

# **Social Informatics – From Theory to Actions for the Good ICT Society**

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**Abstract:** This paper presents ongoing social changes related to the use of ICT. They are analyzed under the headings: workforce, organizational design and structure, psychosocial communication, and work content. A theoretical model entitled ‘The Convergence theory on ICT and Psychosocial Life Environment’ is described, which reflects main ongoing processes in the Network society encompassing various spheres of life, environments, and human roles. A special section analyzes the ongoing changes in the home and home environment. Social Informatics is discussed related to the model and special attention is devoted to the individual level and humans. Concluding remarks deal with visions and actions. Figures with circles and converging circles are used to illustrate and summarize.

**Keywords:** ICT society, theory, work life, network organization, psychosocial

## **1 Introduction**

The area Information and Communication Technology (ICT) and its interaction with social changes on organizational, individual and societal levels has in the 2000’th become of growing attention, due to the depth and wide use of ICT. The focus in the ICT related disciplines has so far been too much on the ‘technology push’ in contrast to focus on human needs and requirements at the development, introduction and use of ICT. New universities, sometimes entitled IT universities, are appearing in many European countries trying to bring together disciplines from the traditional university and disciplines from the technical university in order to facilitate a necessary rethinking and reorientation of R&D. This sometimes results in new centres directly named ‘Humans in the ICT-society’ focusing on the human, organizational, and societal aspects of ICT use. Empirical experiences show that it is important to keep a balance between pure technical research and development in software and hardware

technologies, new fields such as nanotechnology and on the other hand the behavioural and social science disciplines such as psychology, sociology, cultural anthropology, urban/rural planning, and ethnography.

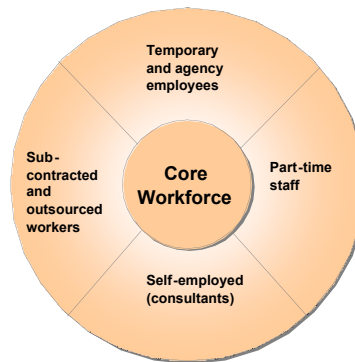
## 2 Ongoing Social Changes in the 'Net Era'

Changes related to the use of ICT are occurring in workforce structure, the structure and design of organization, communications patterns, work content/work tasks, management, and the relation between work, private and public life. The results below are primarily derived from our research over the years in developed countries.

### 2.1 Workforce Structure

We get more and more organic organizational structures, with a focus on flexible work processes, including dynamic networks for capital and human resources, often summarized under the concept of network organizations. Economic systems are being created where the present boundaries are increasingly becoming eroded.

Core Workforce in the Flexible Company is decreasing



**Figure 1.** Core Work Force and Peripheral Work Force (Bradley 2001, 2006)

So-called flexible companies are becoming frequent in the present Net Era. At the centre of Figure 1, a core workforce exists that consists of permanent full-time employees. They enjoy a wide range of employment rights and benefits. In the flexible company, the *core workforce* is decreasing. However, the other part, the *peripheral workforce*, is growing (see the outer circle sectors in Figure 1). It consists of part-time staff, self-employed consultants, sub-contracted and outsourced workers,

and temporary and agency employees. Some of the knowledge workers are key resources, while others can easily be replaced. This is not due to competency, rather due to the applied rules for hiring persons. They might have very strong positions in the company through the network organizational structure, and based on their expertise or social contacts. This phenomenon is invisible. Power is invisible in these new forms of organizations: power has no outward manifestation and is not reflected to the same extent as before in properties belongings associated with leadership.

