Gesellschaft“ dem Thema Privatsphäre kein Raum gegeben wird, wird wohl nicht nur vom einschlägigen Forscher als Mangel empfunden.

Als Einführung für Informatiker leistet das Buch aber hervorragende Dienste, da es über gesellschaftliche Wirkungen und Bedingtheit des IKT-Einsatzes informiert. Die Engfassung auf IKT als „Auslöser“ allein, die manchmal durchklingt, erscheint der komplexen Gemengelage, die zu den hier angesprochenen Entwicklungen führt nicht adäquat. Allerdings zeigt das Buch auch ganz deutlich, dass Trans- oder auch nur Interdisziplinarität nicht von einem allein geleistet werden kann. Sie lebt vom Austausch, vom Miteinander. Darüber hinaus macht es wenig Sinn, das Rad ewig neu zu erfinden. Viele der im Buch angesprochenen Themen sind Standardrepertoire der Technikfolgenabschätzung. Warum also nicht so benennen? Insgesamt erscheint der Aufbau einer MIKROPOLIS-Plattform lobenswert, für bestimmte Zielgruppen auch sinnvoll. Für mit IKT beschäftigte TA-WissenschaftlerInnen birgt das Buch keine Neuigkeiten. Für TA ExpertInnen bedarf es keiner „Re-Kultivierung von Folge- und Wechselwirkungen“ – sie sind unser täglich Brot.

Anmerkung

1) Schon das ursprüngliche MITRE-Ablaufschema verweist auf den sozialen Kontext und die notwendige Analyse der zu erwartenden Entwicklungen. Der VDI-Wertekatalog integriert individuelle und gesellschaftliche Werte. Constructive Technology Assessment (CTA) setzt auf der betrieblichen Entwicklungsebene an, um gesellschaftliche Wirkungen von Technologien frühzeitig zu analysieren und Technikentwicklung mitzugestalten. Real Time Technology Assessment hat einen noch stärkeren Fokus auf die mit der Technikentwicklung befassten Akteure. Und neuere Ansätze der partizipativen TA realisieren den transdisziplinären Anspruch und binden Laien- und Betroffenenperspektiven in den TA-Prozess ein.

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Radio Regulation: Opportunities through Technology Competition and Shared Frequency Use

***K. Werbach*: Supercommons: Toward a Unified Theory of Wireless Communication. In: Texas Law Review, Vol. 82, 2004, pp. 863-973[1]**

***E. Bohlin, C. Blackman, S. Forge, A. Renda*: A Common European Spectrum. Barriers and Prospects, 2007[2]**

Review by Arnd Weber, ITAS

In the use of radio waves and the production of related end-user equipment, Europe is falling behind the US and Japan in terms of innovation, prices and use. This is particularly true with regard to wireless Internet use. Two prominent examples are that most Japanese mobile phone users have been using cheap e-mail and other forms of Internet access from their handsets for about ten years now, instead of the expensive SMS that are still commonly used in Europe. And in the US, innovation became apparent once again with the Apple iPhone, which provides easy access to the World Wide Web.

Particularly from the German perspective, it is worrying that there is a convergence of consumer devices in areas such as radio and optical technologies, which is driven by foreign companies where German companies once were market leaders – remember Siemens Mobile. A good northern European position with regard to the production of cheap handsets does not really help if companies producing high-tech equipment disappear. In this review, a study produced for the European Parliament is presented that addresses actions to be taken by policy makers to bring Europe back to the forefront in the use of radio waves. This study calls in particular for the introduction of a novel concept called “shared use” of radio frequencies, a concept which emerged in the US. I am thus reviewing the most sophisticated elaboration of this approach, a study on “supercommons”, as well.

