Governing Transnational Commons Through Strategic Associations: A Comparative Case of Radio Frequency Management in Europe

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Abstract
This paper explores the nature of collective action in the governance of transnational common resources and proposes a private regimes approach for its study. Using the example of the radio spectrum as a global resource – representing the totality of radio frequencies used largely for wireless communications – the paper argues that the variation in property systems witnessed in global commons cannot be fully explained by negotiations between public actors managing the access and use of these shared resources. Instead, it proposes greater recognition of the role of industry actors organised in strategic associations that negotiate technical standards for the extraction of economic value from the radio resource. This argument is derived from two case studies that address the rule systems formed in the 900MHz band for the deployment of second-generation mobile communications in the late 1980s, and in the 800MHz band for the deployment of mobile broadband in the late 2000s in Western Europe. Using the method of process tracing, the paper shows that, faced with different competitive pressures, industry actors respond by relaxing their rights of use in the first case study and, respectively, by relaxing their rights of access to the resource in the second case study. This occurs irrespective of the presence of a weak or strong public administrator.

Keywords: property systems; global commons; radio spectrum; private governance

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Introduction

The study of collective action is at the core of the social sciences. Collective action refers to "activities that require the coordination of efforts by two or more individuals" (Cornes and Sandler, 1996, p. 324). However, the development of the rational choice theory of collective action has drawn particular attention to the difficulties that short-term self-maximising individuals encounter to produce collective goods for the benefit of all. Depending on their application, the problems of collective action have been referred to as "the free rider problem" (Grossman and Hart, 1980), "the credible commitment dilemma" (Lichbach, 1997), "the tragedy of the commons" (Hardin, 1968) or "the tragedy of open access" (Fox, 1993)[1]. Their proposal, in particular with reference to collective action in shared resources, has generally focused on the delegation of rule-making, monitoring and enforcement powers to an external authority – be it the state or the market – as the only way to achieve stable and sustainable governance:

"A managed commons describes either socialism or the privatism of free enterprise. Either one may work, either one may fail: the devil is in the detail. But with an unmanaged commons, you can forget about the devil: as overuse of resources reduces carrying capacity, ruin is inevitable" (Hardin, 1998, p. 683).

However, the behavioural theory of collective action has gained considerable ground against Hardin's prescriptions, bringing evidence that profit-driven individuals are able to self-govern in a stable and sustainable manner, without overcrowding or depleting a shared resource they otherwise derive economic value from (Bromley et al 1992; Feeny et al, 1990; Ostrom et al 1988; Ostrom 1990; Wade 1986). This literature has made a valuable contribution to the study of collective action in shared resources, highlighting that the physical properties of the resource, as well as the institutional setting in which collective interactions occur, constrain the rationality of short-term self-interest individuals against collective inaction. However, this evidence has been largely taken from small or medium size shared resources such as fisheries, forests or agricultural land, managed by local communities with a relatively high remoteness from the involvement of public or private enterprise.

The overall question in this article is whether we can identify similarly high levels of self-governance – described as the ability to create, monitor and enforce rules – by direct resource beneficiaries in the global commons. This assessment can be hindered by two limitations identified in policy and scholarly analyses of the global commons. The first limitation is that the analysis of governance in the global commons – such as the atmosphere, the oceans, the outerspace or the worldwideweb (Buck, 1998; Hess, 1995; Vogler, 2000) – have focused on state actors as the main negotiators of global governance. And although these studies account for the presence of industry or civil society actors in the negotiation process, these private actors are largely perceived as privileged beneficiaries of access to policy-making in exchange for the provision of otherwise costly knowledge and technical expertise (Buck 1998, Vogler 2000). The second limitation is that the analysis of governance in the global commons does not fully account for the polycentric structure of authority in rule-making, rule-monitoring and rule enforcement. V. Ostrom (1991) defined polycentricity as the ability of

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[1] Ostrom provides a brief review of these different approaches; see E. Ostrom (1998).

different elements of authority to "make mutual adjustments for ordering their relationship with one another within a general system of rules where each element acts with independence of other elements" (V. Ostrom, 1999, p. 57).

