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Position Paper Number 4 for the Workshop "Towards Criteria of Sustainability and Social Meaningfulness in Development":

"Meaningful to Whom?" Technology Design and Stakeholder Integration

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Talking about social meaningfulness of technology immediately raises the questions: What does *meaningful* mean? To what does the term *social* refer to? To *whom* exactly is technology meaningful or to whom could technologies[1] be meaningful?

The term *social* itself is a broad one and can refer to society at large (global, national, regional), as well as to subsystems of society (economy, politics, culture, ecology, technology), and to individuals that – together – constitute society (as they build communities, networks, organizations, etc.). Depending on *how* we define society, we find different forms of *meaningfulness*. Creators and users give meaning to inventions, the structure and design, and the implementation of technologies and decide to a large extend on how technologies are used.

In the first section I discuss the dominance of economy on other subsystems of society, namely politics, ecology, culture, and technology. Section two discusses technology design, implementation and use, whereas section three is devoted to the influence of social inequalities on the design of technologies, section four emphasize on Information and Communication Technology Assessment and Design. This contribution closes with suggestions for questions to discuss during the workshop.

1. The Dominance of the Market Logic

All subsystems of society[2] are mutually interwoven and influence each other. Currently we face a dominance of economy. The market logic influences, or even subordinates, other subsystems of society.

The dominance of economy on politics can be exemplified on the current financial crisis, which led to support of big industries, banks and insurance companies by taxpayers' money.

One example for the dominance of economy on ecology can be found regarding the Kyoto-Protocol, where nation states can buy emission allowances from other operators.

Education is an integral part of culture. The dominance of economy on education can be found in the liberalization and privatization of universities. *Transdisciplinarity* is fostered as a new mode in research, allowing diverse groups of stakeholders, like politicians, practitioners, or entrepreneurs to participate in research and development. Such an approach bears the risk not only being research *with*

[1] Although some of the thoughts apply to different types of technologies (e.g. large industries, energy, acricultural, etc.) I focus on Information and Communication Technologies (ICTs) in the following discussion.

[2] like economy, politics, culture, ecology, technology, etc.

stakeholders, but *for* them and thus creating results in favor of the industry. The advantage for companies is evident: cost cutting of research and development, out-sourcing of R&D-departments to universities, that are still – to a large extend – financed by tax payers[3].

This dominance of the market logic also has an important influence on technology development, implementation, and use. Technological innovation and development is one of the driving factors of economic growth and wealth. Economic dominance on technology can be observed in many instances. For example: shorter "lifecycles" of technologies (e.g. mobile phones, computers), producing more of the same, rather than real alternatives, follow-up technologies are not compatible with previous once (e.g. the next generation of digital cameras or mobile phones often have different chargers than the previous one). Such developments often lead to increasing user demands, rather than serving real needs. *Participatory design* approaches (such as open innovation or peer production) can lead to exploitation of current and/or future customers by handing over idea finding and creation to them.

Although many technologies theoretically offer help for people in need and promise to solve problems, technological development and innovation rather serve the demands of people in rich countries, than the poor ones.

2. Technology Design, Implementation, and Use

Technologies are usually invented *by* some-one *for* someone with a certain intention, desire, and goal. The way technologies are designed, invented, created, tells about the way they can (or more likely *should*) be used.

To understand and assess current trends in technology design, implementation, and use we can learn from prevailing approaches in science-technology-studies (STS). Systemic approaches in STS usually do not take the change of technological development into consideration. According to Nina Degele (2002) there is a lack in theoretical approaches regarding system theoretical and evolutionary approaches. Both of them are prevailing theories in technology assessment, but they are treated independently from each other. With information and communication technologies, i.e. technologies that change rather quickly (especially compared to large-scale technologies) one has to take the dynamics of the technological change into consideration.

Among others, researchers like Degele (2002), or Fuchs and Hofkirchner (2003) criticizes, that many approaches in STS treat technological change as being independent from the social realm. Such an understanding is misleading since technology is part of society, and emerges from society; or as Hughes (1997, p. 10) puts it: "technologies come not in the form of separate, isolated devices but as part of a whole, as part of a system. [...] A technological system [...] is never merely technical; its real-world functioning has technical, economic, organizational, political and even cultural aspects." Thus it is important to question who owns the companies that develop technologies, who can access them, and how these technologies are used.