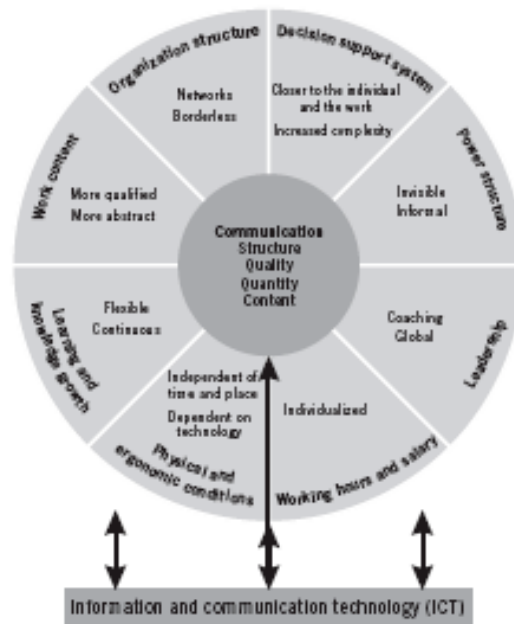
## 2.2 Organisational Design and Structure

Traditional organisational structures have a ‘military’ form with boxes and one directed arrows in tree-like shapes showing attributes such as chain of command and responsibility. Such bureaucracy was originally meant to support and protect individual rights; however, it developed to function in the opposite direction. These organisations still exist, but they are complemented by and sometimes replaced by networks. Network organisational structures are like crocheted tablecloths or bed covers, easily handled by women through history. The loops in the fabric or organizational units (computers) are connected through the same yarn (network, tele-technology). The future structure of the world - social systems, organizations, official authorities, NGOs have this basic form, even if the pattern might differ. The networks interact more and more *wirelessly*. In these networks, *power* can both be centralised and decentralised and the process of building up power is invisible, it takes place in cyberspace. Industrialization and industrial technology during the mainframe period of the computerization era were fading away as well as the *hierarchical structures* of companies. We concluded in early studies of the use of knowledge-based systems (KBS) or use of applied AI that the *distribution of power* became possible in quite a deep sense (Bradley and Holm 1991). Competence was being transferred to the periphery, out to the lower levels of the organisations and even to people’s homes. We can also explain the present trend towards the flattening of hierarchies because the hierarchical regulation and control are built into information and communication systems.

Characteristics of the network organizations are as follows: Direct communication between the various levels of the organization is more and more applied. Barriers between organizational units that deal with on one hand development of ideas and on the other hand execution of those ideas are disappearing. Power is relocated in the organization, also internationally - headquarters as well as production units are moved. The permanent changes of the organisational structure and the professional roles are partly due to and result in an increased openness and awareness of the surrounding world. New professional cultures are being developed and they are often complemented by being part of virtual cultures. The latter are entitled virtual communities and web based communities (WBC), new forms of collaboration. More and more individuals function as self-governing company units, with new challenges.

### 2.3 Psychosocial Communication

In network based organizational structures *psychosocial communication* has come in focus. The communication circle in Figure 2 illustrates how ICT direct and indirect affect qualitative and quantitative aspects of communication between people. As an example, leadership (the sector lower right in the circle) is directly affected by the use of ICT and in addition the changing role of leaders as becoming more of coaches, is affecting communication pattern (in the middle of the circle).



**Figure 2.** The Communication Circle and Psychosocial communication in the Net Era (Bradley 1977, 2006)

When people are working more and more from their computers, greater demands appear on the social and emotional components of communication (Bradley et al. 1993). This is valid still more in the Net Era when people are “working together when being apart” (Jansson 2005) as well as being together when being apart. Working in distributed environments internationally is a common work pattern.

An environment where people trust each other, have a feeling that they belong together and are part of a group, are aware of each other’s competences, and where the communication is open and frequent, will have a much higher chance of being sustainable. To be able to achieve such communication cultures, one should consider different areas in the communication circle. In addition, one should include action strategies on how to handle distance, design in psychosocial work, and examples of activities that concern different sectors in the communication’s circle. The objective

work environment includes organizational structure, power structure, how important the project is considered, leadership and time management, reward system that supports the building of an environment that is motivating and comfortable to work in, team composition, the organizational design of a project, the content of the work tasks, and the communication patterns. In addition, it includes the physical environment, distance per se, and the subjective work environment (Jansson and Bradley 2004, Jansson 2005).