This article proposes that these limitations can be partially overcome if we adopt a club theory approach to the governance of the global commons. Several authors have previously proposed this approach in the analysis of voluntary private governance, which can lead to the creation of stable global standards in the absence of positive or negative incentives imposed by an external authority such as a public administration (Buthe, 2009, Potoski and Prakash, 2009). This approach is important to the study of global commons because it claims that private actors are motivated to create clubs from which they draw exclusive benefits, but which also produce positive externalities that translate into public goods of benefit to all. It is also important because it focuses attention on the role of private rather than public actors as main negotiators of rules for managing global commons, without disregarding the position of public actors in this process.

This article considers whether industry actors establish private clubs in global commons that produce exclusive benefits for their members but also public benefits in the form of positive externalities derived from their private action (Buthe 2009). The article looks at the electromagnetic radio spectrum – representing the totality of radio frequencies used largely for wireless communications – as an example of a global common that has been managed in a stable and relatively sustainable way. The radio spectrum exhibits the characteristics of a common pool resource, similar to other natural resources such as oceans, forests or the atmosphere. In a state of nature, the radio spectrum exhibits high rivalry in consumption and high difficulty in excluding non-contributing beneficiaries from use, which essentially makes it prone to pollution (radio interference) and overcrowding. However, at present, considerable economic value is derived from the use of radio frequencies for wireless communications without witnessing the pollution or overcrowding of this resource.

This article selects two case studies to explore the evolution of this stable governance in wireless communications. It looks particularly at how rules of access and rules of use were negotiated between industry actors deriving direct economic value from this resource. The two types of industry actors considered are operators and developers of mobile communications. First, the paper looks at the creation of rules of access and use of the 900MHz frequency band for the deployment of second-generation mobile communications in Western Europe in the late 1980s. Second, it looks at the creation of rules of access and use of the 800Mhz frequency band for the deployment of mobile broadband in Western Europe in the late 2000s. The two case studies have been selected to address some of the limitations of the analysis of global commons outlined above. Thus, they focus on regional coordination, rather than national or global coordination, to account for the presence of polycentric authority. Also, they focus on Western Europe as the geographic region with a considerably high number of industry actors situated in a considerably high number of jurisdictions interested in maximising their profit from the use of the radio waves, making it more susceptible to pollution and/or overcrowding. The method of inquiry into the two case studies is process-tracing, based on an evaluation of official documents, official communications and official statements of industry experts and policy makers present at the respective negotiations. Each case study is structured in three sections, which explore the motives of cooperation, the methods of cooperation and the effects of cooperation.

I. The Choice of Complex Standards for Governing the 900MHz Band

In September 1987, in Copenhagen, mobile operators from thirteen countries in Western Europe signed the GSM Memorandum of Understanding (GSM MoU 1987), a cooperation agreement that, soon afterwards, made the object of "Council Directive 87/372/EEC on the Frequency Bands to be Reserved for the Co-ordinated Introduction of Public Pan-European Cellular Digital Land-Based Mobile Communications in the European Community" – also known as the GSM Directive (1987). In short, the GSM Directive reserved the 900MHz band, on an exclusive basis, for cellular digital mobile communications without specifying the communication standard to be deployed on this band. However, at the time, the GSM standard was the only cellular digital mobile communications standards in the world. Thus, within a few years since its adoption, the GSM standard was used exclusively for deploying cellular communications in Western Europe and increasingly exported elsewhere. Cross-border coordination for the delivery of public wireless communications in the 900MHz band – i.e. the public good – has been attributed either to successful diplomatic relations between thirteen administrations, each with their own national telecommunications champions (Temple, 2001) or to the growing presence of the European Commission as research and development programme coordinator in the European Communities (Esser, 1996; Fuchs; 1994; Pelkmans, 1987; Peterson 1991).

