Self-employed Labor meets Codetermination - Participatory Design in Network Organizations

Bettina Törpel
Department of Computer Science III / ProSEC
University of Bonn
Roemerstrasse 164
53117 Bonn, Germany
beetee@cs.uni-bonn.de

ABSTRACT
In participatory design (PD) projects, the course of the project itself and the functionality of the evolving application may heavily depend on the establishing phase of the project. In some of the emerging new forms of organizations these formative steps cannot be taken in the same way as in »traditional« organizations. Taking a service network as an illustrating example and referring to the project establishment activities of informing about the project, selecting project participants, allocating project resources and selecting project settings, it is argued that »classical« participatory approaches must be modified in order to meet the needs of these organizations. The descriptive category of the »self-employed laborer« is introduced to stress the roots of the mentioned problems in changing work settings in terms of organizational structure and culture, legal conditions, market structures and individual strategies.

Keywords
Network Organizations, Participatory Design, Self-Employed Labor

INTRODUCTION
In this contribution the role of a range of organizational characteristics relevant to participatory processes for the development and introduction of computer applications is examined.

New forms of organizations have emerged in the past years corresponding to changing markets and reacting to new legal and socio-economic conditions. Differences in comparison with traditional organizations concern, among others, the structure of the organization, the technological infrastructure of the organization, the distribution and exertion of power, the legal status of the relationship between the organization and its members, the (presence or absence of) contracts of the workers, the bargaining structures and, more generally, the ways to react to the market organizationally and individually. For example, this implies that

In *PDC 2000 Proceedings of the Participatory Design Conference.* T. Cherkasky, J. Greenbaum, P. Mambrey, J. K. Pors (Eds.) New York, NY, USA, 28 November - 1 December 2000. CPSR, P.O. Box 717, Palo Alto, CA 94302 cpsr@cpsr.org ISBN 0-9667818-1-3

- it is not always easy to identify boundaries and the meaning of membership in an organization,
- individuals have to focus on very specific tasks under tight time-constraints,
- tasks, objectives and hierarchies change frequently and rapidly,
- a new spectrum of interests and positions has emerged, and
- structures guaranteeing worker participation have either changed or disappeared.

In the context of these changes new forms of participatory approaches to technology development and introduction seem to be necessary. That »conventional« PD options sometimes do either not apply or are not feasible in real-life contexts has been acknowledged in the literature (see for example Bødker 1996 or Robertson 1998). According to Bødker (1996) for example, even in »traditional« organizations problems arise: Often the results of PD core groups are not sufficiently disseminated, the PD efforts lack continuity, management overrules PD decisions, the participants are not sufficiently compensated or the participants do not get sufficient resources for measures qualifying them for the participation, etc. (p. 217). Robertson (1998) reports that design from scratch would not be affordable for small enterprises and that these enterprises rather rely on buying off-the-shelf technologies and tailoring them according to their specific needs. One of her conclusions is that these activities benefit from participatory approaches, but that participation takes different forms than in projects where workers participate in all development stages for their work means. With the growing importance of »non-traditional« forms of organizations, it may turn out that the applicability of widely unchallenged assumptions and strategies concerning the development, introduction and use of information and communication technologies is confined to a set of »traditional« forms of organizations. Accordingly, alternative, appropriate assumptions and strategies may have to be developed for »non-traditional« organizations. In this text, the focus is on assumptions and strategies for the establishment of participatory projects, namely the *compilation and dissemination of information* regarding the projected technology, the *allocation of resources* for the proc-

ess, the *selection of participants*, and the identification of *appropriate settings*.

From the work in a project geared towards supporting cooperation in a network organization in the service area (mainly consulting and training), a number of typical constellations illustrating our statements are described. The interplay of organizational characteristics (like geographical distribution, project orientation and informal hierarchies), market strategies (of the network members and of the organization), legislative conditions (like the absence of codetermination legislation), and typical practices sets a new frame for participatory processes.