Following the recommendations expressed in these documents, radio waves could be used much more intensively than today. This could lead to more wireless use of the Internet, more

video on demand, more transmission of user-generated content[3], and also to so far unknown forms of radio wave use. It appears that the ecological and social aspects of such a change have not yet been addressed. To enable the reader to follow the critique of current radio frequency regulation expressed in the two studies, I will first provide a short overview of the three current modes of regulation:

Commons: When Hertz discovered radio waves in Karlsruhe in 1886, their transmission was, of course, unregulated. Early in the 20th century, the free emission of radio waves was already leading to interference, whereby receivers were no longer able to differentiate between signals from different transmitters. Today, free transmission is therefore only allowed in a few narrow bands, with limited emission power. One of those bands is the so-called industrial, scientific, medical (ISM) band at 2.4 GHz. Transmitters such as Wi-Fi wireless area networks, DECT home phones, or RFID chips share this band and some similar ones. This approach of unfettered communications has been pushed by companies such as Apple Computers and Intel.

Command & control: When interference occurred in the first half of the last century, governments started giving licences for certain frequencies to certain users. Typical examples are broadcasting and military vessels communication. In this way, the government can prescribe the service to be provided, the technology used and the power level. Alternatively, the government can also leave decisions on details up to the licence holder. This approach of "command and control" may be discarded as now being inappropriate for communications, because government administrations may not know better than the market players what is in demand. However, command and control also allows the government to issue new licences if an oligopoly of existing licence holders is deemed to set prices too high. The Japanese government has been using this approach for regulating the mobile market, with the effect that technology and price competition has become stronger there than anywhere else. This has contributed to Japan becoming the world's mobile market leader in terms of innovation and pricing (Weber, Wingert 2006; Weber, Haas 2008).

Property rights: Currently, at least in Europe and the US, one can witness a strong tendency towards the introduction of property rights in the so-called radio spectrum. Auctioning licences such as UMTS bands is well known. The government may prescribe the use of a certain technology, as with GSM or DVB-H, in order to create leadership through economies of scale in the production of equipment. Licences can also be provided with "technology neutrality", allowing licence holders to use whatever technology they want, and with "service neutrality", allowing, e.g. a licence holder to select between broadcasting and voice services. This kind of technology- and service-neutral regulation is currently being implemented in the European Union.

In addition to these existing ways of regulation, a new approach is emerging, called "supercommons", or also "shared" or "collective" use. The discussion proceeds from the point that the users ought to obtain more commons for their free use. For instance, with the transition to digital TV, users could be given a spectrum commons in "beach-front" bands below 1 GHz, in which the waves propagate well through walls and even whole valleys. The most radical proponents of the supercommons approach even question whether splitting up the spectrum into slices by frequencies makes sense in the first place. Current licensing has led to the effect that only few bands are actually used to a substantial degree, such as the mobile communications bands. Large bands reserved for government, TV and other forms of use are hardly used at all. From the well-usable radio spectrum below 3 GHz, measurements have shown that even in New York City at most only 13 % are used at a certain place and a certain point in time (McHenry et al. 2005).

According to the new approach, interference could be dealt with in new ways with modern technological and legal approaches. If regulation allowed for a "shared use" of bands – shared with licence holders as long as no interference occurred –, suppliers could sell the necessary new technologies, and users could find new ways to communicate. This way, the costs per bit could be reduced, Internet traffic could increase, and the digital divide be reduced. Private or industrial users could even set up self-operated systems in industrial or poorer regions,

and new types of applications would emerge, much in the same way as garage door openers or Wi-Fi using cameras emerged in the past, on ISM bands. The new type of shared wireless transmission would increasingly compete with traditional wireless (paid) channels, as well as with copper and fibre cables. I will now review Werbach's article on "supercommons" because this is the theoretically most elaborated document on the new approach.

1 The "Supercommons" approach as a new way

Kevin Werbach is Assistant Professor at the University of Pennsylvania. His argument rests on one main conclusion: The spectrum should not be equated to a physical commons such as land, water or air. He points out that there is no thing as the "spectrum"; it does not exist in the same way as land does. He shows that this metaphor is misleading and has produced inefficient regulatory regimes. In the name of protecting incumbent licence holders from interference, innovative and socially beneficial technologies have been prevented from being widely adopted. Furthermore, Werbach argues that the two main proposals for the future dealing with the suboptimal allocation of spectrum frequency, a private property rights regime and a commons regime, both perpetuate the pernicious metaphor of the spectrum as a commons. Rather than focusing on property rights of certain frequencies, Werbach suggests adopting an allocative system based on the communication devices and their transmission characteristics, i.e. on wireless technologies themselves.

