

Bridging the gap of technology and work *Conceptual reflections from a Technology Assessment perspective*

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Workshop

Technology & Work from a TA Perspective

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Agenda

- 1 Modern Times: the rational logic of work in industrialised societies
- 2 Transformation of technology *and* work
- 3 Work as a socio-technical constellation
- 4 New questions from a TA perspective

1 Modern times: the rational logic of work in industrialised societies

Industrial capitalism (**new modes of production based on mechanization processes**)

David Ricardo (1772-1823), Karl Marx (1818-1883) and Friedrich Engels (1820–1895):

- history of society is based on the **mutual relationship between technical progress and competences (Produktivkräfte) and socio-economic relations (Produktionsverhältnisse)**. Here, technical development is no external factor, but integral part of societal development (technological knowledge, (technical) qualification of work, societal organisation of work)
 - Organisation of work: **human-machine-interaction leads to new modes of work** (fragmentation of work processes, specification of working instruments, combination of human work and technical action towards a socio-technical system > interdependency of humans and machine (models of co-operation, supplement, substitution))
 - **Technological development is no momentum of its own**, but the result of socio-economic processes (dynamic of competition within markets, speeding up of production cycles, relationship between factor ‚human work‘ and ‚capital‘)
- (Buraway 1979 & 1985, Bravermann 1985, Rammert 2007, Huws 2003 & 2007, Turkle 2011, Schmiede 2015) ...



1 Modern times: the rational logic of work in industrialised societies



*“It is not the articles made, but **how** they are made, and **by what instruments**, that enables us to distinguish different economic epochs.*

Instruments of labour not only supply a standard of the degree of development to which human labour has attained,

*but they are all **indicators of the social conditions** under which labour is carried on.”*

(Marx 1969a, p. 194-195, Capital Volume One, Part III: The Production of Absolute Surplus-Value)

1 Modern times: the rational logic of work in industrialised societies

Indicators of the social conditions:

- Integration of **paid work model** into capitalistic societies. Negotiation over remuneration of work become intrinsic to welfare state system
- Technological changes and the division of labour are considered as the **source for productivity** (efficiency & value added) (go back to approaches of Adam Smith and Frederic Taylor)
- Relation of **division of labour** and the **organisation of work** (efficiency // rule) (from *Tayloristic model* to „*labour entrepreneur*“ (Moldaschl 2010, Voss, Pongratz 1998)
- Relationship between automation processes and the importance of **knowledge, qualification and skills** (shift of sectors)
- Organisation of work as a **process** (organisational level) and as a **result** (societal level)
- Human work as a **commodity** (social and economic recognition of human work)
- Growing importance of **unpaid work** as component of economy structure but still with low social recognition (social economy) (i.e. domestic and care work, voluntary work, crowd work).

2 Transformation of technology and work



Since 1960 shift to „postfordistic“ production models: „**Information society**“ (Machlup, 1962; Drucker, 1969; Touraine, 1971; Bell 1973, Masuda 1980), „**Network society**“ (Wellman, 1973; Castells 1996) „**Knowledge society**“ (Reich 1991, Stehr 1994, Foray 2000, Bechmann 2009 etc.)

Three features of information technologies (IT) account for structural transformation in the economic, social and economic framework (Soete 2001, Baukowitz et al. 2006, Huws et al. 2011, Krings 2011 etc.):

- Capacity of IT to store, process and disseminate information at minimal cost leads to a expansion of use of IT application >> **to codify and to quantify formal knowledge**
- Digital convergence between IT and computer technologies renders any combination of communication forms feasible and creates possibilities to network, interact and communicate worldwide >> **new forms of international division of labour**
- Rapid growth of international electronic networking makes IT the first real “global” technological transformation >> **restructuring of value chains**

2 Transformation of technology and work

“Businesses are broken down into separate ,trades’ or ,branches’ which are in turn subdivided into ,operations’ which may in turn be carried out by different specialist ‘hands’ (or workers) using specific labour processes.