## 2.4 Work Content

Accelerated changes at work and in the content of work tasks are occurring in the 'net era'. We have achieved more *flexible work processes* regarding both in the professional role and in leadership. All human roles (the professional role, the learning role, and the role of citizen) are becoming more and more *integrated*. Changes that dominated for many years in industry as well as in office (e.g. repetitive jobs, physically strenuous jobs including routine work) are disappearing and a total upgrading of qualifications occurs. Consequently, the organizations have flattened out, even if we still can see organizations that keep levels that are not required by company goals. The worldwide sale and application of the *same type of software programs* continues and hence people carry out the work tasks in a more and more similar way. This facilitates the mobility in the labour market.

Our studies of young IT people in the city centre of Stockholm show that they have *strong social networks* that were an important part of their work situation. Workmates and friends were often the same people and *trust* had an important role. Work tasks should have a *meaning* to their life. Most people were deeply involved in their work and found their work tasks *fun, stimulating, interesting, and independent*. *Flexibility* concerning time and space was a key aspect in their work situation. Due to much of responsibility in both work and private lives, they felt a great freedom. They took care of themselves in professional *development* and learning became a part of their daily work (Danielsson 2002).

## 3 The Convergence Theory on ICT and the Psychosocial Life Environment – and some Future Trends

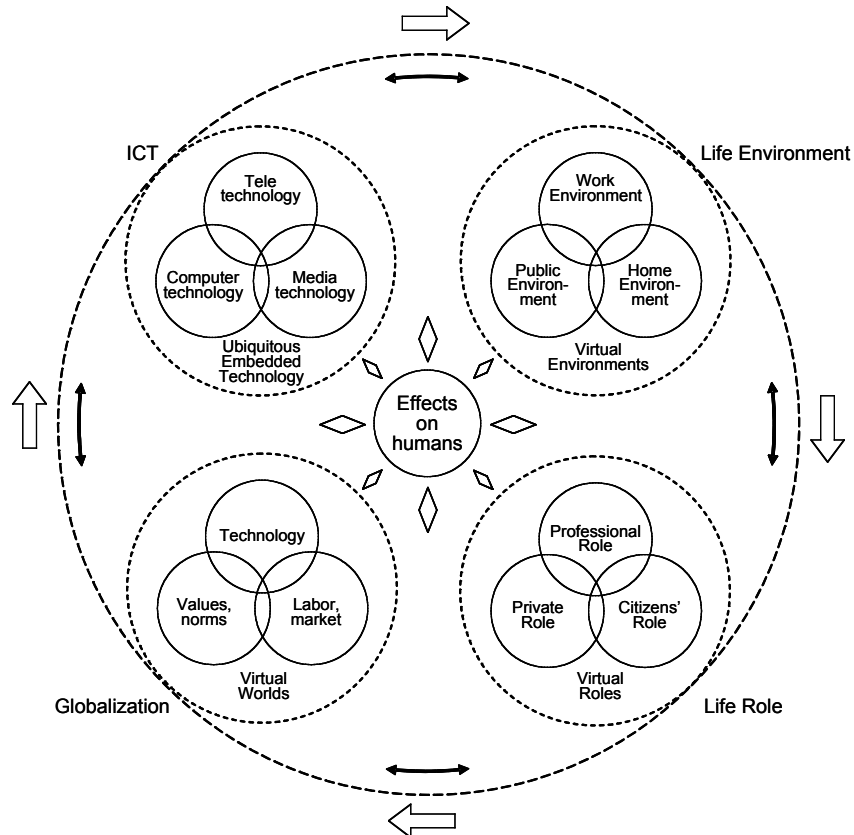
### 3.1 Convergence Theory

The convergence model on 'ICT and the Psychosocial Life Environment' is a graphical illustration of ongoing changes in the 'net society', which will appear in detail in my forthcoming book (Bradley 2006). Some comments to the model in Figure 3 will follow and the description is structured with reference to concepts in the outer circle in the figure.