It will become obvious that common steps in the establishment phase of participatory projects are not applicable to organizations like the one reported on. This means that at least some of the common steps have to be replaced. This has implications for later phases in participatory processes in case they rely on inapplicable initial steps. The work on these implications is left for further research.

First, the importance and relevance of the initial establishment activities will be outlined and a set of assumptions and approaches typically assumed in PD projects and literature will be explicated. The case description of a service network illustrates how the working conditions in »non-traditional« organizations may deviate from the working conditions in »traditional« organizations. The case description of the organization is divided into three parts: characterization of the organization itself, tendencies of individuals working in the described type of organization and our own research activities within the network organization. This case description provides the background for the attempt to apply the typical approaches to PD project establishment to this kind of organization. Some limits of the applicability of these approaches will become obvious. In the conclusion, tentative directions for the search of alternative approaches are suggested. At some points it might become obvious that the background for this contribution is provided by the German legal and economic system. Some of the statements may have to be modified for other countries.

TYPICAL STEPS IN THE FORMATION OF PARTICIPATORY DESIGN PROJECTS

Participatory approaches to the development and introduction of computer applications have recently gained relevance. A variety of methods has been developed and successfully applied in practice. Reports of and comparisons between participatory design (PD) projects, collections of related of suggested and suitable methods, and compilations of criteria for successful participatory processes are abundant in the literature (see for example Kuhn & Muller 1993, a special issue on Participatory Design in the Communications of the ACM; Trigg & Anderson 1996, a special issue on Participatory Design in the Journal "Human-Computer Interaction"; or the proceedings of the biannual "Conference on Participatory Design" PDC). Before engaging in the actual design activities a participatory project has to be somehow established. The MUST research programme (see e. g. Kensing et al. 1998) for example contains as one of five proposed "main activities" (p. 183) in their model of project execution the phase of "project establishment" (pp. 183); for the STEPS model (see e. g. Floyd et al., 1989) "project establishment" is a fundamental formative activity to be performed at the beginning of every new project cycle (p. 61). For PD projects reported on in the literature (for historical accounts and overviews see e. g. Floyd et al. 1989 or Clement & Van den Besselaer 1993) typically

1. information on the objective of the projected technological innovation had been compiled and disseminated,
2. resources had been allocated,
3. participants and/or samples of persons whose knowledge, status or perspective were deemed relevant (i. e. interviewees) had been chosen, and
4. a preliminary suggestion for settings (who contributes or exchanges when, how often, where, how) had been made.

Among the typical criteria for the selection of participants (often combined) are

3a. position in the organizational hierarchy,

3b. content area of work,

3c. represented interests or perspectives and

3d. individual motivation.

Typical settings are working groups, open circles, rotating sets of representatives, and on-the-site meetings.

These measures implicitly assume a set of organizational structures and the applicability of a set of criteria, e. g. for the choice of participants or settings. That these organizational structures are by far not always present and hence that alternative criteria have to be developed and used will become obvious in the course of this text.

SIGMA - A NETWORK ORGANIZATION

The InKoNetz project [1] from which the results presented in this contribution are derived, is concerned with the co-development and mutual influence of organizational characteristics and technical infrastructure in small and medium-size network organizations (see also Rittenbruch et al., 1998). Our main application partner has been Sigma [2]. Our research strategy involved a variety of approaches and methods (see below).

---

[1] The project "Integrated Cooperation Management in Network Organizations" (*In*tegriertes *Ko*operationsmanagement in *Netz*werkorganisationen, InKoNetz) is funded by the ADAPT Initiative of the European Commission.

[2] "Sigma" is an alias name.

Sigma is an umbrella organization, a network of about 200 freelancers, teams and small private liability companies offering services, mainly training and consulting. The founders, who established the enterprise in 1992 and who are now the managing directors, envision the organization as a network organization or virtual organization. The enterprise and its services are structured along the lines of projects, with each project having its specific objective, a specific time limit and a specific composition of team members differing from project to project.

Requests for project commissions are initiated either by the managing directors or by freelancers who have the necessary knowledge and contacts.