The latter assumption is particularly problematic because, whereas the European Commission was indeed broadening its competences in industry sectors as a result of the establishment of the common market, it was only at an incipient stage in the development of such competences in telecommunications policy (Alabau and Guijarro, 2011; Hulsink, 1999; Sauter, 1995). Instead, this section suggests that cross-border coordination for the delivery of public communications in the 900MHz band was achieved by industry actors negotiating rules of access and use in the Conference of Postal and Telecommunications Administrations (CEPT) – a voluntary decision-making body set up by telecommunications operators across Europe. Below, I evaluate the motives, methods and effects of this cooperation among operators and developers of telecommunications and their role in determining flexible rules of use of the 900Mhz band.

The Motives for Cooperation

Against a background of telecommunications liberalisation in the late 1980s, telecommunications operators and developers across Western Europe had two motives for developing a single standard for digital mobile communications, to be deployed in the harmonised 900MHz band. The first motive was farming a newly opened resource. The 900Mhz band was mostly unoccupied when negotiations in CEPT started in the early 1980s. The second motive was internal competition within CEPT in the absence of a dominant technology. These two factors gave CEPT members an opportunity to minimise internal rivalry among them while developing an exclusive standard that would be complex enough to contain a majority of proprietary technologies.

In the late 1980s, when telecommunications sectors in Western Europe and the United States were opening up at different speeds, mobile cellular systems were using analog technologies that were occupying considerable frequencies, were expensive to develop, purchase and deploy and were not benefiting from the economies of scale and scope we witness today. Instead, in Western Europe, analog mobile communications continued to reflect the fragmentation of telecommunications markets along national lines, with a single operator – generally a Postal, Telegraph and Telephone Administration (PTT) – relying on an established national developer – generally a national champion – to manufacture otherwise proprietary telecommunications technologies. This vertical integration along national lines had contributed to the widespread development of proprietary, incompatible systems that made cross-border intercommunications difficult and costly to achieve. Against this fragmentation on the European continent, the Scandinavian operators agreed to develop a decentralised cross-border network that relied on a single standard – Nordic Mobile Telecommunications (NMT) – to be deployed in the harmonised 450MHz band. NMT-450 was designed to be an open standard but the technology behind it was mostly proprietary, corresponding to a joint venture by Ericsson and Televerket of Sweden. By the early 1980s, NMT-450 had considerable export capacity, which made it a very successful standard for analog mobile systems.

Faced with increased competition among proprietary standards[2], the overcrowding of the 450MHz band, as well as with pressures from the Scandinavian PTTs to consider the pan-European harmonisation of the 900MHz band (GSM Doc 3/82), representatives of eleven telecommunications operators in Western Europe formed Groupe Spécial Mobile (GSM) within the CEPT. The establishment of the GSM Group within CEPT was preferred for two reasons. First, it allowed for close coordination and monitoring of development activity among competing telecommunications sectors across Europe. Second, it allowed for the possibility of proposing a winning technology that, if supported by everyone, would benefit from deployment across a harmonised market derived from the farming of the 900MHz band.

The Methods of Cooperation

The practice of cooperation within CEPT followed that of a transnational regional association of telecommunications operators, which adopted non-mandatory decisions by consensus. At the time, the CEPT was not a standardisation organisation, and the common development of standards among competing national champions in Europe had been largely unheard of. However, in the context of competition among manufacturers, as well as the privatisation of telecommunications operators, coordinating for the 900MHz band was a way of monitoring competitors while attempting to push through a single, dominant technology.

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[2] In the late 1970s and early 1980s, national mobile operators across Europe had chosen incompatible standards for delivering analog services. As such, analog networks in France used Radiocomm 2000, in Germany C-Netz, in the United Kingdom TACS and in Italy RTMI.