The current network period very much follows the convergence and integration of three main technologies: computer technology, teletechnology, and media technology. The convergence process (Figure 3) is enforced all the time by smaller,

cheaper, and more powerful components. More and more, people are using ICT in almost every activity and we find it embedded in more and more things (ubiquitous computing). The converging circles reflect graphically the ongoing process.

Both convergence and interactions are important features in the model. Convergence here means a move towards a common content. Interaction means that technology interacts with the social world with values and beliefs. There is also an ongoing interaction between the 'clusters of circles'.



**Figure 3.** Convergence Model on ICT and Psychosocial Life Environment (Bradley 2005, 2006)

*Globalization* (lower left in the circle in Figure 3): We see that a convergence is occurring between technology, economy, values and norms, and labour market and is entitled *Globalization*. The geographical span is changing. At present, our work life is mainly based on national and international trade that will become more global. Electronic commerce and electronic market places are creating a strong change factor behind the structure of work life. The geographical space in the future is both global and beyond – including applications of virtual reality (VR).

- *ICT* (upper left): A convergence of computer technology, telecommunication technology and media technology is occurring and it is becoming what we define

as ICT. Knowledge companies and knowledge workers are increasing. In these organisations, *knowledge* is managed in new ways. In the early 2000s, multiple communication channels exist such as word of mouth, writing, and audio visual, electronic. In the future, we should expect to apply meta-channels (e.g. meta-media of virtual reality (VR)) and controlled reality environments (environments that we manipulate and manage in VR).

- *Life Environment* (upper right): Work environment, home environment, and public environment are converging to a ‘life environment’ where the work and public environments move into our homes. We should see a new *emphasis* on certain dimensions in the current psychosocial environment as well as new *dimensions* in the psychosocial environment. We have to be open for unforeseen implications.
- *Life Role* (lower right): The professional role, the private role, and citizen's role converge to become a ‘life role’. Role and role formation are central concepts in social psychology and they represent a level between structures and the individual. A ‘role’ appears where psychology and sociology meet and social psychology emphasizes the interaction between the levels. In democracies, the individual *can* influence and form his/her role/roles that are not solely a victim for structures;
- *Effects on Humans* (in the middle): In Figure 3, we represent the ‘effects on humans’ by the circle in the middle with two ways arrows around as a flower, which illustrate interactions. ICT, the life environment with its three sub-environments, the life role with its three sub-roles, and globalisation with its three components of values, technology and labour market all affect the individual. However, the individual can also influence the technology, the environment, and her/his own roles and phenomena on the organisational and societal level and the new virtual reality. Complexity characterizes the society and is mirrored by the fact that effects on the *individual* become more *multi-faceted and complex*. The way humans handle his/her situation can roughly be categorised as *active or passive reactions*.
- *Virtual Reality* (VR): We illustrate virtual reality by four circles marked with dotted lines, surrounding the four clusters of converging circles. These circles reflect our participation in cyberspace on various levels.
  - To the lower left part in Figure 3 we could talk about *Virtual Worlds* on the global level.
  - Within the concept of ICT the step taken by applied *Embedded and Ubiquitous technology* make the technology more hidden for the individual and in the society as a whole.
  - *Virtual Environments* in the upper right part of Figure 3 is already a common concept.
  - *Virtual Human Roles*, in the lower right part, is in a more extreme form another person/personality that people take on e.g. avatars.
- The thin double-directed arrows represent interaction, the broader one-directed arrows represent the main direction for the movement, and the process described in the circle model. Transferred to *actions* we can in our professional role, private role and citizen’s role influence our life environment on various levels of analyses (see further Section 4).