The members of the network live and work in locations throughout Germany. The network does not have official headquarters, but several regional branches for administration and information purposes in a range of areas. The only office space rented by the company in Bonn can be seen as unofficial headquarters.

Apart from a few employees whose work contributes to the infrastructure of the network (for example administration and office work), the network does not employ members on the basis of contracts. Instead, the individual members are freelancers, »self-employed laborers« (see below). They pay a fixed (but negotiable, see below) percentage, about 10 percent, of their incomes from training and consulting measures to the network. Working with Sigma means to provide one's own workplace, typically a home office with telephone, personal computer, internet access, fax, and other technical equipment.

After a phase of growth in terms of the number of members, two forms of subdivisions of the organization were installed, one according to business objectives (mainly in the fields of Information Technology and Human Resource) and one according to location. Communication within and beyond the network in general and personal relationships between network members in particular are crucial factors for the work within Sigma. Meetings of various levels of exclusivity and dedication of Sigma members in their areas or of groups with overlapping interests take place frequently, typically in bars or restaurants. These meetings serve the purpose of establishing relationships, exchange of experiences and ideas, and the development of new business objectives.

Sigma stresses its strength of being flexible. This means that the network is often able to quickly, unbeaurocratically, imaginatively and appropriately react to market changes with innovative services and products. One factor functional to the flexibility of the organization is the flat (official) hierarchy: Formally, the levels of the hierarchy are the managing directors, the project managers, and the regular project members, with the two latter positions varying over time. The managing directors have a strong notion of leadership, exert power and play a decisive role for the enterprise. Beyond the official hierarchy, informal hierarchies are omnipresent and strongly structure the organization and the activities of its members (see below). An extreme case of the existing informal hierarchies is that the criteria of who belongs to Sigma or groups within Sigma, successfully works with and remains working there, are quite vague (see below).

For the network members flexibility often means working conditions in accordance with their individual preferences and constraints (e. g. time budgets), having more responsibility than »ordinary employees« for the projects they work in, work based on motivation and self-determination and an income about as high as in other organizations offering comparable services. However, the freelancers trade this off for less security concerning their future incomes (like in cases of inability to work) and for other disadvantages and ambiguities (see below). They work in a hybrid situation between being employed and being autonomous freelancers hoping to get the advantages of both while at the same time often suffering from the disadvantages of both.

As a legal form, Sigma is a private liability company. The shareholders - freelancers within Sigma or associated individuals - participate in the business successes and failures (so far only successes: the turnover has increased from DM 4.2 million (approx. $ 2.1 million) in 1994 to DM 14 million (approx. $ 7 million) in 1998.) and influence major organizational decisions according to the percentage of the shares they own. The percentage of shares in the hands of the managing directors guarantees their income, as long as the organization operates successfully, and their absolute majority in decisions. In conclusion, SIGMA basically is a prospering company with an innovative approach.

SIGMA - AN UMBRELLA ORGANIZATION OF »SELF-EMPLOYED LABORERS«

One perspective on Sigma is to regard it as an association of self-employed laborers (SEL), in the sense of Voß & Pongratz (1998).[3] According to the authors, self-employed laborers actively and offensively market their working capacity, i. e. their individual profile of skills, experiences, knowledge and other characteristics (p. 139). They consciously design, realize, manage and maintain their working capacity: individual self-employed laborers systematically structure and organize their whole life with respect to the maintenance and further development of their capacity for work (p. 139). This differs from »traditional« employees on the basis of employment contracts, with »traditional« skills, professions and positions, who do not have to continuously and actively sell their working capacity (p. 139).
The freelancers' work (like of Sigma members) is a formally self-employed form of self-organized work (p. 136). Self-

[3] The term "self-employed laborer" is the result of my attempts to compose a self-explaining equivalent of the German word "Arbeitskraftunternehmer" used by the authors, which literally means "working-capacity entrepreneur".

employed laborers are entrepreneurs only in respect to their own capacity for work and not in respect to other people as capitalists (p. 145).