Werbach points out that it is quite possible for two transmitters to operate on the same frequency. Thus, there is no general need to grant exclusive usage rights for a given frequency. The US regulator, the Federal Communications Commission (FCC), itself has long operated on this assumption, allowing the unlicensed use of certain frequencies to transmitters that meet certain specified criteria on ISM bands. Technologies as used in UMTS also show that shared use is feasible. Another way of dealing with interference, Werbach writes, would be to set up rules and use tort law if somebody emits radiation that causes harm to somebody else, e.g. at too high a power level.

Werbach argues that exclusive property rights are also inefficient, as the owner will hinder others from transmitting. New wireless technologies, he writes, can be used to check whether a given frequency is in use at a certain place and time (cognitive radio, as already used with DECT). When a licensed sender wishes to initiate a transmission, the incumbent transmitter may need to communicate with the licence holder and identify an alternative frequency or check a database for available frequencies at a certain physical location. New wireless technologies can also be used as an underlay or an overlay of a given technology if a different modulation technology or a different power level is used. A simple example of this is in-car FM transmission as used by car navigation systems when sending output to the car radio. Furthermore, modern transmitters are being designed to adapt in terms of frequency and modulation technology used ("Software Defined Radio"). Certain new wireless technologies can even be meshed to form "ad hoc networks"; the "One Laptop per Child" computers already have this capability, based on Wi-Fi. The combination of such technological approaches holds the promise of keeping interference under control, so that in principle anyone could use licensed frequencies to a much larger extent. Unlike the advocates of a commons regime, Werbach argues that, with a few initial exceptions as for security services, there is no need to restrict the shared use of the spectrum to narrow ISM-like bands. This is the reason why he characterises his proposal as a "supercommons" regime. He describes the supercommons as combining "incremental experimentation from current baseline licences with a *universal access privilege* wherever a transmission would not be harmful to other systems" (Werbach 2004, p. 915, emphasis AW). His proposal can be seen as an extension of the related thoughts of Yochai Benkler, Lawrence Lessig and Eli Noam, hence I dare to characterise it as "libertarian". Compared to traditional radio regulation, the supercommons approach is much more open for innovation on the technology producer side, as well as on the user side.

2 A European Parliament study

The second study reviewed is a report for the European Parliament. It was requested by the European Parliament's Committee on Industry, Research and Energy and contracted by the ETEPS network (http://www.eteps.net), of which ITAS is a member. The authors of the study are: Erik Bohlin, Professor at Chalmers University of Technology in Gothenburg, Colin Blackman, editor of the journal "info" (UK), Simon Forge, a consultant in the UK, and Andrea Renda, Professor at the Centre for European Policy Studies in Brussels. They refer to the "commons" and "supercommons" discussion in the US as a way of overcoming the alleged spectrum scarcity at the European level. The authors start from the observation that the current use of the spectrum is inefficient, as only small bands are congested, while communication in them, as in the mobile bands, is expensive. They argue that shifting the regulatory focus from the exclusive allocation of frequencies to a "shared" or "collective use" of frequencies would enable a vibrant and competitive radio industry to emerge with a considerable long-term growth potential.

A first step in this direction could be taken by reserving a large portion of the "digital dividend" – the bands being freed with the transition from analogue TV to digital (DVB) transmission – for commons use. In a study from the year 2007, Forge et al. have shown that 300 MHz of valuable spectrum could be freed, even if some 100 MHz were reserved for high-definition TV.

