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Regulating Infrastructures: The limits of the regulatory state

Abstract
This article points to the centrality of the infrastructure industry in the study of regulation in general, and the regulatory state, in particular. It progress in three steps. First, it considers the particular attributes that make infrastructure industries a unique site for the exploration of policy trajectories and the limits of statehood. Second, it discusses, in brief, cross-national and cross-sectoral experiences in regulating infrastructure industries to highlight the diversity and instability that have characterized their regulation over the past three decades. Finally, the article questions the problem-solving capacity of the regulatory state in the face of inherent 'wicked issues'. In conclusion, the article develops three scenarios for the future of the regulatory state in infrastructure industries, noting that it is likely to be one of high instability and high politics.

Key words: Regulierungsstaat/regulatory state, Netzwerke/Network industries, Regulierung/Regulation, Politikreform/policy-reform

1. Introduction

Among the long-standing interests of public administration and political science is the relationship between core industries and politics. Indeed, for Max Weber, the telegraph and the railways were *the* expression of the modern occidental state. Whether the centrality of infrastructure industries relates to 19th century competition between different German, or indeed, continental states, over railway traffic, or the railways' importance in the transport of military forces, the central role of the German railways as part of the Versailles Treaty's reparation payment obligations, or the contemporary significance attached to communications and transport facilities for economic development, the use of key industries to achieve state aims has been at the heart of politics. Issues of control and the regulation of infrastructure industries have also, therefore, been at the heart of political and academic interest.

The last three decades have witnessed a rejuvenated interest in the study of industries that have been defined as that of 'utilities', 'network' or 'infrastructure'. For one, the privatisation 'bandwagon' has led to a change in ownership patterns (outside the US) (*Ikenberry* 1990). Second, considerable interest has also been paid to issues of control over these industries, given the creation of non-majoritarian institutions as separate, quasi-autonomous units within systems of executive government. Third, the operation and re-

gulation of infrastructure sectors has witnessed considerable trans-nationalisation, for example, in terms of the Europeanisation of regimes, in terms of ownership and in terms of being part of conditionality requirements negotiated between international donor organisations and less developed countries. In other words, infrastructure industries are at the heart of modern politics, and they are also at the heart of a multi-level conflict regarding competing values and the allocation of competencies.

Much has been written about individual sectors or states and their regulatory reforms. Similarly, much has been said about the phenomenon of regulatory agencies, especially in the context of Western Europe. However, the integration of evidence and analysis across sectors and with respect to the problem-solving capacity of the regulatory state at large has been rather limited. Therefore, this paper seeks to take a step back from these writings of the past thirty years or so in order to address three key debates regarding the 'regulation of infrastructure' or 'networks'. First, what is the significance of infrastructure industries for the study of public policy and administration? Second, have we indeed witnessed the rise of one single idea of a regulatory state or are developments shaped by diverse regulatory capitalisms *(Levi-Faur* 2006)? Third, what does the regulation of infrastructures tell us about the problem-solving capacities of the regulatory state (*Lodge* 2008)?

The following uses the term 'infrastructure industries' and 'network industries' interchangeably. The term 'infrastructure industry' may be regarded as straightforward in some cases: it relates to industries that require some form of 'network' in terms of wires, pipes or rails. In other words, it includes telecommunications, rail, electricity, gas and water. However, it could also be argued that banking, postal services and food supply chains represent critical infrastructures, with banking being largely about exchange facilities, postal services about distribution facilities and food supply about the availability and distribution of food. Such definitional boundary problems are inherent to the term 'infrastructure', but what is at the heart of 'infrastructure' in the context of this article is the presence of some form of natural monopoly component, whether this is constituted by roads, rails, power lines or gas/water pipes.

2. The state, regulation and infrastructure industries

The idea of a rise of the regulatory state across European states (and elsewhere) has been closely related to changes in infrastructure industries over the past three decades. As noted, the regulatory state has been defined by three phenomena: privatisation, regulatory agencies and the increased reliance on formalised and contractual arrangements rather than informal relationships (*Majone* 1997, S. 1996). Majone's argument was based on the claim that given depleted state budgets, disappointment with previous exercises in controlling these industries, and, in particular, the need for private investment in industries, the provision of a 'good' regulatory climate had become critical for states. Should states fail to provide for high quality regulation, they would suffer in terms of attracting investment. The changes in particular industries associated with infrastructures went hand-in-hand with the phenomena that define the regulatory state. However, just because there has been considerable activity across a set of related industries does not justify particular attention being paid to them. This section points to some of the aspects that justify the special status that infrastructure industries have received in the study of public administration.

As noted, the political importance of infrastructure industries can hardly be overplayed. Railway timetables accelerated processes of nation building by forcing time harmonisation and facilitating population mobility. Railways facilitated military movements. In short, infrastructure industries have widely been seen as an expression of state power. As a result, changes in ownership from publicly- to privately-owned, and in particular to foreign-owned, have traditionally raised considerable political attention. For example, the German constitution requires the federal state to own a majority of shares in the railway infrastructure – with amendments to this set-up requiring extra-large legislative majorities (Art 87e(3)GG).

The strategic importance of infrastructure industries to socio-economic well-being is indisputable. They score highly in terms of levels of public attention. Urbanisation means that populations are unlikely to be able to function without access to the essential infrastructures of water and energy. Disconnection can quickly turn into individual and collective disaster. As a result, rate-setting or minimum standards of services have triggered considerable political mobilisation. The availability of infrastructure to make different regions of a state 'accessible' is a central aspect of spatial planning. Debates about whether infrastructure should be supply-led or demand-led continue in contemporary discourse. On one side, there are those that argue that high quality (and/or cheap) infrastructure attracts investment and economic development. On the other side are those who argue that all infrastructure investment should be led by actual demand in order to avoid unnecessary expenditure and infrastructure provision.