The authors provide a suitable characterization of organizations like Sigma: "A very peculiar assembly of self-employed employees [SELs, B. T.] are so-called *virtual enterprises*... These are temporary cooperations of freelancing working people or micro-enterprises without legally unambiguous constitutions who act toward the outside world as homogenous entrepreneurial entity. Aim is the reliable achievement of results at maximum flexibility and individual sovereignty." (p. 136/137).

In this kind of organizations and for most self-employed laborers in general, the direct command of the capital becomes replaced by an »outside-determined self-determination« (p. 134): individual self-employed laborers are responsible for the employability and successful employment of their working capacity (p. 137). Success in this respect is immediately indicated by the general (labor) market and by market structures within their organizations (p. 142). The lifestyle, purchasing power and world view of a self-employed laborer underlie extreme long-term and short-term modulations, according to the congruence or incongruence between commissions (within and outside the organization) on one hand and the specific personal portfolio on the other hand (p. 148).

In self-employed laborers, the tendency for self-exploitation is omnipresent (p. 151). Forced self-determination affects their entire personalities (p. 151). The opposition of capital and labor, »traditionally« an opposition between groups/classes, in self-employed laborers revolves in their "souls and hearts" (p. 152). In the face of the typical dangers like self-exploitation and self-submission, new variants of external support and representation of needs and interests have to be found and installed (p. 152).

SIGSYS AND ITS REPLACEMENT

In organizations like Sigma, the work of almost every member heavily relies on an appropriate organizational groupware system for the purposes of internal communication, cooperation and coordination as a central work means. The work of the InKoNetz project with Sigma has largely been concerned with their internal groupware system.

As part of the research of the InKoNetz project, project members participated in Sigma's working group on organizational computer applications "Sigma Information and Knowledge Management" (SIW). The SIW members included the managing director responsible for Sigma's information technology, Sigma's specialist for internal computer systems, one managing director of the provider of the organizational groupware SigSys [4] and the InKoNetz researchers. As part of the collaboration in the SIW group, InKoNetz members have elaborated suggestions for the functionality and features of the groupware and for the processes of its development, introduction and use. Beyond this, we gained knowledge on the organization and its technology from various other sources of information: we conducted interviews with a spectrum of Sigma members; we have participated in a working group on Sigma's organizational culture; we have observed the use of SigSys and analyzed messages and documents communicated via SigSys; and we have analyzed organizationally relevant documents like the annual letters of the managing directors to the shareholders. This combination of observation, participation and intervention certainly affected the organization and the objective of our research in a way not entirely reconstructable. We often attempted to act in the (self-contradicting) form of »non-directive intervention«. For example, we repeatedly encouraged Sigma groups and members to reflect the potentials, feasibility and possible forms of *participatory approaches to organizational and technological issues* or to reconstruct the specific *relations of organization and technology* in Sigma.

SigSys, the organizational groupware since 1996, was developed by a software company of about six developers. (The company is »traditional« in terms of its organizational structure and in terms of the developers' view on software development.) It is basically an online-offline e-mail and bulletin board system. Exchange can take place within the system and to and from the internet. Additionally, text documents, pictures, presentations etc. can be sent to and retrieved from a pool. Recently, it has become possible to operate SigSys from the web, under the label of SigSys online, with its limited functionality unchanged (e.g. no access to personal e-mail via WWW). The development and introduction of SigSys and SigSys online was basically not a participatory process.

In the beginning of 1999, the provider of SigSys announced the development of a system potentially replacing SigSys, again without participatory elements. The InKoNetz project encouraged the SIW members to initiate a participatory process, mainly for the requirements analysis (elaboration of work scenarios), design (mockups, prototypes) and introduction of the system. The non-research SIW members from the SIW asked the InKoNetz project to facilitate these activities, but did not make any commitments regarding the status of the participatory activities of participating Sigma members. Rules, for example regarding the impact of the suggestions or regarding the participants' compensation, were not set or negotiated. As a consequence, the decision, design/purchase and introduction procedures regarding the organizational groupware have remained unparticipatory.

