitating access to all kinds of informations (e.g. about jobs), to economic and cultural on-line services for all citizens. Along with these advantages, however, the potentially negative aspects of the Internet future have to be considered.

"With each new technology that arrives and with each new responsibility for managing those technologies granted to some persons or organisations,

there is always the danger that they will use that technology against those who would benefit most "(Hardie, 1998).

One aspect to be considered is the technical dependence: when people begin to do banking, communicating with the family, planning the vacations on-line and to share live and learning in virtual communities, they invest a great deal (of social capital) in these technologies. If the technology fails, people are left helpless because eventually they forget the old, conventional ways to do these things.

The negative aspects of the Internet can be differentiated in groups like the following:

- cultural aspects like the loss of identities,
- social aspects e.g. the dominance of media, the decrease in privacy, the dependence,
- political aspects like dominance of commerce and shift in responsibility,
- economic aspects e.g. shift of economic control.

Against those phenomena, Tenner (1996) gives good advice:

" For both technophiles and technophobes, the best, and perhaps the only way to avoid the revenge effects of computing is to maintain skills and resources that are independent of computer. We can work and learn face-to-face too and telephone relationships with colleagues and outsiders to avoid the misunderstandings of excessive reliance on electronic mail."

4. THE USE OF THE INTERNET IN ORGANISATIONS

No matter how the implications of advantages and threads will finally be judged, due to the structure of the Internet and the Web, more small and medium sized organisations, including the mentioned BSA, should be motivated to use these technologies as tools to support their work. They are, more than other media, conducive to the human way of communication, learning, growing and knowing.

Some barriers hindering the use of Internet in organisations till now are the following:

- Lack of experience. Many organisations have been accessing the Internet for less than two years which suggests that they are still in the early stages of their learning curve. In the literature there is no well developed body of knowledge about using the Internet for business processes, examples are lacking; local organisations in the public sphere often have had little contact or opportunity to explore the use of the Internet by themselves and to develop their own experience.
- Lack of knowledge within small and medium organisations about the issues which contribute to

an effective use of the Internet technology. The duality of knowledge of the business and understanding of the technology and potential of the Internet is still a rare combination.

- The Internet does not yet meet business needs due to the lack of security in all aspects. This includes system security, privacy of communications and of economic transactions.
- For small organisations that have to commit themselves to the costs and effort of using the Internet the existing possibilities of the Internet are not imperative. New services for cooperative working, business and learning should be developed in cooperation with these organisations.

In the following part we give an experiment where we try to use the power of the Internet in a social space within BSA in Germany.

5. AN EXPERIMENT IN USING THE INTERNET IN A SOCIAL SPACE: MANAGING KNOWLEDGE AND LEARNING BY AN INTEGRATED APPROACH IN BSA

Our considerations for the project "Economic development as a knowledge-based service activity" are based on the supposition that approaches and tools for supporting firms and industries on a local and regional level, have to take better account of the recent developments on global markets and offer services which are not only directed towards the single enterprise but, in interacting with firms, also contribute to an increase of attractiveness of the location as a whole. We call this an integrated approach (Rehfeld, 2001).

Another shortcoming in regional/local business support is that available and potentially valuable knowledge is not used in a way that it guarantees best possible output. It can be shown that there are different types of knowledge (Lundvall, 1996) that require different access in order to be used in innovative processes. Practice indicates that, on the one hand, that BSA often offer redundant and unnecessary knowledge, on the other hand, implicit (or person-related) knowledge often is not incorporated into learning processes but rather is lost when projects are finished and/or persons leave (Brödner et al., 1999a).

It is our concern, therefore, to develop an approach which integrates not only different levels of regional development but which is based on the use of available knowledge and provides a better basis for processes of learning in the region.

This will be done by developing and testing new strategic solutions for theoretical and practical knowledge-based concepts for services of BSA including Internet-based procedures for supporting communication and learning.

The work within the project will be structured by questions which refer to organisational aspects, management of internal and external resources, development of competencies and the supporting digital infrastructure. This should facilitate “high quality” of communication and information exchange both within the economic agencies as well as with their clients and co-operation partners and support Web-based learning processes and the building of learning communities.