Two steps in the cooperation process confirm this assumption. First, in 1982, industry representatives had to decide whether analog or digital systems were to be developed for the 900MHz band. Whereas industry representatives from the Scandinavian states were proposing digital systems, following enhancements in radio interface technology, industry representatives from France and Germany were largely focusing on analog technologies. In the absence of a dominant technology and strong presence in competing markets, both methods of speech transmission were considered, following consensus rules within GSM-CEPT. Thus, the initial proposal of the Dutch and Nordic PTTs to include digital speech transmission as an a priori system characteristic was removed from the main system specifications and adopted only as a working assumption (GSM Doc 53/83). Second, in 1986, industry representatives had to decide among eight competing proposals for the GSM system to be potentially deployed in the 900MHz band. Whereas, by now, most proposals included digital speech transmission, the competition was taking shape between alternative access techniques based on either code division multiple access (CDMA) versus time division multiple access (TDMA). When the proposed radio access technologies were tested against broad system specifications previously agreed within GSM-CEPT (GSM Doc 97/85), the technology that scored the highest was the proposal made by Elab and based on TDMA (*Table 1*). However, following consensus decision-making within CEPT, and in the absence of a single dominant technology, the proposal was once again shelved.

Table 1. Competitive Proposals for GSM Trials 1986

System	Developers	Main Access Technique	Key partnerships
CD-900	Alcatel/SEL/AEG/SAT/Italtel	Wideband TD/CDMA	SEL (former ITT subsidiary) sold to CGE/Alcatel in 1986 & SAT part of Alcatel group
MATS-D	Phillips	Hybrid narrow/wideband FD/TM/CDMA	Phillips through TeKaDe/TRT subsidiaries
S 900-D	ANT/Bosch	Narrowband TDMA	ANT acquired by Bosch in 1992
SFH 900	LCT	Narrow/Wideband CD/TDMA with frequency hopping	Lab Central de Telecommunications France, subsidiary of Matra
DMS-90	Ericsson	Narrowband TDMA	Ericsson acquired Marconi share of SRA (radio systems) and Magnetic (base stations) in 1983
MAX	Televerket	Narrowband TDMA	In partnership with ERA labs
-	Nokia	Narrowband TDMA	
ADPM	Elab	TDMA	Project sponsored through FMK project

Source: Adapted from Arnold et al (2008); Bekkers (2001, p. 288); Dupuis (2001)

However, by this point, essential exchanges of intellectual property had already taken place among industry members of the CEPT. The most important one was the quadripartite patent partnership among telecommunications operators in France, Germany, Italy and the United Kingdom. This patent exchange was, however, threatened when the German operator announced the support of the TDMA instead of the CDMA technology put forward by the Frech backed proposal (i.e. CD-900). Thus, a breach of the patent agreement could have also jeopardised the considerable investment allocated to research and development.

The compromise was the creation of a complex standard – the GSM standard[3] – that put together the most important technological contribution of all competitors in CEPT group. An official statement made by the main contributors read: "Europe must have a single standard supported through the CEPT. This should be based on a narrowband TDMA concept defined by CEPT at its Madeira meeting in February 1987, enhanced in the area of modulation and coding to provide the greatest flexibility in receiving equipment implementation" (Bonn Declaration 1987). Thus, a single standard was to be adopted through the CEPT only if narrowband TDMA, the technology supported largely by Scandinavian telecommunications industry, was enhanced in the area of modulation and coding with the technology supported largely by the French and, partly German, industry. The creation of a complex standard for exclusive deployment in the 900MHz band means that industry actors were able to alter the rules of use of the radio frequency at the 900MHz in their favour, developing a wide compatibility standard that allowed for specific technologies to be included in the use of the band.