Recently, plans for a new organizational groupware have changed several times. During a semi-annual meeting of the Sigma management and other interested Sigma members at the end of 1999, an ad-hoc group talked about IT matters in Sigma. Within a couple of weeks, this group met several

[4] "SigSys" is an alias name

times, quickly turning into a taskforce on organizational groupware, and then merging with the SIW group. Within a few months, the new group decided to develop the new system; the provider of SigSys joined the groupware task force and Sigma as a member organization and has taken part in the development under the umbrella of Sigma. Developers belonged to the group of Sigma's IT specialists. Self-set time limits were tight - the group planned to deinstall SigSys and SigSys online by June 2000. Again, the procedure was not participatory.

Currently, it seems likely that Sigma will buy an off-the-shelf groupware system. The adaptation of this system to Sigma's specific needs would then be the task of the provider of SigSys and some of Sigma's IT specialists. Test versions of groupware products may be used and commented by interested individuals and groups.

We still think that Sigma would benefit from a participatory groupware development; communications with Sigma members confirm this impression. Yet, the feasibility of participatory measures in the face of internal and external pressure (especially related to the market) is often doubted. Situations like the one described give a first impression of the necessity to approach the issue of participatory processes through the aid of new concepts, procedures and means.

An appropriate organizational groupware certainly is a factor enhancing the competitiveness in general. In my view, the particular features of Sigma - especially its extreme fragmentation and fast pace of internal change - necessitate an especially thorough process in order to develop/purchase/assemble the appropriate kind of groupware. To do the analyses of its different local work contexts and their needs for technical support of their communication and cooperation from an »outside« perspective is much more difficult, tedious and inaccurate than analyses by the local »work specialists« themselves. The participatory procedure would have to be a special one with an impact on distribution and integration (see below).

While trying to elaborate a suitable PD strategy we eventually came to realize that »traditional« PD procedures presuppose different work contexts than present in Sigma. In the following this will be exemplified by the formative steps of participatory design projects.

TYPICAL STEPS IN THE FORMATION OF PARTICIPATORY DESIGN PROJECTS CONFRONTED WITH PRACTICES IN SIGMA

In this part activities to be performed prior to actual design activities in participatory processes are reconsidered. (They have been introduced in the section "Typical steps in the formation of participatory design projects" and exemplified by 1. compiling and disseminating information on the intended technological innovation, 2. allocating resources, 3. selecting participants and respondents, and 4. choosing settings.)

Common recommendations will be compared with the realities in the Sigma network regarding the possibilities of dealing with these issues. Most attention will be given to the issue of the selection of possible participants, because this issue highlights central organizational matters.

1.) Compiling and disseminating information on the objective of technological innovation

In many areas of Sigma, official and binding procedures and responsibilities do not exist. This is true for many fields, including situations in which information could be helpful. Information of technological projects potentially affecting many network members is not granted. Even though SigSys has become a standard channel for the dissemination of information, it is by no means clear that crucial information, like on a planned network-wide system and its development process, would be presented in SigSys. Responsibilities, like for the dissemination of information, are often undefined; sometimes an ad hoc responsibility gets established. The formation of the new development group for Sigma's future organizational groupware was not preceded by a call disseminated to the network members.

In May 1999, the InKoNetz project compiled and disseminated information of the system under development during the past years and its projected development process. The information was distributed during and after the annual shareholders' meeting in May 1999. In May 2000, this was done by the managing director in charge of IT within Sigma.

2.) Allocation of resources

Formalized and generalizable rules and procedures in general are rarely present in Sigma.

This also applies to allocation processes; these are not formalized or specified. This holds true for any process including processes for technical improvements, processes suited to enhance the efficiency of the organization, and for many other expenditures.

Resources have to be gathered in informal bargains between varying actors. Each case (person, purchase, situation) is individual; resources and procedures have to be (re-) negotiated on a case-to-case basis. For the development of the system to replace SigSys, a bargain on resources like time and money took place after some time - Sigma members pay half a percent of their income (contained in the ten percent contribution to the network) for the organizational information technology infrastructure.