Infrastructure industries have also been traditionally regarded as convenient places to offer employment to particular constituencies (in particular, in ethnically divided societies). Thus, infrastructure companies are politically important, whether in terms of directing investment, economic development, socio-economic implications of charges and rates, or in terms of affecting different electoral constituencies. It is the latter feature that has made infrastructure industries particularly attractive to those who diagnosed that all regulation was inherently about capture: rate-setting was in the interest of concentrated and mobilised industries and the exclusion of competition for the provision of 'public services' was about protecting loss-making companies rather than an abstract idea of a 'public interest' (*Barke/Riker* 1982, *Stigler* 1971, *Peltzman* 1976). According to this 'private interest' perspective on regulation, regulating infrastructure industries is not about 'state power', but about the ability of politician-regulators to sell monopoly rents to the highest bidder or best organised interest.

However, merely infrastructure viewing industries as a location of high (interest group) politics would miss a number of unique economic aspects that justify regulatory responses. One particular aspect is so-called network externalities. They imply that any single nodal addition to a network increases the possible number of total connections exponentially. Another is positive externalities. Wider socio-economic development is said to benefit from having high-quality infrastructure, whether this is in terms of offering populations good transport connections, attracting industries with transport and communications infrastructures, or, more fundamentally, with the provision of clean water and sewerage. Finally, the natural monopoly component remains an inherent issue in the provision of infrastructure industries. In other words, it is economically wasteful to provide a duplication of pipes, wires or train stations. Although technological change has enabled the reduction of the monopoly character of some of the network industries (especially in telecommunications by, for example, developing alternative technologies to overcome the

problem of the 'local loop'), substantial monopoly or market dominance aspects have remained and are unlikely to wither away with further liberalisation, accelerated competition or technological innovation.

The most important regulatory aspect of infrastructure industries, however, is their fixed asset character. This means that they are particularly problematic in terms of designing regulatory institutions that offer so-called 'credible commitment'. Briefly, the credible commitment problem relates to the problem of political time-inconsistency. Can, for example, private investors trust politicians to keep their promises once they have made their investment in infrastructure? The fixed asset character of infrastructure means that investment, once made, is non-retrievable. This problem has triggered a whole industry of studies into regulation, in particular, in the context of development. According to Levy and Spiller (vgl. 1994), the credible commitment problem can be solved by reducing administrative (and political) discretion. How such discretion can be reduced depends on the national 'institutional endowment', e.g. the historically evolved character of political-administrative institutions.

So-called Westminster systems *(Lijphardt* 1999), characterised by single parties in government, absence of powerful constitutional courts due to a flexible (unwritten) constitution, unicameralism and plurality vote ('first past the post') electoral systems provided the grounds for a lack of commitment. Where it is possible to reverse legislation easily and quickly, there can be very little trust in the 'sticking power' or independence of regulatory agencies. For example, in 2001, the UK Labour government decided to discontinue its financial support for the private infrastructure provider, Railtrack, thereby forcing the latter into administration. Opposition by the then-economic rail regulator, Tom Winsor, was dismissed with reference to the ministerial powers to pass emergency legislation to constrain the regulator's powers (*Lodge* 2002, *Moran* 2003). Regardless of the particularities of this case, the insight from this episode was that merely focusing on the formal autonomy of a regulatory agency (as provided by statutory provisions) is hardly a good indicator for pointing to a credible commitment. Instead, systems that lack 'veto powers' (i.e. where legislation can be passed quickly) require alternative devices that can provide regulatory agencies with 'credible commitment', namely licences and concessions (the latter has proven to be particularly attractive in water regulation and in developing countries of French colonial inheritance).[1] For example, exclusivity licences are utilised to minimise (if not, eliminate) all forms of flexibility for national governments. In the 'Westminster-system' context of Jamaica, the use of 'discretion proof' exclusivity licences was widely held to be a corner-stone of substantial network expansion in telecommunications (*Spiller/Sampson* 1995). Later empirical studies, however, placed some doubts on this particular World Bank-sponsored account (*Lodge/Stirton* 2006); nevertheless, the wider insight is that any analysis of regulatory institutions needs to take the wider political system into consideration.

In sum, infrastructure industries are important to exploring the nature and conditions of contemporary statehood. Given the centrality of these infrastructure industries to social and economic life, the state is inherently involved in these industries regardless of their exact ownership patterns. Questions of control and ownership therefore continue to be closely linked to wider debates regarding boundaries between state and market. Their political importance also means that they are at the heart of political battles between competing interests, whether these relate to the political power of the providers of services, or industries depending on infrastructures, or diffused consumer interest. Finally, their spe-

cific nature also raises particular policy and regulatory problems. This makes infrastructure industries an exciting site not just for high politics, but also for social science analysis. Practice and theory build on each other, with theory being directly applied in regulatory design, while regulatory practice has directly fed into the moderation of key theoretical claims, in particular regarding arguments that emphasise the centrality of institutions in steering behaviour. In other words, infrastructure industries and their regulation are not merely an additional broad policy sector that has offered material for case studies, it is one that requires specific appreciation of the technical aspects that are inherent to these infrastructure industries and it is an area that points to long-running debates concerning regulatory control and institutional design.

3. Infrastructure industries and the regulatory state

As noted, the initial interest in the 'rise' of the regulatory state was centrally driven by changes in the regulation of network or infrastructure industries (*Majone* 1994). Indeed, these changes are said to have brought about the age of 'regulatory capitalism' (*Levi-Faur* 2005). Policy trends such as privatisation (*Vickers/Wright* 1988, *Müller/Wright* 1994), the rise of regulatory agencies, and, since then, transnational 'networks' (*Thatcher/Coen* 2008), have attracted large-scale intellectual effort. This section does not aspire to provide a comprehensive survey of the literature, but rather wants to explore whether we can talk about a 'regulatory state' after nearly three decades of diagnosed regulatory reforms across network industries.