In the European Parliament study reviewed here, the authors suggest implementing technologies for shared use, using licensed bands when unoccupied, be it through explicit agreements with the licence holder or through undetected "borrowing" when not in use, much similar to Werbach's suggestion.[4]

In their review of EU legislation, Bohlin et al. also analyse future licensing. Licensing remains, for the time being, of relevance as licensed communication is proven to provide a high level of service quality over long distances, as, e.g. needed for voice. Bohlin et al. discuss the slow introduction of technology- and service-neutral regulation in Europe. This may turn into a disadvantage compared with the regulation in Japan, the US and China, which all have already implemented at least technology-neutral regulation.

The authors conclude that central spectrum coordination with pan-European bands would be needed, for both licensed and shared use, to form a common market in communications. This does not exist until today, as Europe is characterised by national spectrum regulation competence, fragmentation and effects such as roaming fees.

3 Current change

In the US, change is taking place with the provision of more commons. In 2008, the US FCC has adopted "TV White Spaces" regulation. "White Space" is the result of neighbouring TV broadcasting stations not using the same frequency band, to avoid interference, but rather using different ones. Therefore, TV bands remain unused in many neighbouring areas. To reduce interference, the new devices should not only "listen before talking", but are also required to check a database of empty TV spaces. Some of the computer companies who pushed for access to the white spaces have already announced products.

In Europe, the provision of commons bands is moving at a glacial pace. Forge already published key elements of his proposal in 2004 (see Forge 2004). In 2005, the European Commission stated that the need for commons should be investigated (see the special issue of "info", edited by Bohlin et al. 2006). By the end of 2008, the European Commission still had to follow through with its plan to investigate this matter (see Radio Spectrum Policy Group 2008).[5] There are several reasons for this state of affairs: (1) The current holders of spectrum licences, typically TV broadcasters, are opposed to the new policy regime; (2) the lack of interest by mobile communications licence holders, who fear a further decline in revenues; (3) opposition by policy makers mostly interested in future auction fees.

With regard to supercommons, some change can be noticed in both the US and Europe with the legislation allowing Ultra Wide Band communications, operating at very low power. Another indication of some change is

that Barack Obama has nominated Werbach to co-lead the Federal Communications Commission review team. As to licensed communication, in stark contrast to the US, Japan, and China, in Europe technology neutrality is slowly being introduced in legislation, but in practice the single standards model is still being pursued. No major operator uses a competing technology to GSM/UMTS, while outside Europe competing technologies are used or being introduced, such as CDMA2000 (similar, but not equal to UMTS), PHS (much like DECT, but usable almost like GSM), and WiMAX (a kind of enhancement of Wi-Fi). No pan-European licences are in sight either, which would make it possible for an operator to conduct a switchover without roaming. Abandoning the single standards model and implementing competing radio technologies would mean that licence holders would co-operate closely with certain developers to develop new characteristics which their competition does not yet have. No such technology competition is emerging in Europe yet.

4 Conclusions

Technology competition, commons and supercommons may increasingly be seen in Europe, slowly, during the years to come. As the proponents write, these concepts should be beneficial in economic terms. The broader and unencumbered availability of wireless receiving and transmitting technology with supercommons, including those at higher power levels, is likely to generate novel applications, much in the same way as baby phones or wireless Skype (by laptop users) were unimaginable before the ISM band was made available. Even long-range point-to-point communications may emerge. While it is fairly straightforward to build them based on, e.g. Wi-Fi, service quality such as latency may be a problem; once overcome by military or civilian research on ad hoc networks, user-operated mesh networks could lead to significant social value. Technology neutrality, commons and supercommons could all stimulate the resurgence of a vibrant European radio and consumer electronics industry.

Hardly addressed in the reviewed studies and elsewhere, it seems, are the social and ecological aspects of filling the "spectrum". What is the contribution the novel approaches could provide for broadband communications without fibre? What are the effects in terms of consumption of energy and other resources of the various approaches?[6] Will user-operated devices with the commons and supercommons approaches be more acceptable than centrally managed radio transmitter stations? Or will a new discussion of health effects emerge if emissions increase? Finding the balance between fixed line, exclusive wireless and shared wireless use on the one hand, and benefits, acceptability and resource consumption on the other is a very challenging task. But it is also a crucial investment in the viability of a strategic economic sector which influences innovation and costs in many other sectors. Engaging the public openly will be the best way to deal with both concerns and benefits.