3. Social Inequalities and Technology Design

The question of who can access and use technologies and who is excluded in using them, refers to the digital divide debate. Thereby we have to differentiate between diverse forms of divides. The global divide refers to those people who live in regions where the necessary technological infrastructure is utterly missing or inappropriate. The social divide describes the gap within a country, e.g. where the technological infrastructure is more or less given and affordable. The gap is one consequence of lacking education and computer literacy. People with lower formal education tend to deny to use technologies, because they have no value for them, or because people are cautious in using them. We are recently facing a new gap when speaking of social software or Web 2.0. These notions characterize a change of the web and de-

[3] For a deeper discussion on this issue please see the position paper of Wolfgang Hofkirchner and Robert Bichler for this workshop (same issue).

scribe a shift, where users change their roles from being rather passive consumers towards active contributors. Additionally, people who live in oppressive regimes are censored or blocked and thus might be excluded from using certain technologies and services as well.

In terms of production of technologies we have to think about *how* they are created, by *whom,* and with which intention. Only few technologies for example are produced with the knowledge of people from developing countries[4].

Howard Rheingold (2002, p. 96) points out that "the designs that dominate early in the growth of a technology can have disproportionate power over the way the technology will affect power structures and social lives." We can distinguish between two extreme perspectives in terms of power relations inherent in technologies: ICTs can help to increase control over and exploitation of users and privacy diminishes. At the same time the Internet (e.g. Open Source, Social Software) is associated with a more powerful role of users and the Internet enables democratization.

Social patterns, including social inequalities, influence technological innovation and development, i.e. technologies are invented in a western and/or academic environment. The design and structure of technologies often origins by using know-how from western/academic contexts, but the production is outsourced to developing countries. This furthermore leads to using or denying certain technologies which increases digital divides, social inequalities, and knowledge gaps.

Notions such as the knowledge gap digital divides, and social exclusion characterize inequalities in terms of access, skills, and competences. Inequalities in social class, education, skills, and lack in capabilities influence the way technologies are designed, constructed, implemented, and used. Sometimes technologies are used in other ways, which were not intended in the design, but appropriated by users, e.g. using social networking sites for protest and political mobilization (Neumayer and Raffl 2008, 2009).

[4] … although often produced *in* developing countries.

4. Technology Assessment and Design

Technologies do not invent themselves but they are created, shaped and (re-)designed by technicians, constructors, designers, engineers and users – they give meaning to technologies. Constructing technology per se is a social act. Technology is created and designed by society. Consequently, society has the ability to shape technologies. Very often people tend to arrange themselves with technologies, rather than changing or adapting them.

Technologies influence society, they are both, enabling and constraining. This means for example in terms of information and communication technologies that society on the one hand may benefit from, e.g. the empowerment of citizens, democratization and participation. On the other hand these technologies have the power to exclude a large number of people in accessing information, or technologies are used to observe and control people, thus to incapacitate them.

Technology Assessment and Design provide decisive tools for the evaluation and regulation of emerging technologies, to foster their positive potential and to decrease those forces that enable negative short- or long-term side effects, as well as intended and unintended consequences. Therefore they have the potential – and thus shall be used – to shape society in a way, that emerging technologies remain more than a space for competitiveness, but foster cooperation and the potential for a common knowledge base to emerge. The technological infrastructure given at the moment both enables and constrains cooperation. A paradigm shift that has the potential to overcome the dominance of the market logic, requires awareness and the support of empowered people that are not exploited by powerful elites.

5. Future Perspectives?

As discussed above: Those people who invent, create and use technologies give meaning to them and thus decide about how they are created, designed, implemented, and used, although appropriation to a certain extend is possible.

Rather than envisioning a dystopian view of the future, it is important to assess and evaluate current trends, analyze their potential and limits and create alternatives to assumed negative outcomes. The aim of this position paper was to lay the foundation for a deep discussion. Alternatives which may be discussed and analyzed during the workshop, include (but are not limited) to following topics:

How can we foster:

- radical innovation, rather then incremental innovation? Is this feasible? Who would profit?
- participatory design approaches, that remain more then a "laboratory experiment" (Bogner 2009), exerted by professionals, but really include a variety of perspectives?
- those factors that support a *Global Sustainable Information Society* (Hofkirchner *et al.* 2007).

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