Looking at the 'regulatory state' as a macro-level trend, it is difficult to dispute the change across the different infrastructure industry sectors, whether this relates to energy, telecommunications, railways or water. Similarly, the emergence of quasi-autonomous regulatory agencies has been widespread across national administrative landscapes. That these industries and regulators now operate at a transnational level is also difficult to question: national railway operators bid for franchises in different countries, there has been an emergence of European-wide 'utility' giants (such as RWE and EdF), and relationships between governments and service providers have become formalised. Furthermore, given the transnationalisation of communications and energy industries, there has also been a rise of the EU-level as an important source of standard-setting, most prominently in establishing the framework for telecommunications liberalisation (in the 1990s) and also in shaping national energy regimes through continuous attempts at 'energy packages'. Less extensive measures have characterised the railway domain. However, within these broad contours, there is considerable scope for variation and contestation. Table 1 summarises the key dimensions of the regulatory state, and points to key areas of conflict between administrative doctrines.

If it is accepted that broad empirical trends support the claim of a 'rise' of a regulatory state, then this has implications for 'statehood' in a number of ways. One, following *Majone's* work (vgl. 1996), is that the 'regulatory state' is a world in which the state prioritises efficiency over equity and relies on authority to achieve its policy goals. It is a world in which private parties have to bear compliance costs; therefore the state has conveniently outsourced the cost of changing behaviour to private organisations, concentrating instead on the monitoring of compliance.

Table 1: Dimensions of the regulatory state

Dimension	Particular issues
Ownership and market structure	Ownership distribution (debates about the degree of transfer of entity from public to private sector, type of ownership transfer, and about degree of national to non-national shareholders) Structure of policy domain (horizontal fragmentation) (debates about the degree of domain fragmentation) Vertical separation (debates regarding the fragmentation of the industry between different elements of the service production stages)
Allocation of regulatory authority	Authority and organisation of regulatory agency (debates regarding whether regulator should be focused on a sector, an industry or should be cross-sectoral; what type of leadership should be provided for (collective or individual), types of appointment procedures and how funding for regulatory activity should be provided (taxpayer or industry) Distribution of regulatory competencies across actors (how resources are allocated across regulatory domain, their formal authority)
Decision-making style	Formalised relationships between actors in terms of social obligations, price control and enforcement (procedures and style, e.g. adversarial vs. co-operative, diversity of regulatory instrument deployment, e.g. types of information gathering and behaviour modification tools)

Source: Lodge/Stirton (2006, S. 468).

A second interpretation of the regulatory state relates more closely to the idea of a 'infrastructure state'. According to this argument, the past two decades have witnessed a refocusing of the state's role in facilitating individual activity. To some extent, this may be seen as the withdrawal of the state from direct production, with, at the same time, an increasing emphasis placed on controlling and investing in infrastructures. One the one hand, this points to continued state activity in facilitating economic activity; on the other hand, it signals that the state has taken on an activating and enabling, rather than a 'directly providing', character.

A third interpretation is that the regulatory state in infrastructure industries is inherently about (the necessity of) multi-level governing, whether this relates to transnational companies, the (varying) significance of the European (and WTO) levels of rule-setting for domestic regulatory regimes, and the emergence of new executive networks, for example the networks of competition and regulatory agencies.

A fourth interpretation of the regulatory state is one of risk allocation. As infrastructures are seen as strategically valuable and as the provision of water and electricity has associated 'social' aspects, ultimately, the state remains the provider of 'last resort', regardless of private ownership and delegation of responsibility. The final and fifth interpretation of this supposed age of the regulatory state is that this is a further attempt at institutionalising 'depoliticised' synoptic control (*Moran* 2003). Accordingly, regulatory institutions are a further attempt to provide for long-term stability and focused control that avoid problems of industry capture or political time-inconsistency. It also promises a future of stable funding (secured through contractual means) instead of the age of public ownership with its annual negotiations with finance ministers.

These five interpretations offer contrasting implications for our understanding of statehood that arise from embracing the idea of an age of the regulatory state. However, what lessons can be drawn from experiences in regulatory reform in infrastructure industries over the past three decades? The rest of this section discusses the three key characteristics of the regulatory state, privatisation, regulatory agencies, and formalisation in turn. It draws on examples from three jurisdictions: the UK, Germany and New Zealand. The UK is widely regarded as a 'benchmark case' in the sense of having embarked on an

early privatisation programme (in the 1980s) and of having instituted the sectoral regulation model. Germany provides an example that has moved to an alternative regulatory model, whereas New Zealand offers the case of a country that was characterised by initial sectoral reforms that were, however, combined with continued public ownership and an eventual (and reluctant) move towards sectoral regulatory oversight. More generally, New Zealand has widely been regarded as public sector reform outlier since it embarked on its institutional economics-inspired reform programme in 1984.

Comparative examples of privatisation suggest considerable variation across and within countries. In Britain, British Telecommunications was sold off in stages. In later cases, such as that of the railway infrastructure provider, Railtrack, privatisation – through floatation – was conducted in one step. In the UK, one also finds variety in private ownership patterns over time. In electricity, a series of 'ownership waves' can be distinguished, ranging from dispersed to concentrated ownership structures and ownership ranging from US and European utility firms and infrastructure and private equity funds. In terms of ownership, the end result of this period of instability has been, according to *Dieter Helm* and *Tom Tindall* (vgl. 2009), an exhaustion of balance sheets without addressing growing investment needs. Similarly, in the railways, following the bankruptcy of the privatized infrastructure provider, Railtrack, the government decided to establish a 'not-for-dividend company' (arguably a form of public ownership) in which risk has been indirectly 'returned' to the taxpayer. Instead of dividends, all profits are supposed to be returned to investment in infrastructure, while 'shareholders' are 'board members' drawn from various parts of society.