- *Home of the Future*: Close connected to the convergence model is home and home environment. During the last few years we have studied changes in society and human behavioural patterns at the use of ICT in homes and home environments in USA, South East Asia (Singapore, Malaysia) and Japan (Bradley, Linda et al 2000, Bradley, L. and Bradley, G. 2001, Bradley L. 2005, Danielsson 2002). A general trend is that in the home many human roles are converging to *one life role* and the home is moving towards encompassing also a *virtual space* as well as *physical space*. Driving forces are converging and embedded technologies are appearing. We could regard the home as an extended family centre, a care centre, a multimedia centre, a centre for democratic dialogue, a market place, a learning centre, or an entertainment centre. We could summarize all of these as a *communication sphere*.

### 3.2 Convergence and Allocation Issues

Despite the observable tendencies of convergence in the ICT society, there are also *counter-movements*. We can observe that regions, nations, and subgroups in the world work towards separation, self-government, autonomy, and sometimes isolation. Related to this phenomenon is the allocation issue in a broad sense.

Throughout computerization, it has been possible to make huge profit and the question of allocating the profit should have been a key issue at an early stage. However, even if we could foresee the global economy, it was not until recently that the allocation issue has come in focus for actions both at the national and global level. The allocation issue has very much to do with allocating:

- work and leisure time
- citizens' services (paid/unpaid)
- production and reproduction
- cities and rural areas
- profit between sectors within a country (profit between industrialised countries, profit between industrialised countries and industrially developing countries).

In the Western countries, we have achieved a subdivision with one group that is overworked and another that is shut out from the workforce. It is not a necessary development and there are many alternatives. In later years, they used ICT to support the 'weak' in society and the people with various kinds of handicaps: linguistic, physical and intellectual. The 'digital divide' is a descriptive and analytical term whereas the 'allocation issue' and allocation of resources are terms that are more political. There is a call for actions incorporating social and humane costs and the gains of globalization, in a short and long-term perspective. The potential of balancing deep divides in resources is inherent in ICT, but plans are needed.

### 3.3 Individual reactions

The individual level needs more attention with respect to interaction between ICT – Society – Individual. There are both positive and negative impacts on the Individual. In the present flexible network of organisations, too much of responsibility is placed



on the individual who loses permanent employment. The peripheral work force (see Figure 1) has to manage his/her competence development and market himself/herself. These new knowledge workers are as individuals exposed to a competitive world market.

We might view this pattern as freedom from paid work in a traditional sense, freedom to choose your life. However, some questions have to be raised. Should our schools prepare for educating so-called ‘free agents’ or prepare for acting proactively? We all need a basic security as employees and citizens, but there is a need for balance between a strong society and strong individuals. Most people are not ‘strong’ throughout the life and we need to think in terms of *sustainability* regarding physical and social environments and thus sustainable human beings.

Regarding the ‘Effects on Humans’ in Figure 3, we can conclude that the use of ICT has changed human qualities so far. They include identity and self-perception, social competence, creativity, integrity, trust, and dependency. We could either strengthen or weaken each of these qualities.

In stress-theoretical terms, we often talk about the importance of balance. ICT is contributing to a balance or an imbalance between emotional - rational components of life, female - male aspects, and involvement - alienation.

Research shows that an *accelerated tempo* is occurring in the industrialized world. There are reasons to talk about ‘ICT stress’ or ‘Internet stress’. Certain ICT stress is related to the fact that we have an increased *dependency* on computers and networks and an increased expectancy that these technologies are functioning well. Stress phenomena in the Internet world are *information overload*, *contact overload*, demands for *availability*, lack of *organizational filters*, and difficulty of separating ‘noise’ from essentials, changing level of expectations and an altered *perception* of time and space in general.

[Tasks and environments that expose people to one of the two poles of over stimulation and under stimulation should be avoided in our society. The reason is due to the risk of stress (the individual level), the risk of a fragmented labour force (group/organization levels), the risk for a digital divide in nation states, and the risk of marginalization and exclusion from the mainstream of society (individual, group and societal levels] (Bradley 1989).