Generalizable rules regarding the relationship of the individual contributions to the network and the individual benefits from the network are not in effect. Accordingly, the encouragement, reward and pay to participants in a PD process would again be a matter of informal case-specific negotiation. This will probably be the case for the network-wide groupware: those members who want groupware functionality beyond a »minimal functionality« will have to make an extra payment to the organization.

Since it cannot be supposed that Sigma would pay the members of a participatory process, an individual pecuniary »freedom« for motivated participation cannot be presupposed. This is the present situation as Sigma has not yet taken serious steps in the direction of PD. However, it is certainly possible that the organizational climate changes in this respect and that a certain percentage out of the ten percent network contribution became a »PD contribution«.

3.) Selection of participants

3a) Selection according to position in the organizational hierarchy

In a selection of participants according to their positions within the hierarchy of the network, problems would not arise in reflecting the explicit (flat) hierarchy of managing directors, project managers and simple project members. Rather, problems would arise when acknowledging that inofficial hierarchies play a vital role in Sigma and should therefore be regarded for the composition of the group of participants.

Informal hierarchies in Sigma exist for example along the lines of

- access to information,
- position in the flow of communication within and beyond the network (e. g. with customers),
- skills related to the commissioning of projects and to winning grants,
- extent to which the network relies on a person, or
- promotion from the side of the management.

Most informal hierarchies are not immediately visible and hence are difficult to take into account. Many dimensions for informal hierarchies within Sigma are not only inexplicit but also inexplicable. Yet, they play a crucial role. An appropriate composition of the group of participants would rely on representing a range of positions in a multitude of informal hierarchies.

How far-reaching the issue of informal hierarchies is may be illustrated by the fact that it is difficult to determine members vs. non-members of groups within Sigma and of Sigma as a whole. Should the perspectives of those members who are at the borders of Sigma have a special impact on the system under development because the situation of marginalized persons should be improved? Or are their perspectives less relevant because their work-related activities and interests are not confined to Sigma?

3b) Selection according to content area of work

Selecting participants according to the content areas of their work also poses serious problems because the services they provide change over time. Projects last only a limited amount of time - sometimes they last a few months or longer, typically they do not last more than a few days. After finishing a training or consulting measure, Sigma members turn to new tasks. As an organization, Sigma reacts to the »global« market which implies changes in its internal market: Sigma continuously changes its spectrum of products and services. The self-employed laborer continuously extends her/his portfolio and offers her/his skills and potentials to a twofold (labor) market: the market within Sigma and the »global« market outside. Both markets constantly change, and hence the portfolios of the Sigma members change too.

3c) Selection according to represented interests or perspectives

In »traditional« organizations with »traditional« codetermination, the processes of selection and negotiation are structured by oppositions like management vs. immediate production or service provision, developers vs. users, employers vs. employees, or capital vs. labor. As Bødker (1996) points out, with changing production and management strategies, interests, even in large »traditional« organizations, are not as clear or monolithic in groups or individuals as often assumed (p. 224). But the phenomenon of inter- and intraindividually fragmented interests get another quality in organizations like network organizations.

Codetermination rights are based on employment contracts as legal prerequisite. Since the members of Sigma are mostly self-employed, legislation does not require or suggest any formal codetermination procedures. Instead, circles, caucuses, discussion groups, working groups (like the working group on organizational culture or the new working group designing the future organizational groupware) etc. informally get established and their status remains unclear, but they may yield results affecting the whole network.

Within Sigma, groups according to »traditional« spectrums of interests cannot be identified. As Voß & Pongratz (1998) stress, for self-employed laborers, the antagonism of capital and labor is not an antagonism between classes/groups, but is located within the self-employed laborers who have to act as entrepreneurs and as employees at the same time. Groups of self-employed laborers with homogenous (intra- and interindividual) interests are hard to find within Sigma.

Traditional forms of codetermination are absent and would be inappropriate. Institutionalized, stable, formal negotiation procedures, codetermination possibilities and other frameworks and procedures for conflict resolution are not in effect.