Defining 'privatisation' in terms of a transfer of ownership would, however, exclude the so-called privatisation of the Deutsche Bahn, the German railway operator. Up to the time of writing (early 2010), the repeated attempts to float at least parts of the company or sell them to an investor had remained unsuccessful due to political resistance. In this particular case, privatisation was purely in legal form, rather than in terms of ownership. Looking at a very different jurisdiction further points to the problems in identifying privatisation as one of the key trends. In New Zealand, regulatory reforms in telecommunications and electricity were initially conducted without privatisation (as the Labour government feared electoral punishment). The incumbent in telecommunications was eventually privatised. However, the electricity industry continued to be shaped by competing state-owned retail, distribution and generation companies (as well as one privatised company) – and the state-owned transmission company. Thus, private ownership only plays a limited role in New Zealand electricity, despite extensive and ongoing regulatory reforms.

Defining 'privatisation' as a core characteristic is therefore somewhat problematic: it includes numerous forms of (re-)organisation (ranging from ownership status, legal status, market-type mechanism such as franchising, to 'state withdrawal' from services) and it fails to account for the continuing extent of state ownership in a cross-national or cross-sectoral perspective. It is therefore important to focus on industry structure rather than solely on ownership.

In the UK, the overall development in terms of industry structure can be defined as a continued and repeated attempt to introduce structural solutions prior to privatisation – therefore taking advantage of the starting position, namely the nationalised nature of infrastructure industries (see also *Hood* 1996). Thus, following the initial privatisation of British Telecom and British Gas as vertically integrated monopolies, the subsequent

regulatory reforms increasingly adopted structural solutions. In the case of electricity, this meant vertical separation as well as a horizontal separation between generation, transmission, distribution and retail. In water, the inherent difficulty of allowing for vertical separation or of introducing competing water infrastructures meant that a yardstick competition model was chosen when the performance of regional monopolies was assessed.

Finally, in the railways, various 'lessons' from previous reforms were incorporated (after considerable debate about how to reform an industry that was regarded as inherently loss-making but politically too sensitive to close down). In brief, there was an emphasis on vertical separation – leading to the emergence of a privately owned infrastructure operator (the timing and nature of privatisation was largely driven by the needs of making railway reform 'irreversible' before the 1997 election); there was an emphasis on franchising, supervised by a 'franchising director', in order to allow bidders for passenger franchises to bid on the quality and the amount of subsidy required; and in particular there was reliance on an 'economic regulator' to oversee the infrastructure (*Lodge* 2002). In general, the key lesson of the UK experience was that the regulation of privatised monopolies had proven difficult and adversarial and that private ownership, on its own, had not led to increased service quality. Instead, rather than relying on regulators, emphasis shifted to structural and incentive-based solutions; in other words, the emphasis shifted away from relying on regulators controlling private monopolies and towards the creation of market structures that would ensure competitive behaviour among market participants.

Looking back at these initial choices as of early 2010 suggests a pattern of continuity and change in industry structure. Most change relates to the degree of liberalisation rather than industry structure as such. In telecommunications, British Telecom was forced to operate as a 'virtually' separate company (in 2005), splitting network and services to facilitate network access for competitors in the broadband market. In gas, British Gas separated 'voluntarily' in 1995, allowing for increased competition. In electricity, there has not only been a trend towards increased 'integration' between generation and retail, but also somewhat of a concentration of ownership. Six large suppliers dominated both retail and generation with a substantial decline in independent power generation since the early 2000s. To some extent, these developments were linked to the move away from the market 'pool' to the more voluntary arrangements of the 'New Electricity Trading Arrangements' that allowed for long-term contracts. In addition, electricity trading has fallen considerably since the collapse of Enron. At the same time, there was the emergence of 'energy' companies offering both electricity and gas (*Thomas* 2006). The structure in water remained largely unchanged.

Even the railway industry structure has witnessed only a degree of change. One major change was the financial collapse of the railway infrastructure operator, Railtrack (as noted) and its 'rebirth' as a 'not for dividend' company (it has since been renamed 'Network Rail'). More importantly, the initial design idea – that infrastructure would be paid for through franchised rail services (and therefore indirect subsidies), rather than directly through tax-payers – triggered considerable problems involving decisions about the allocation of public money and the role of unelected regulatory bodies. In 2003, the railway regulator conducted his regular price review in order to set the track access fees. These fees would then have to be paid by the passenger franchise operators (in receipt of a public subsidy). The result was that the rates were set at a level that (seemingly unexpectedly) depleted the overall budget of the Department of Transport. This episode pointed to two related problems. One was that an unelected economic regulator had, indirectly, a

considerable effect on the use of taxpayers' money. The other problem was the reluctance of the elected government to offer the regulator any form of guidance in terms of its funding levels, or its preferences regarding quality or size of the infrastructure. As a result, in this 'information-free' zone, the regulator determined rates, making him an ideal blame-magnet target for blame-avoiding politicians. As a response, the Transport Act 2004 considerably reduced the role of the railway regulator. The responsibility for passenger franchising was transferred to the Department of Transport. Franchising attracted continued conflict over its duration and also attracted over-optimistic bids that have led to some providers losing their franchises during their lifetime. In other words, a structure that emphasised fragmentation witnessed modification towards a reduction in the degree of fragmentation.

In Germany, none of the reforms in telecommunications, postal services, energy or railways involved extensive reform in terms of industry structure. In energy, structural reform was difficult due to the private ownership pattern of most of the industry. Considerable industry concentration occurred. In electricity, the market was largely shared between four providers (Eon, RWE, Vattenfall and EnBW) and the gas market remained overly fragmented with localised dominant providers. In 2008, increased EU attention regarding the market dominance of German (and French) firms encouraged some of the companies involved to spin their transmission networks off from their other business operations. In railways, the initial terms of the 1996 Act provided that the *Deutsche Bahn* should be a holding company consisting of separate subsidiaries. The holding company was to wither away (at an unspecified point in time), paving the way for the operation of different private business units. This ambition was never fulfilled. Partly because of the strong institutional position of the Deutsche Bahn that strengthened rather than weakened the holding's authority over the subsidiaries, partly because of subsequent government's reluctance to risk a potential sale price by splitting up the incumbent, there was never much interest in following the provisions of the act. Continual debates regarding change in ownership structure evolved around the issue of vertical separation of infrastructure and services, especially whether the infrastructure should be organised as a separate entity or as part of the incumbent – the key institutional problem involved a constitutional requirement that the infrastructure was to remain in federal ownership. The compromise package intended to establish an infrastructure 'holding' (with 100 per cent share ownership) and a 'mobility logistics' part (that would allow for up to 24.9 per cent private shareholding). The overall privatisation process, however, was postponed in 2008 following party-political resistance (within the Social Democratic Party (SPD)).