The Effects of Cooperation

The above statement, made in the Bonn Declaration, was soon formalised in the GSM Memorandum of Understanding, signed by all members of GSM-CEPT (GSM MoU 1987). The GSM MoU was also, at least in its original phase, a patent exchange program designed to keep all technology incorporated in the standard open to all the signatories. However, based on the GSM MoU, the standard was to be exclusively deployed by all signatories, helping them draw exclusive economic value from the radio band at 900MHz in Western Europe. This allowed for a reduction in rivalry among all contributors, while ensuring that the standard was complex enough to deliver a considerable economic yield for each participant. Essentially, the GSM standard was a club good – i.e. low rivalry among members and high exclusion of non-members – that also produced positive externalities in delivering wireless communications to wider public. The creation of the GSM standard led to the deployment of affordable wireless communications, making the mobile phone the indispensible accessory it is today. The effects of this cooperation led, in fact, to the creation of the most successful mobile communications standard in the world to date[4].

II. The Choice of Complex Rules for Governing the 800MHz Band

In May 2010, the European Commission passed "Decision 2010/367/EU on Harmonised Technical Conditions of Use in the 790-862MHz Frequency Band for Terrestrial Systems Capable of Providing Electronic Communications Services in the European Union". Essentially, the Decision refarmed the 800MHz band (790-862MHz) from exclusive use by broadcasting services to non-exclusive use by communication services with a capacity to provide mobile broadband (Art 1, Decision

[3] Note that the acronym GSM was changed from Groupe Special Mobile – the name of the working group within CEPT – to Global System for Mobile Communications – to reflect the worldwide deployment of this standard.

[4] GSM is the standard with the largest market share in mobile communications at global level. By the early 2000, the GSM standard had a global market share of over 86%. By the end of 2013, it was still the most widely deployed standard worldwide, with a market share of over 60% (WCIS Database, Informa).

2010/267/EU). As in the case of the GSM Directive (1987), negotiations for refarming the 800MHz band did not take place within the established policy-making venues within the European Union. However, in this case, the European Commission had established extended competences in telecommunications policy and, most importantly, new competences in harmonising radio spectrum bands (Directive 2002/21/EC and Decision 676/2002/EC). Thus, whereas in the previous case study, the European Commission had limited competences in the field of radio spectrum management, in the current case, the European Commission was an established agenda-setter for spectrum policy as well as an established lobbying venue.

However, instead of lobbying the European Commission for the deployment of mobile broadband in the 800MHz band, at the expense of broadcasting services that were occupying the band, the mobile communications industry organised itself in a private regime and carried negotiation within the Radiocommunications Sector of the International Telecommunications Union (ITU-R). In this context, this section suggests that cross-border coordination for the delivery of mobile broadband in the 800MHz band was achieved by a select group of industry actors that held dominant technologies in mobile communications and were able to establish complex rules as well as to develop complex bargaining power in order to ensure continued presence in mobile communications markets. Below, I evaluate the motives, methods and effects of cooperation among operators and developers of mobile communications and their role in determining flexible rules of access in the 800MHz band.

The Motives for Cooperation

The development of mobile broadband communications took place against a background of relative caution from both industry and policy makers. In the early to mid 2000s, the mobile communications industry in Western Europe, as well as globally, was suffering from a market slowdown following the deployment of third generation mobile communication services. Across Europe, these services brought relatively little changes to mobile communications technology in an already oversupplied market, compared with the generous investments made in infrastructure development and license fees (Bohlin et al, 2007; Lehr and McKnight, 2003). This had the effect of bankrupting a considerable number of small and medium size industry players. In this context, the mobile communications industry was cautious to invest in new technology development for networks and services, while acknowledging that the previous strategies of proposing complex standards for deployment on an exclusive basis were not as successful in mature markets as in incipient markets such as the early GSM one.