### 3.4 Social Informatics and the Convergence Theory

In the web page for the TC 9 world conference on Social Informatics it is pointed out that terms such as ‘human choice and computers’, ‘computers and society’, and ‘social informatics’ refer to a similar concern. The key question is formulated as follows: ‘How is the human being and its societal environment kept in the centre?’ and in particular, ‘How to build up an ‘Information Society for All’ (UNESCO, 2002; eEurope, 2002) when developing our more and more complex ICT systems?’ For example, we refer to a definition by Rob Kling as: “Social Informatics is the interdisciplinary study of the design, uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts” (Kling, 1999).

Earlier sections in this paper, both the empirical and theoretical one, confirm and underscore this basic perspective and the need to focus on *actions*.

#### 4 Concluding Remarks – From Theory to Actions

In 1986, I visited Rob Kling at UC Irvine and lectured on ‘Psychosocial Work Environment and Computers’, which was the title of my book that appeared the same year (Bradley 1986). We very much shared the same perspective in our research but we used different terms depending on our backgrounds. At that time, I looked at myself as a behavioural scientist, educated as a psychologist and working at a department of sociology, doing cross-disciplinary research together with computer and system scientists, economists, and sociologists.

One way to summarize the discussion on the ICT, society and the individual are to address *psychosocial processes*. These could be formulated as policy statements and with positive formulations of goals to be reached. ICT should contribute to goals such as:

- Information access for all
- Wellbeing and quality of life for all
- Enrichment in the social contact between people
- Integration and respect for diversity
- Greater autonomy for the individual
- Prevention of various kinds of overload and stress
- Deepening of true human qualities
- Deepening and broadening of democracy
- E-cooperation and peace
- Sustainability in a broad sense (the environment, economy, and human side)

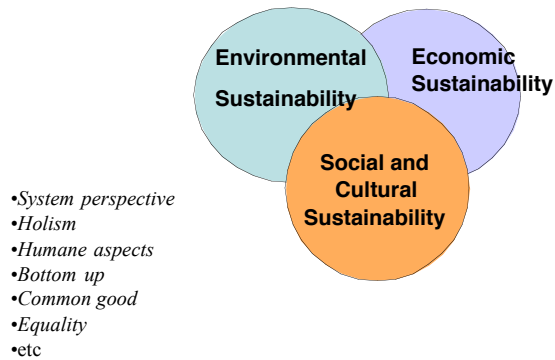
Internationally, the first official statements of goals for the ICT society were formulated at the World IT Forum (WITFOR 2003). The so called Vilnius Declaration brought forward goals which had a great implication for the involvement of the developing countries e. g. *bridging* the digital divide between rich and poor in the world; urban and rural societies; men and women; different generations. Another main concern was *reducing* poverty using education and information and communications technology (ICT).

Many concepts in the list above are overlapping and possible to analyze from various angles. By now we need to move to action-oriented and value-oriented research to support and influence actions strategies. TC 9 World Conference is highlighting a field of research, practice, and education with accelerated speed of change and complexity as well as urgency. There is a need for a much stronger support internationally for cross-disciplinary, cross-cultural, and action-oriented research on the topic ‘ICT for Deepening of Humane and Societal Qualities’. Social informatics has to be a mandatory part in education and training in ICT-related disciplines.

Official bodies on the international and national level such as WSIS (World Summit on the Information Society) and national ICT programs are actors as we move to an ICT society on a global scale. ICT applications as Internet, web, and blogs should be used for dialogue between cultures, increase mutual understanding, and

enrich us all. How can human rights be more deeply understood, exemplified, and applied in the ICT society? In 2006, the United Nations is reviewing human rights; can IFIP and Social Informatics contribute?

### Sustainability as Convergence



**Figure 4.** Sustainability and the use of ICT are close connected

Social informatics can be defined in various ways, but visions are shared about wellbeing, democracy, and quality of life for all as well as social, economical and ecological sustainability as illustrated in the convergence circles of Figure 4. We can all be ‘actors’ in this process, researchers, IT professionals, NGOs, and the individual.

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