A similar diversity of approaches across jurisdictions and industry sectors can also be diagnosed in the second dimension of the regulatory state, the creation of regulatory agencies. It is one thing to diagnose the existence of agencies or to find broad measures that point to some form of similarity, whether it is in terms of appointment patterns, resignations or other tools of political intervention (*Thatcher* 2005). However, as *Marian Döhler* (vgl. 2002) has noted, calling something a 'regulatory authority' is one thing, but how its role is incorporated into the domestic context of formal administrative law and informal understandings is a different matter. Nevertheless, while therefore the claim of a universal spread of 'regulatory agencies' needs to be treated with some caution, there is some force in the argument that regulatory agencies have not only become a widespread feature across sectors and states, but that they have also become prominent factors in the

politics of regulation, even in contexts where initial regulatory reforms sought to avoid the establishment of such agencies.

For example, in Germany, initial reforms led to the creation of a regulatory authority to deal with telecommunications and postal services. In other sectors (i.e. rail, electricity and gas), the idea of having a sectoral regulator was rejected on the basis that competition law and the federal cartel office would suffice to oversee market processes, whereas sectoral regulators would be captured (*Lodge* 2002, *Humphreys/Padgett* 2006). The railways saw the creation of a regulatory body, the Eisenbahn Bundesamt, which, however, was largely responsible for licensing and safety.

In New Zealand, the initial assumption behind the structural reforms in telecommunications and electricity was that competition law, overseen by a competition authority, as well as the idea of 'contestable markets', would suffice. However, the idea of 'contestability' proved to be mostly an argument about protecting incumbent interests. More importantly, both telecommunications and electricity witnessed the emergence of sectoral regulators. In the case of telecommunications, this development was triggered by a court case regarding access charges that ended up in New Zealand's highest court (the Privy Council, located in London). In electricity, the electricity regulator emerged as a result on the one hand of supply shortages in the early 2000s and the continuous failure of the different industry parties (despite being state-owned) to self-regulate (*Evans/Meade* 2005). In Germany, railways and energy sectors also came under the authority of the regulatory body that had initially been concerned with telecommunications and postal services. In this particular case, the shift towards supporting sectoral regulation was the result of diverse pressure, ranging from EU-packages, domestic disappointment with associational regulation (in the case of energy), and case-overload of the Federal Cartel Office. The choice of putting these functions into one single 'infrastructure regulator' was, on the one hand, justified on the basis of synergy effects that would also encourage a consistent regulatory approach across infrastructure industries. On the other hand, it can also be argued that the German choice reflected a certain political convenience in that, informally, the telecommunications and postal service regulator had not established the same degree of autonomy from ministerial interventions as the longer-established federal cartel authority.

In contrast, the British experience is widely used as example of relying on sectoral regulatory bodies. Each privatisation process was accompanied by the creation of a sectoral regulator, based on the model of a 'director general' (who was the sole authority mentioned in the initial acts). The 'director general' model was preferred to that of regulatory commissions, as found in North America. These latter were said to encourage non-transparent collective decision-making. The option of an 'individualised' leadership was further chosen to allow the regulator to be able to face up to incumbents and to be identifiable by the public. Both design decisions (the director-general model and the idea of sectoral regulation) have been revisited since 1997. First of all, in energy and telecommunications, new regulatory bodies were created. In energy, this meant the merger of electricity and gas regulators following the claim that the industry was largely operating on 'dual fuel' lines (created under the 2000 Utilities Act). In telecommunications, the argument of converging communication markets was used to justify the creation of a 'communications regulator' (created under the 2002 Communications Act), merging telecommunications, broadcasting and other communications regulators.

Furthermore, these reforms also brought about a wider change in the governance structures of the regulatory bodies more generally, with a move towards a more collective

decision-making structure based on a division between chairperson and chief executive. The official reason for this choice (apart from arguments relating to corporate governance) was that regulators throughout the 1980s and 1990s (and early 2000s) were accused of representing their office in a highly personalised manner, thereby leading over time to inconsistent regulatory approaches. Others saw this as a political attempt to reduce the visibility of regulatory offices. Related to the issue of personalisation was the incident involving the railway regulator, Tom Winsor, which has already been alluded to, namely the threat to issue emergency legislation should the regulator seek to oppose a ministerial decision. For some, this incident pointed to the great myth of 'independent regulators' in the British political system. Regulators were seen to be required to read the political 'wind' and were chosen accordingly – and were expected to choose to resign when they faced political resistance (*Moran* 2003). For others, this particular incident was seen as the 'abyss' of the relationship between politicians and regulators that was not to be repeated. As a response, on this view, regulatory autonomy had increased informally due to reluctance among politicians to repeat a similar challenge to regulators following the negative consequences that followed the breakdown of the relationship between transport secretary of state and the railway regulator. In other words, regulatory agencies seem to have become part of the 'furniture' of the regulation of infrastructure industries. Their organisation and status, however, have remained highly political (and not just in the UK), while the evolving patterns point to substantial diversity.

Turning to the final dimension of the regulatory state – the formalisation of relationships – also reveals a pattern of diversity and unintended side-effects. Regulatory objectives and tasks became ever more complex – and arguably also contradictory, requiring regulators and companies to address economic, social and environmental concerns.