Negotiations along identifiable and generalizable lines of interest and within generalized frameworks of codetermination are replaced by individual bargains, the results only applicable for individuals, single situations and for a short time. The quality and longevity of the results of these bargains correspond to the individual position in the informal hierarchies.

3d) Selection according to individual motivation

Individuals might select themselves as participants due to their motivation for participating in the process. Individual self-employed laborers might, for example, deem this beneficial for their individual portfolios.

Motivation of self-employed laborers is always ambivalent: on the one hand, self-employed laborers are highly self-determined and oriented toward developing their potentials and their personalities; on the other hand, self-determination in an organizational market situation has features of »outside-determined self-determination«. Bottom-up or top-down decision making in an association of self-employed laborers is often difficult to tell apart: what at first looks like voluntary acts and decisions on the part of the self-employed laborers may well turn out to be reactions to subtly uttered organizational, collegial or managerial demands of submitting oneself. When this sort of pressure is present, the above-described double market reinforces pressure on the self-employed laborers. Moreover, it can be doubted if the most experienced people always find the time to participate in such activities. On the contrary, there is an understandable tendency that people new to Sigma are over-represented in such processes since they are the ones who have more time available and are eager to move closer to the organization's core. Weather this is an advantage or a disadvantage is not clear: the presence of new members, for example, might encourage other design participants to look at the organization with a »naive« view, less dependent on unquestioned regarded »self-evidences« which have developed over the years. On the other hand, it might be argued that long-term experiences with the organization should have an impact on the system.

4.) Finding settings for the prospective PD process

Since the Sigma network is geographically distributed and since the self-employed laborers work in their home offices, traditional meetings, e. g. as in working groups, close to »the« working site cannot take place. The individual home offices are often far apart from each other, and meeting space is not available (the Bonn area as an exception).

How suggestions and decisions within Sigma are made is often neither traceable nor predictable. As seen in the example of the changing plans regarding the development project for the organizational groupware, »local« cooperation with potential network-wide effects emerging at random is preferred to organization-wide procedures.

Tele- and videoconferencing, document and application sharing, newsgroups, mailing lists, interactive websites and many other electronic group support might be means for the support of participatory processes as well as for collective information and decision making processes. They might change the situation of »local« yet potentially organizationally relevant developments. If changes in these respects are desirable remains to be discussed among Sigma-members.

SUGGESTIONS AND CONCLUSIONS

Beyond the economic advantages of an organizational form flexibly reacting to the market, network organizations like Sigma have enormous advantages for their members: the members of the network are not subjected to many levels of formal hierarchies; to a large extent they determine the content, amount, and setting of their work; payment is about as high as in organizations offering comparable services; and the organizational culture suggests work practices that make many work activities more enjoyable than in other kinds of organizations.

But, at the same time, network organizations like Sigma have serious disadvantages. Traditional forms of representation, codetermination and support would neither be possible to install nor likely to meet the needs of self-employed laborers within their organizational and societal conditions. Appropriate forms of representation, codetermination and support have not yet been developed.

As our empirical evidence indicates, the described interplay of organizational, legal (e. g. codetermination legislation), cultural and economic factors facilitating the formation of network organizations like Sigma necessitates new forms of participatory processes for the development and introduction of computer applications.

As a conclusion I will now present two of many possible directions for future research and development approaching issues of user participation in organizations like Sigma.

One extension of the perspectives on organization-wide technology projects would have to take into account »local« developments (in groups, teams, projects etc.), organization-wide processes and societal factors. In the past years, for example, individuals and groups within Sigma purchased, developed, introduced and used a multitude of computer applications (like internet accounts, individual installations of Lotus Notes and other groupware systems). Some of these individual solutions would possibly meet the requirements of an organization-wide groupware, some could be used by other local work contexts within Sigma. In a situation like this, it would certainly be worthwhile observing and evaluating »local« processes and results of negotiation and decision making and their impact on the organization as a whole. Hypotheses might concern factors explaining why some »local« developments gain organization-wide momentum, while the effects of other developments stay confined to their original setting. The parallel development and use of multiple computer applications has set the stage for new questions and concepts in research and practice of participatory system development. Participatory processes of requirements analysis, design, implementation, purchase, adaptation, introduction and evaluation (regarding the suitedness for local and network-wide work) could possibly be based on the interplay between local settings and an organization-wide exchange. Local experiments of the introduction and evaluation additional to the specific composition of the local technical infrastructure should be encouraged. Since the validity of the results is confined to the local contexts a regular network-wide exchange of local delegates could take place in order to explore the local developments' potentials for generalization. It could turn out that more groups could use a certain local system or that a local development could be used as organ-