In this case, the incentives to organise did not come originally from the industry, but from a political actor, in the form of the European Commission. In the early 2000s, the European Commission noted that terrestrial broadcasting services – i.e. those using radio frequencies as opposed to cable or satellite – were still using analog technologies. As outlined in the previous case study, analog technologies would occupy up to five times more radio frequency space than digital technologies, space that could otherwise be utilised for enhanced broadcasting services as well as for other communications services. The location of terrestrial broadcasting services was between the 400MHz and the 900MHz band. As such, the Commission proposed to digitise terrestrial broadcasting services in what was widely known as the Digital

Switchover (COM(2003) 541). The digital switchover, then, did not necessarily mean a relocation of broadcasting services from the 800MHz band.

However, in the context of the digitalisation of terrestrial broadcasting services, the 800MHz band raised the interest of the mobile communications industry. There are two reasons why the industry decided to cooperate and propose mobile broadband as a fourth-generation wireless communications technology. First, the 800MHz band was one of the most sought after bands in the commercial radio spectrum, due to its very good propagation characteristics, which meant less investment in infrastructure for a wider market. This was particularly attractive for the mobile telecommunications industry, especially mobile operators, whose previous investments in infrastructure deployment and license fees had squeezed their profit margins. Second, the 800MHz band was adjacent to the 900MHz band, which had just received non-exclusive status for mobile telecommunications deployment. This meant that, mobile operators that had exclusive allocations to the 900MHz band for second-generation technologies were now gaining the freedom to refarm the frequency with whichever technology they preferred, as long as their acquired licenses. In this context, aligning the 800MHz band with the 900MHz band would mean a larger pool to organise the delivery of more flexible networks that did not keep operators locked into a particular resource. Thus, the second motive of the telecommunications industry was to reconfigure their technology systems in a way to reshape the market back into profit. The only way to do so, that would also be attractive for the political actor in charge of reallocating the frequency space, was to propose technology development in the form of a new generation of mobile communications – i.e. mobile broadband or fourth generation mobile communications.

The Methods of Cooperation

Whereas cooperation in GSM-CEPT followed that of a transnational regional association of telecommunications operators, with only a limited number of members and relatively homogenous preferences, the situation was different in the mid 2000s. By then, the CEPT remained a transnational organisation for broad policy alignment, including radio spectrum harmonisation, but the standardisation powers it acquired with the creation of the GSM Group were soon transferred to the European Telecommunications Standards Institute (ETSI). ETSI operates as a voluntary standards development association for manufacturers and operators within the CEPT geographic area and is one of the largest standardisation bodies in the world. However, although ETSI remains a voluntary association, the decision-making rules within its working groups had changed from consensus to voting through proportional adjustment at every stage of the standards development process. This decision-making structure resolved the problem of heterogeneity of group preferences as well as the problem of increasing decision-making costs to unacceptable costs for its members.

However, the industry structure had also changed considerably, with increased competition among operators and a strengthening of the position of a few manufacturers with dominant technologies. Essentially, these technologies were patented at the time of the emergence of global standards such as GSM (second generation mobile communications) and UMTS (third generation mobile communications), allowing them considerable leverage in negotiations (Bekkers, 2001). Because of this tiered decision-making process in ETSI, the largest manufacturers of mobile communications gathered momentum for mobile broadband outside the established route of standards development in ETSI. Instead, they set up the Wireless World Research Forum (WWRF) to reflect a coordinated research and development in the direction of mobile broadband. However, instead of suggesting an evolutionary radio technology, they proposed an evolutionary core network that would support backward compatibility with technologies from previous generations, as well as a new radio technology for mobile broadband entitled Long-Term Evolution (LTE).

Thus, in 2003, the proposed vision of the new system architecture suggested by the WWRF was passed as ITU-R Recommendation M1645[5]. The Recommendation clearly restated the approach adopted in the WWRF, based upon "the functional fusion of existing, enhanced and newly developed elements of IMT-2000, wireless access systems and other wireless systems with high commonality and seamless interworking" (ITU-R M1645: 6). Having passed the network design through the ITU-R, the focus of the mobile communications industry between 2003 and 2007 was to build a case for frequency allocations in the 800MHz band.

