Information technology, decoupling and networked commons – a conceptual overview

Information technology (IT) is in various ways related to the idea of decoupling, i.e. loosening the strong ties between the growth of the economy on the one hand and the use of resources and energy on the other hand (cf. Hilty 2008, Mol 2008, Tomlinson 2010). At first view, it seems that an information-based economy has to be material-extensive, because bits and bytes represent economic value without being anchored in the physical realm. With the shift from industrial production to the service sector, and with the growing importance of information and communication in this sector, one could assume that a broad "dematerialization" of the economy must happen.

Obviously, this isn't the case. First of all, one could argue that the process we see as shift from agriculture and production to the service sector in the global north is only our end of an increasingly global division of labor. Raw materials are mined, agriculture does happen, industrial production with all its environmental impact is a global reality. The longer the systems of provision and the global value chains become, the easier it is to ignore the consequences of everyday practices that are hidden from view in the global north.

A second point is the actual material-intensity of the service sector. Whereas the ideal-typical idea of the service sector focuses onto hands-on, human-related services, one cannot ignore (a) the amount of transport that is strongly linked to service industries like logistics and commerce, and (b) the increasing dependence of everything only marginally related to finance, communication, media, science and other types of information processing, knowledge and creative works on IT (cf. Castells 2003), and thus on running systems. This includes not only computers and (mobile) phones, but in the last two decades also an increasing dependence on network infrastructures: the internet, (mobile) phone networks, and everything else that happens in data processing centers, from centralized business operations to cloud computing. In the end, bits and bytes are not immaterial, but do have a physical reality.

At the same time, the material impact of these activities becomes more and more hidden from the practitioner. Whereas a century ago the tools of work were present as material stuff in the work-place, and even the non-networked computer of the 1980s was more or less a representation of the actual material use – hiding the "gray" environmental costs of production and recycling, but not the costs of energy consumption –, things changed with networked computing. Today, we as users just don't know the environmental impact of simple acts. Is it true that a Google search uses the energy equivalent of heating water for a cup of tea? How long could an old, incandescence light bulb burn for repeatedly hitting F5 to renew the browser view? What is the environmental cost of a networked file system, how does a Facebook "like" compare to a Google "+1" in terms of energy use? Or: How does streaming music on the phone compare to playing it from a local MP3 to a cassette or CD?

The more our informational environment becomes seamless and part of an augmented reality, the less do we know about the actions that a touch, a blink or a click set in motion. Thus IT helps to hide the material side from the view of users, but it does not truly dematerialize.

Thirdly, material intensity of IT is not only related to the digital and virtual actions, but also to the machines and artifacts itself. Ever brighter and shinier smartphones become obsolescent after one or

two years of use, ever more powerful computers running more complex user interfaces and software, creating the illusion of no progress at the user side. The Fairphone (cf. Schmitt 2013) shows the difficulties – but also the possibilities – that occur if one tries to produce a smartphone enforcing fair labor standards in the whole value-chain from raw material provision to the manufacturing of modules.

Finally, the optimization of work processes and organizations that is connected to terms like the "smart factory" – i.e. improving efficiency with the help of sensor networks and fine-tuned, automated control – in theory could greatly improve the ecological impact of industrial process as well ("smart home") of every day environments. The same promise is given for the substitution of material goods through informational processes, e.g. the "paperless office". In both cases, the well-known rebound effect with its various relatives, i.e. the "induction effect" enters the center-stage (Hilty 2008: 147 ff.).

Taken together, this gives a rather dim view of the "greening" potentials of IT in itself. The question how IT can contribute to decoupling and a degrowth society has to be reframed. Information technology as technology hides the still growing material impact behind lean and light concepts like clouds, smart factories and easy-to-use mobile apps. Neither the technology itself nor "sustainable consumption choices" change the grave environmental backpack of IT on the various levels discussed. In the end, a use *of* IT for goals of sufficiency would be a typical example for sociotechnical change, for a transition that does not only changes the infrastructure, but can only be seen as the active development of new practices, networks and modes of provision (cf. Shove 2010).

So maybe the most interesting use of IT isn't optimization of processes or "dematerialization", but new practices of use that built upon IT systems, especially upon two idea: the idea of the (social) network of distributed, but more or less equal contributors, replacing the ideas of hierarchies and markets, and the possibility to share digital goods without loss. Following this leads, the most interesting thing about IT may be the link to the commons (cf. Hofmann 2006) that can be found in the *open source movement* (GNU, Linux, as well as much of the network software used all over the world, growing into the *Maker* movement), in the idea of *sharing* (e.g. the Creative Commons license system, the *Open Access* movement) and in the idea of *user-generated content* (e.g. Wikipedia). Following Baier et al. (2013: 91), one could even argue that (commercial) *social network platforms* like Facebook are an infrastructure for community-building. If the positives of these platforms nullify the environmental (and data-protection) negatives, remains to be seen, but this doesn't invalidate the thought that the experience of free use, of sharing, and of crowds working together that all are technologically enabled practices of the networked society, are the seedlings from which a transition towards innovative ways of economy, work and life will grow.

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