ization-wide system. Should the delegates see potential for generalization within the network, these hypotheses should be fed back to the local contexts for approval.

Maybe some information technologies have the potential to support network-wide participatory experimentation and integration processes. But this has to be examined carefully because computer applications are often objectifications of societal and organizational (power) structures; informal commands inscribed in these tools may reinforce invisible commands in informal yet effective hierarchies and strongly suggest self-employed laborers to subject themselves under detrimental conditions. (This quality of computer applications has been described by various authors; see Boes 1996 for a theoretical account).

Bødker (1996, p. 220) extracts the historical stages of 1. traditional non-participatory design, 2. participatory, experience-based design and 3. participatory, experience-based design, partly applying and tailoring standard technologies with experimental »pilot« groups. Maybe a forth stage suited for network organizations like Sigma would have to replace the notion of a technology development/introduction project by the notion of a continuous process of parallel local experimentation and network-wide collection of experiences, feedback and integration into an overarching infrastructure consisting of a variety of local substructures.

If it is true that »non-traditional« organizations gain importance and may even outnumber »traditional« organizations we have to systematically compare these new forms and take a historical perspective on types of organizations. Only then will we be able to develop and put into effect a whole spectrum of appropriate strategies for the participatory development and introduction of computer applications.

REFERENCES

Bødker, S. (1996). Creating conditions for participation - Conflicts and resources in systems development. Human-Computer Interaction, 11(3), pp. 215-236.

Boes, A. (1996). Formierung und Emanzipation. Zur Dialektik der Arbeit in der »Informationsgesellschaft«. In: Schmiede, R. (Hg.) Virtuelle Arbeitswelten: Arbeit, Produktion und Subjekt in der »Informationsgesellschaft«. Berlin: Edition Sigma, pp. 159-178.

Clement, A. & Van den Besselaer, P. (1993). A retrospective look at PD projects. In: Communications of the ACM, 36, 4, pp. 29-37.

Floyd, C., Mehl, W.-M., Reisin, F.-M., Schmidt, G. & Wolf, G. (1989). Out of Scandinavia: Alternative approaches to software design and system development. In: Human-Computer Interaction, 4, pp. 253-350.

Floyd, C., Reisin, F.-M., & Schmidt, G. (1989). STEPS to software development with users. In: Lecture Notes in Computer Science, 387, pp. 48-64.

Kensing, F., Simonsen, J., & Bødker, K. (1998). MUST: A Method for Participatory Design, Human-Computer Interaction, Vol. 13, No. 2, pp. 167-198.

Kuhn, S. & Muller, M. (eds.) (1993). Special Issue on Participatory Design. Communications of the ACM, 36(4).

Rittenbruch, M., Kahler, H., & Cremers, A. B. (1998). Supporting Cooperation in a Virtual Organization. In: Proceedings of the International Conference on Information Systems (ICIS) '98 (December 13-16), pp. 30-38.

Robertson, T. (1998). Shoppers and tailors: Participative practices in small Australian design companies. Computer Supported Cooperative Work, 7(3-4), pp. 205-221.

Trigg, R. & Anderson, S. I. (eds.) (1996). Special Issue on Current Perspectives on Participatory Design. Human-Computer Interaction, 11.

Voß, G. & Pongratz, H. (1998). Der Arbeitskraftunternehmer. Eine neue Grundform der Ware Arbeitskraft. Kölner Zeitschrift für Soziologie und Sozialpsychologie, 50, 1, pp. 131-158.