In order to be easily integrable and to assure low development costs the supporting digital infrastructure will be based on the Web and on the existing intranets of the agencies. The functionality of the intranets will be extended with procedures for communication and information acquisition as well as for knowledge management e.g. collect, structure, transfer, evaluate and use knowledge.

All these procedures as well as a learning environment (and training modules) will be accessible by using a Web portal with easy to use search engines. As an example we give below a more detailed description of the type of learning environment to be used in our project.

For the experiments we cooperate with two different BSA: one municipal economic support institution (“Wirtschaftsförderung”) in Gelsenkirchen. It is an old industrial city in the core of the Ruhr Area with an ongoing restructuring process resulting in an unemployment rate up to 18 percent. The second is the regional BSA of the “Rheinisch-Bergische Kreis”, located in an area dominated by small and medium companies with a high degree in sectoral differentiation.

6. A LEARNING ENVIRONMENT WITHIN THE EXPERIMENT

One of the main aspects within the project is to support the process of training by developing a flexible, easy to use learning environment based on the Internet technologies which brings progress by changing the traditional classroom. This also means that, in addition, functions like conventional learning, computer-supported acquiring, distributing and creating of knowledge as well as collaborative learning should be supported.

In order to fulfil such requirements, in our project we use a Web-based learning environment similar to the one developed within the German project FrauTelNet (Engert et al., 1999).

The deployment of materials available in a variety of formats by using new media (mainly as computer-based technologies, but also as broadcasts, print, audio and video recordings), can have a reinforcing effect, and allows the agencies staff to choose the

approach that best suits their learning and own evaluation styles.

Referring to decisions on choice of media and technologies they should be based on considerations of access, quality and cost. It is a major objective of the project to keep the necessary equipment for the trainees at a minimum, in order to avoid technical discrimination. In the project the requirements are Internet access and a Web browser.

Within the learning environment we are going to provide the following categories of learning resources and tools: the course-ware, email, chat, discussion forums and feedback-forms. The learning-centre contains the basic course materials and exercises. The forum functions as communication platform for trainees and tutors.

Two types of computer mediated communication will be offered by using the environment: chats for synchronous communication and discussion forums for asynchronous. The chat is appropriate to ask short questions, to discuss special topics, and to assign working exercises. We are going to offer a chat-room for every learning module which will be developed as well as a meeting point. One major advantage of the chat is that this type of communication allows the fast and efficient exchange of comments on one topic. However, a disadvantage lies in the impossibility to follow different discussions at the same time and the loss of remarks, which are forgotten along the discussion process.

For the exchange of longer text and data material the different discussion forums can be used.

In addition to the advantage of offering a structured discussion, the forum allows a certain flexibility concerning the working hours of the trainees. Within our previous projects we experienced that the publicity of the discussion forum is a disadvantage, because many participants rather send an email or discuss within the chat than to contribute a message to the discussion forum, which is readable for all trainees. Therefore, a strong tutor is needed to encourage the trainees to participate.

We strongly argue for the inclusion of presence-sessions not only for on-line classrooms, where trainees and tutors meet face-to-face. The presence session is important to lower barriers against a technology and a method of learning, which is, in any case, unfamiliar to most learners. In our particular project, moreover, the workshops play a significant role in providing hands-on experience with the required technologies, especially the techniques needed in order to work with the Web-based learning environment. Furthermore we would like to stress, that it is very important to provide sufficient technical support throughout the course, i.e. to have a person in the

team which is accessible every day, also by telephone, to help with technical questions.

In the project the development of a learning community between the participants and also between trainers and participants will be facilitated by various means. At the beginning of the training program, the virtual learning community will be stimulated by promoting small teams around the trainee's projects and the exercises which are set for them and included in the course-design.

7. CONCLUSION

In this paper we present the conceptual framework and first steps of a project that refers to the testing and critical assessment of the use of the Internet to support knowledge-based services in two BSAs in Germany.

The use of this technology to improve processes of knowledge creation and handling can only come to bear if it is accompanied by the creativity and competencies of the staff to even out possibly questionable impacts of the new technologies.

Both of the two agencies have their own specific profile so that the project team in this early phase works intensively with the staff in order to find the proper balance between an Internet-based concept and other approaches for developing and introducing knowledge-based services and individual and social learning processes.

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