Two examples point to the problems that were inherent in the assumptions and hopes that were associated with the regulatory state. One involved the importance attached to the price-setting formula RPI-X (retail price index minus the regulator's determination regarding efficiency gains). This formula, devised for the initial privatisation of British Telecommunications in 1984, was supposed to prevent the diagnosed over-capitalisation effects that the traditional (US-based) rate of return-based regulation had triggered. Instead, what was at the heart of RPI-X was the idea of simple incentive-based regulation.[2] Companies were given incentives to perform below the cost assumptions of the price control 'cap' by allowing them to retain the benefits from the resulting efficiency gains. Once the 'X' factor had been determined, there were considerable constraints on further discretionary interventions by the regulator. However, in 1995 the 'creator' of this formula and then electricity regulator, Stephen Littlechild, was faced with a dilemma: he had just determined the latest price-cap when he was almost immediately confronted with a hostile takeover, which the target sought to fend off by releasing financial statements that suggested that the basis on which the regulator had made his determination was wrong. The subsequent decision to re-open the price-cap again suggested the fundamental problem of 'credible commitment' in the regulation of infrastructure regulation; it signalled that, given pressure, regulators would renege on their promise not to review their decisions, thereby reducing the incentives for companies to be efficient.[3] Further criticisms regarding the RPI-X formula point to its growing complexity, which has meant that its methodology has started to converge with that of the 'rate of return' mechanisms that it sought to replace. Nevertheless, despite some regulators reviewing the future of RPI-X, at the time of writing, there was little sign of its demise.

A second mechanism that was widely used was franchising, in particular in the area of transport. Again, the idea that competition for the market represents a good substitute for competition *in* the market has been well-established. However, as the experience in Britain (and, to some extent, Germany) suggests, franchising as a regulatory strategy provides for numerous regulatory problems, whether this relates to the franchising period, the number of franchises, issues of ownership of rolling stock and its transfer to potential incoming franchise owners, or in terms of sanctions for failing to maintain agreed standards and payments. Franchising has also repeatedly encountered the problem of an optimism bias when it comes to the bidding stage. What were widely seen as devices to 'hardwire' and 'contractualise' relationships have proven to be highly controversial instruments, especially in terms of the duration of the franchising contracts and the enforcement of contractual obligations. In sum, contractualisation has encouraged further politicisation rather than depoliticisation of regulatory issues.[4]

Table 2: Overview of national developments

	UK	Germany	New Zealand
Industry Structure	Growing emphasis on structural separation; some moderation of private ownership	Privatisation initially in legal form (telecom, postal services and railways), limited industry restructuring	Emphasis on structural solutions and continuation of public ownership (in electricity)
Regulatory Authority	Sectoral regulation with some mergers justified by industry 'convergence' (energy and telecom)	Move towards cross-sectoral infrastructure regulator	Move from reliance on competition law to sectoral regulators
Formalised relationships	Formalised relationships broken in 'political heat'	Formalised relationships (franchising) largely at Land level, continued informality due to ownership	Limited, rivalry and lack of formal arrangements (and interest in self-regulation) triggers creation of industry regulator

In sum, the experience across the three dimensions of the regulatory state point to considerable diversity in approaches and trajectories. Table 2 summarises this section. Therefore, while some features of the regulatory state are widespread at one level, there are diverse experiences at the national and sectoral level to warn against claims that diagnose a universal policy trend. Indeed, we find that not only do regulatory decisions have certain self-reinforcing tendencies (such as structural choices made during the initial reforms); they also generate considerable side-effects that do not fit the wider assumptions that surround the age of the 'regulatory state'. The next section problematises the limits of problem-solving capacity within the arrangements of the regulatory state.

4. The limits of regulating infrastructures

Having noted considerable diversity in trajectories across sectors and states, how can we understand the overall problem-solving capacity of the regulatory state in regulating infrastructures? This section considers three aspects that point to the limited problem-solving capacities of the contemporary regulatory state in infrastructure regulation in turn.

First, as noted earlier, the regulatory state is said to be inherently about prioritising the value of efficiency over other administrative values, namely those of equity and re-

silience (for related discussion, see *Hood* 1991). Efficiency is about parsimony and minimising cost, equity is about maximising fairness, while resilience is about maximising any system's ability to avoid break-down or bounce-back. None of the three values can be maximised at the same time: maximising resilience requires stand-by capacity for extraordinary peak demands, which are not efficient to maintain on 'stand-by' during day-to-day running. Similarly, maximising resilience by adding capacity is likely to increase prices, which has effects on equity. Equally, maximising equity is in tension with the other two values. Providing every individual with the same quality of service means that those living in remote areas receive similar service quality to those living in metropolitan areas. Cross-subsidisation is at best a second-best solution to providing efficient services (apart from the problematic aspect of deciding on what the levels of 'uniform service quality' are supposed to be). Similarly, given fixed budget lines, seeking to provide for equity of services takes away resources to allow for building additional redundancy into the overall system. As a consequence, regulating infrastructures – given their central role in individual and political life – is always going to face inherent trade-offs between these three underlying administrative values.

If therefore the regulatory state is comprised of a distinct set of administrative doctrines, based on and justified by the value of efficiency, the side-effects and trade-offs of the regulatory state will become increasingly prominent: there will be increasing concern with regard to resilience in light of the dominance of 'efficiency'-oriented regulatory instruments; with the price-control RPI-X mechanisms said to encourage 'asset sweating' rather than modernisation of infrastructure. Indeed, one of the key trends in energy were price reductions given the 'slack' that was said to have been inbuilt during the 'gold-plating' era of public ownership. Indeed, in the context of the cold winter of 2009/10, even the UK energy regulator, Ofgem, pondered whether its 'Anglo-Saxon' regulatory approach would withstand the challenges presented by long-term forecasts of gas shortages internationally.