Notes

1) Werbach, for download see http://werbach.com/research/supercommons.pdf.
2) Bohlin et al., for download see http://www.europarl.europa.eu/meetdocs/2004_2009/documents/dv/itre_st_2007_spectrum_poli/ITRE_ST_2007_SPECTRUM_POLICY.pdf.
3) See the article by Böhle in this issue on a recent study conducted by ITAS, also on behalf of the European Parliament.
4) In a workshop at the University of Karlsruhe, "Communication Regulation in the Age of Digital Convergence: Legal and Economic Perspectives", on December 1, 2008, one of the authors of the study, Simon Forge, summarised the approach. His presentation slides are available at: http://io-telco.iism.uni-karlsruhe.de/downloads/Simon__Forge.pdf.
5) For the discussion in Europe see also Tonge and de Vries (2007), Horvitz (2005), and the Freifunk initiatives, who already developed Wi-Fi based mesh-networks for use in e.g. Africa (http://start.freifunk.net).
6) This review was produced within the project "User-operated Internet Infrastructures: Opportunities and Resource Consumption" (Nutzerbetriebene Internet-Infrastrukturen: Chancen und Ressourcenverbrauch), a small project conducted with support of the University of Karlsruhe in the co-operative framework of the emerging Karlsruhe Institute of Technology. My thanks go to Franco Furger, Net Landscapes, for valuable discussions and input.

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Formen lokaler Bürgerbeteiligung in der Diskussion

***H. Klages, C. Daramus, K. Masser*: Bürgerbeteiligung durch lokale Bürgerpanels. Theorie und Praxis eines Instruments breitenwirksamer kommunaler Partizipation. Berlin: edition sigma, 2008 (Modernisierung des öffentlichen Sektors, Bd. 32), 111 S., ISBN 978-3-8360-7232-8, € 8,90**

***A. Vetter (Hg.)*: Erfolgsbedingungen lokaler Bürgerbeteiligung. Wiesbaden: VS Verlag, 2008, 240 S., ISBN 978-3-5311-5728-3, € 39,90**

Rezension von Ulrich Riehm, ITAS

Manchmal hat man den Eindruck, dass sich die Debatte über Formen der politischen Teilhabe ganz auf E-Partizipation, also die neuen Möglichkeiten der politischen Teilhabe durch das Internet fokussiert habe. Dies ist in den beiden hier anzuzeigenden Büchern ausdrücklich nicht der Fall und das ist auch gut so. Denn die Beteiligung von Bürgern am politischen Leben findet in vielfältigen Formen überwiegend außerhalb des Internets statt. Hierzu nicht nur Modelle, Reflexionen und Fallbeispiele beizutragen, sondern auch nach den Erfolgsbedingungen insbesondere lokaler Bürgerbeteiligung zu fragen, macht den Reiz der Lektüre aus. Dass bei der Vielfalt der Themen und Bedingungen der Leser kein Erfolgsrezept vorfindet, mag nicht wirklich überraschen. Die Lektüre ist trotzdem anregend.

1 Vorbild „Citizen's Panel" in Großbritannien

Die Idee des „Bürgerpanels" stammt aus Großbritannien und hat das am Deutschen Forschungsinstitut für öffentliche Verwaltung Speyer (FÖV) tätige Autorenteam fasziniert. Bürgerpanels in Großbritannien sind mehrmals jährlich stattfindende repräsentative Panelbefragungen (wiederholte Befragungen gleicher Personen), die um intensivere Methoden der Bürgerbeteiligung wie Gruppendiskussionen, Bürgerforen, Zukunftswerkstätten etc. ergänzt werden. Sie haben sich als Mittel der Evaluation und Qualitätssicherung öffentlicher