The more specialist this division of labour is, and the more it can be automated, the greater is the value that is added in any given ‘operation’”

(in: Huws et. al. 2009:12 ff. based on David Ricardo 1817, Chapter 7)



2 Transformation of technology and work

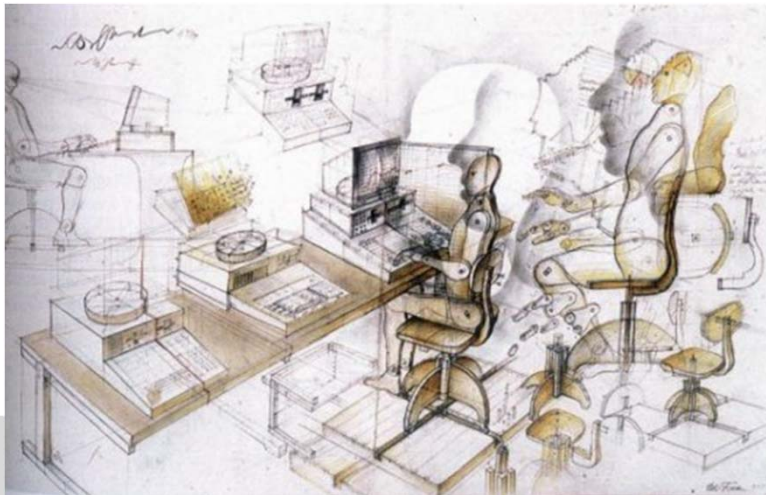
Recent trends:

- Socio-technical systems are able to **afford the flow of goods, knowledge and capital** connecting locations for businesses 'systematically' within different countries to a transnational system of production (i.e. Hirsch-Kreinsen 2010, Morgan 2005, Castells 2001, Altvater/ Mahnkopf 1997, Hirsch 1995, Varoufakis, 2013, Picketty, 2014) >> **economic dimension**
- IT systems allow the further processing of time and space, which has accelerated work flows in all sectors and branches >> **speeding up processes, intensification of work**
- Increase of fragmentation of work processes; effects also in semi and high skilled occupations (i.e. software development, research & development, health care etc.) >> **new forms of division of labour, new occupations**
- The “networking company” (Flecker, Kirschenhofer 2007) goes hand in hand with the demand on the ‘flexible men’ (Sennett 1998) >> **new forms of working conditions, subjective character of work**
- Difference between ‘core’ and ‘periphery’ work nationally and globally >> increase of ‘insecure’ working conditions, **institutional framework does not cover “hidden”** (Krings, Nierling 2012) effects of social shifts

3 Work as a socio-technical constellation

There is a lack of approaches of human-machine interactions (HMI) with regard to work environment:

- **Relation** – “socio-technical constitution” (Bijker et al.1987, Pickering 1993, Grunwald 2002, Rammert, Schulz-Schäfer 2002 etc.) (i.e. ergonomic configuration, design in working environment)
- **Agency** - „entities do things“ (Latour 1988, Haraway 1995) > agency of technology > work as a specific form of interaction: “rational agency” (Habermas 1986) embedded into purpose-means usage (i.e. care sector)
- **Control** - “principles of scientific (& technical) management” > speeding up- processes (K. Marx), internalization of motivation (Taylor 1911, Foucault 1973, Mehrtens 2002), technical system distributes human autonomy and creativity, cultural and social shift of work (Schmiede 1996, Voss 2010), need to increase the trust on technology and liability of complex systems (Kuhlmann, Schumann 2015)



3 Work as a socio-technical constellation

“Technological innovations occur on bionics, on micro- and nano-robotics, on haptic, grasping and manipulation, on tele-robotics, networking and swarm systems, on autonomous agents” (Moniz 2014)



4 New questions from a TA perspective

Shift of perspective

- Technical innovations create new modes of HMI in many working fields; increase of **systemic character of assessment**
- HMI has specificities of requirements if considered from the point of view of producers (operators) or of users (customers, products, i.e. UBER)
 - Operators transform resources creating valuable products
 - Consumers acquire products or services for their use
 - Technology products are between these two social entities

Mainly production processes are strengthened in research; there is **a lack in the perspective of assessment** (agency, control, innovations, future orientation > sustainable development)

- HMI is rarely sketched empirically with respect to the **shifts of work** as well as to the mutual relationship between technical progress (production forces) and socio-economic relations (modes of production)
- Assessment of (technologies in) working fields imply **“big” questions** > welfare state building, distribution processes, demographic change, equality, social stability, “vita activa” (H. Ahrendt 1996)

4 New questions from a TA perspective

Questions from a TA perspective

Conceptions

- How does HMI change work & working conditions in different fields?
- Which research questions are to be adressed?
- What is the specific role of TA in this field?

Methods

- What stakeholder groups are to be identified and to be involved?
- Which research methods are being to applied?

Policy Advice

- How to regulate such a complex issue with regard to policy advice?
- What are current difficulties with regard to political regulation?

4 New questions from a TA perspective

“Thus, the story of somebody’s doing something for a reason is not a psychological one, uncovering the inner springs of action. It is a historical one, locating the action among things happening”
(Bittner 2001:162)