Similarly, the observed 'adding' of regulatory objectives onto regulatory institutions, in terms of social (that were part of the initial regimes) and environmental objectives can be understood as seeking to deal not just with changing political priorities, but also with attempts to address the side-effects generated by the regulatory state in infrastructure industries. If, instead, the institutions of the regulatory state, namely its organisation and instruments, show ability in accommodating side-effects and trade-offs, then we are likely to observe the sort of destabilising process of layering that has been at the forefront of recent historical institutionalist writing (*Thelen* 2004). Put differently, the incorporation of ever more competing objectives into regulatory regimes has two effects: one is that there will be ever-increasing tensions between these objectives that remain irreconcilable; the second is that with ever-increasing regulatory objectives, non-majoritarian institutions such as regulatory agencies increasingly resemble mini-governments.

Second, there are also increasing concerns regarding the problem-solving capacity of the regulatory state. As suggested in the earlier section, a reliance on regulatory agencies supposedly focusing on economic regulation, decentralised industry structures and regulatory instruments emphasising efficiency are characteristics of the regulatory state. Governments are said to have left the days of planning and intervention behind. However, arguably, these decentralised and fragmented structures fly in the face of system-wide planning of and payment for infrastructure capacity. While some view market structures and self-regulation as workable options for negotiating capacity requirements, others regard

the demands of long-term infrastructure planning and the short-term interests of market-facing infrastructure providers and users as inherently contradictory. In other words, the structures of the regulatory state lack the incentives to collaborate in the light of the coordinative demands of infrastructure planning and modernisation; especially also in a context of heightened public rejection of large-scale projects (in particular in their own backyards), whether related to wind farms, nuclear reactors or the erection of transmission cables. Such concerns have become increasingly articulated in the context of climate change and renewable energy debates. In particular, controversy has focused on issues such as how to price different forms of energy and how to deal with the infrastructural demands of a more volatile source of energy, such as wind. Questions have once again been raised about the capacity of private parties to provide for the type of long-range planning that seems to be required.[5]

Finally, and related, the age of the regulatory state – and the attraction of the 'regulation'-word in general – was linked to a (long-standing) hope that institutional devices offer the recipe of depoliticised and predictable relationships between the worlds of (unpredictable) politics and of infrastructure industries. Contracts, regulatory agencies and changes in ownership were meant to distance these industries from the short-term demands of politics and allow them to 'plan' on a more long-term basis. As the previous section has shown, the age of the regulatory state has hardly led the way to a world of depoliticisation. Instead, there continuous attention has been paid to failing investment records, operational failures and company profits. The age of the regulatory state in infrastructure industries appears to be more a state of hyper-politicisation than depoliticiation. To some extent, this might be explainable by the inherent 'high politics' nature of industries such as infrastructures with their considerable implications on social and economic life. However, to some extent, this hyper-politicisation is inbuilt in the instruments of the regulatory agencies. As noted, conflicts between politicians and regulators are one source of hyper-politicisation. A second source are regulatory instruments themselves, with the competing demands for flexibility (to deal with emerging problems) and 'predictability' (to signal 'credible commitment') as the source of considerable tension between regulators, industry and politics. However, formalisation and attempts at depoliticisation have not just led to hyper-politicisation; they also have arguably sown the seeds of destabilisation. On the one hand, relying on institutions with clear value-bias generates the kind of side-effects noted earlier. On the other hand, the mere reliance on 'regulatory agencies' to monitor and enforce raises further concerns that relate to the wider argument made by *Mike Power* in his *Audit Society* (vgl. 1997) and *Organized Uncertainty* (vgl. 2007) accounts. That is, an over-reliance on (uncertain) technologies of control and an over-concentration on specific measures increases the risk of missing 'unaccounted' problems. In other words, the more we seek to formalize, the less we are likely to scan the overall domain, thereby potentially missing-out on system-threatening risks.

5. Conclusion

So what is the future of the regulatory state in infrastructure regulation? The previous section has pointed to the limitations of its problem-solving capacities. This was not to suggest that alternative arrangements offer more comprehensive or advanced solutions. In this conclusion, this paper suggests three possible futures for the regulatory state, one is

'plodding along', the second is 'adaptation' and the third is 'transformation' (building on widespread distinctions between first-order (incremental/gradual) and second-order (system-changing) change in organizational and public policy studies).

Turning to 'plodding along' first, with this future, the regulation of infrastructure regulation would follow established paths. The broad contours of the regulatory state would remain as they are, with some variation in the underlying techniques and institutional arrangements. However, whether such a world would be a stable one is questionable. Adding ever more objectives onto regulators and dealing with the inherent side-effects in the face of challenges such as renewable energy systems is unlikely to allow for stability. In the UK, infrastructure companies' mountains of debt are said to seriously inhibit the possibility of meeting diagnosed investment needs (*Helm/Tindall* 2009). Nevertheless, a future of 'plodding along', at least in the short-to-medium term, cannot be fully discounted.

A future of 'adaptation' would suggest that the regulatory state has substantial flexibility. This view would suggest that the institutions and instruments that dominate contemporary regulation of these industries are not based on any single set of dominant assumptions, but rather that different assumptions and objectives can be incorporated into regulatory regimes. Such a future would raise issues for liberal democracies as the ever-increasing objectives imposed on regulatory agencies would mean that they become quasi-ministries, but without elected politicians to be held accountable. Whether such tensions can be resolved through institutional design (if at all) is questionable; however, it is an open question whether the instruments and institutions that are associated with the age of the regulatory state can display sufficient adaptive capacity. Therefore this future cannot be discounted either.

The third future would point to 'transformation' due to the inherent limitations and contradictions of the regulatory state. One challenge would be the lack of problem-solving capacity in the existing regulatory arrangements in which fragmented organizations are unable to cope with the wider collective investment and other needs, whether this relates to infrastructure modernization, changing preference regarding technological standards or the wider implications of climate change. Further challenges would emerge from the inherent tension between the desires of the regulatory state, on the one hand, and the demands of politics on the other. As noted earlier, the attraction of regulation and the regulatory state is that it promises a world of depoliticised, synoptic control in which discretion is tightly constrained (*Moran* 2003).[6] The centrality of infrastructure industries to socio-economic well-being and high politics means that there is a continued need for flexibility and informality. In an age of personalised politics in which blame for operational failings among infrastructure industries easily becomes a matter of high politics, the incentive for discretionary intervention is particularly high. This tension between 'non-discretion' and 'discretion' is inherent to the politics of regulation, and will remain at the heart of regulatory politics and, with this future, is likely to remain unresolved. In other words, infrastructure industries have been at the heart of the modern occidental state and issues of their control will continue to define the character and limits of statehood.