The Effects of Coordination

The approach to network design for mobile broadband was negotiated mostly outside of ETSI, between two collaborative associations of manufacturers and, respectively, operators. These were the Mobile Industry Backing Terrestrial Spectrum for IMT (MiB Group) of manufacturers represented by the original founders of the World Research Forum, and the Next Generation Mobile Network Alliance (NGMN) of mobile operators representing more than half of all mobile phone users worldwide. The main requirement made by the NGMN was that the proposed system integrated all previous technologies in a flexible manner, so that operators could phase in and out of their systems, without being constrained by technology or service limitation imposed by licensing (NGMN White Article 2006, Robson 2009). In order to ensure enough spectrum capacity for this flexible approach, representatives of the WWRF formed the Mobile Industry Backing Terrestrial Spectrum for IMT (MiB) just a few months prior to the ITU World Radicommunication Conference (WRC 2007). The role of the MiB was to advocate new spectrum allocations, preferably in bands adjacent to those that had been allocated to mobile cellular communications on a primary basis at international level. Prior to the conference, MiB had advocated an additional need of approx 700MHz to 1,000MHz of new radio spectrum allocations in the Europe Radio Region. These findings were presented at CEPT and ITU-R and were directly based on the requirements of the new system design and network growth.

But most importantly, MiB advocated for the identification of harmonised bands for IMT mobile communication services at the global level that, as the head of the MiB group, noted "would enable operators to plan an orderly growth of their network with

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[5] ITU-R or the ITU Radiocommunication Sector is charged with the international management of radio frequency spectrum and satellite orbits. ITU-R can also issue non-mandatory recommendations for international technical standards to be deployed in specified radio frequencies. However, it is not a certification body nor does it have the formal role of a certification body.

global roaming capacity" (Costa 2007). In this context, the 800MHz band was indicated as highly viable for global harmonisation, largely because it was already allocated to mobile cellular systems in the Americas and was open for digital switchover in the wider Europe Region. As a result, the WRC 2007 identified the 790-960MHz band for IMT cellular-based mobile networks (Resolution 224, WRC-07). This decision overturned the allocation of broadcasting services on a primary basis in the 800MHz band. But, most importantly, coordination in the WWRF, NGMN and MiB, outside of the formal decision-making of CEPT or the EU, led to the recommendation for allocating the 800MHz band on a global basis to a specific cellular-based system - i.e. IMT. This system, based on a horizontal network that integrated previously competing technologies, without overspecifying them in band allocations, narrowed the regulatory choices available at national or regional level in the 800MHz band, regardless of the choice of flexible rights of access as specified by regulatory decisions.

Conclusions

This paper asked what explains the governance of transnational commons such as the radio spectrum. Focusing on two case studies of radio spectrum management, it questioned whether the origin and development of rules of access and use of radio frequencies rest solely with public administrators, as the literature sometimes indicates. Instead, the paper proposes that rules of access and use of radio spectrum are created by industry actors when they negotiate technical standards for the extraction of economic value from the common yet limited resource. This paper further inquired whether mobile communications, as public goods derived from the exploitation of radio frequencies, are in fact positive externalities of club goods established by industry actors. Such a proposition would confirm the club theory of global private regimes that this paper suggested as relevant for the study of governance in the global commons. This paper finds that the first case study – the governance of the 900MHz band - confirms this hypothesis. However, the second case study – the governance of the 800MHz band – shows that industry players with a strong market presence can sometimes form factions outside established clubs in order to alter the rules for farming the spectrum resource in their favour. In the second case, clubs do not create immediate positive externalities to facilitate advancement in mobile communications for the wider public but relax rules of access in order to redefine markets and increase profits. Overall, this paper concludes that, whereas such practices ensure the stability of governance in radio spectrum, they do not and cannot guarantee the sustainability of governance for global resources.

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