Notes

1 A further device is a reliance on informal support from regulatory constituencies that make legislative change politically too costly. One example would be financial markets 'punishing' national governments for appearing to interfere in regulatory arrangements.
2 In the UK, the initial 'X' chosen at the time of privatisation was determined by ministers and not regulators. They were widely regarded as having been set rather generously in order to allow the privatised companies to get off to a good start (*Moran* 2003, S. 108).
3 A comment in *The Independent* noted: 'First he cocked up his price review, then he cocked up the timing of its repeal, now he has messed up on the announcement of its replacement. It is hard to see how this Forrest Gump of a regulator can survive the latest shambles' (*Independent*, 7 July 1995).
4 In New Zealand, such concerns regarding contractual arrangements were expressed in the context of security of supply, especially in the context of the then Labour government's decision to construct additional generation capacity.
5 At the same time, there has been only limited debate regarding the supposed advantages and disadvantages of 'planned' systems.
6 *Moran* (vgl. 2003) argues that this tension is particularly acute in the case of British politics. However, this paper argues that this tension is inherent in the politics of regulation across political systems.

Bibliography

Barke, Richard P./Riker, William, 1982: A political theory of regulation with some observations on railway abandonments, in: Public Choice, 39, S. 73-106.
Döhler, Marian, 2002: Institutional Choice and Bureaucratic Autonomy, in: West European Politics, 25(1), S. 101-24.
Evans, Lewis/Meade, Richard, 2005: Alternating Currents or counter-revolution, Wellington: Victoria University Press.
Ikenberry, G. John, 1990: The International Spread of Privatization Policies, in: *Suleiman, Ezra N./Waterbury, John* (Hrsg.), The Political Economy of Public Sector Reform and Privatization, Boulder, CO: Westview.
Helm, Dieter/Tindall, Tom, 2009: The evolution of infrastructure and utility ownership and its implications, in: Oxford Review of Economic Policy, 32(3), S. 411-34.
Hood, Christopher, 1996: United Kingdom: From second chance to near-miss learning, in: Olsen, Johan P./Peters, Guy B. (Hrsg.), Lessons from experience, Oslo: Scandinavian University Press.
Hood, Christopher, 1991: A public management for all seasons?, in: Public Administration, 69, S. 3-19.
Humphreys, Peter/Padgett, Stephen, 2006: Globalization, the European Union, and Domestic Governance in Telecoms and Electricity, in: Governance, 19(3), S. 383-406.
Levi-Faur, David, 2005, The Global Diffusion of Regulatory Capitalism, in: Annals of the American Academy of Political and Social Science, 598, S. 12-32.
Levi-Faur, David, 2006: Varieties of Regulatory Capitalism: Sectors and Nations in the Making of a New Global Order, in: Governance, 19(3), S. 363-6.
Levy, Brian/Spiller, Pablo T., 1994: The Institutional Foundations of Regulatory Commitment, in: Journal of Law, Economics and Organisation, 10, S. 201-46.
Lijphardt, Arend, 1999: Patterns of Democracy, New Haven: Yale University Press.
Lodge, Martin, 2002, On Different Tracks, Westport: Praeger.
Lodge, Martin/Stirton, Lindsay, 2006: Withering in the Heat? In Search of the Regulatory State in the Commonwealth Caribbean, in: Governance, 19(3), S. 465-95.
Lodge, Martin, 2008: Regulation, the Regulatory State and European Politics, in: West European Politics, 31(1/2), S. 280-301.
Majone, Giandomenico, 1997: From the positive to the regulatory state, in: Journal of Public Policy, 17(2), S. 139-67.
Majone, Giandomenico, 1996: Public Policy and Administration, in: Goodin, Robert/Klingemann, Hans-Dieter (Hrsg.), New Handbook of Political Science, Oxford: Oxford University Press.

Majone, Giandomenico, 1994: The rise of the regulatory state in Europe, in: West European Politics, 14(3, S. 77-101.
Moran, Michael, 2003: The British Regulatory State, Oxford: Oxford University Press.
Müller, Wolfgang C./Wright, Vincent,1994: The State in Western Europe: Retreat or Redefinition?, in: West European Politics, (14(3), special issue.
Peltzman, Sam, 1976, Toward a more general theory of regulation, in: Journal of Law and Economics, 19(3), S. 211-40.
Power, Michael, 2007: Organized Uncertainty, Oxford: Oxford University Press.
Power, Michael, 1997: The Audit Society, Oxford: Oxford University Press.
Spiller, Pablo T. and Sampson, Cezley I., 1995: Telecommunications Regulation in Jamaica, in: Levy, Brian/Spiller, Pablo T. (Hrsg.), Regulations, Institutions and Commitment, Cambridge: Cambridge University Press.
Stigler, George, 1971: The Theory of Economic Regulation, in: Bell Journal of Economic and Management, 2(1), S. 3-21.
Thatcher, Mark, 2005: The Third Force? Independent Regulatory Agencies and Elected Politicians in Europe, in: Governance, 18(3), S. 347-73.
Thatcher, Mark/Coen, David, 2008: Reshaping European Regulatory Space: An Evolutionary Analysis, in: West European Politics, 31(4), S. 806-36.
Thelen, Kathleen, 2004: How Institutions Evolve, Cambridge: Cambridge University Press.
Thomas, Steve, 2006: The British Model in Britain: failing slowly, in: Energy Policy, 35(5), S. 583-600.
Vickers, John/Wright, Vincent, 1988: The Politics of Privatization in Western Europe, in: West European Politics, 11(4), S. 1-30.

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