

State Infrastructuring and the Austerity Consensus: The Political Economy of the National

Infrastructure Plan

Introduction

Infrastructuring is central to the existence and sustenance of the state (see for example Auster and Silver 1979, Taylor 1994). It is through the provision of these physical structures within its demarcated borders that the state is able to achieve its core functions (i.e. territorial integration, security, control and growth) (Mann 1984). Consequently a core objective of the state is to establish and maintain a National Infrastructure System (i.e. the totality of interconnected networked physical infrastructure within the borders of the state) that enables the state to establish and sustain its territoriality. For many advanced states, the main challenge is to ensure that their mature NIS (i.e. which offer universal coverage) do not suffer from the senescence and/or obsolescence to the extent that such systems become divorced from their contextual drivers (see for example Canning and Bennathan 2000). The strategic implication for advanced states is the need to constantly evaluate the NIS to ensure it retains its ability to support the objectives of state territoriality especially where many of these NIS exhibit higher degrees of polycentrism (Ostrom 2010). Such strategies have gained in salience as infrastructure has moved to the fore of public policy debates regarding the desire to stimulate growth in a low growth era of public sector austerity. This paper will focus on examining how the UK has sought to use infrastructure as a growth catalyst through the high profile National Infrastructure Plan (NIP) (re-named the National Infrastructure Development Plan from 2016). However before that issue is addressed the paper will initially seek to explore the themes underpinning such a strategy.

State Infrastructuring and the Austerity Consensus

Over the past three decades, there has been substantial change in the process of state infrastructuring as the state has progressively withdrawn from the ownership and provision of infrastructure as they have evolved into more explicitly polycentric systems (Batten and Karlsson 1996). This process has led some to argue – see for example Strange (1996) – that this fundamentally re-defines the role of the state within the NIS. Indeed some may argue that the state has increasingly undertaken the role of the client within the infrastructuring process (see also Estache and Fay 2007). However this shift towards polycentrism within NIS does not diminish the salience of infrastructuring to the state. The fact that infrastructuring remains core to state territoriality despite its increasingly polycentric form is reflected in the rise of state critical infrastructure strategies (Brown et al .2006, OECD 2008). These critical infrastructures are those infrastructures that are core to territoriality whose failure or disruption would challenge state territoriality (Hammerli and Renda 2010, Hokstad et al 2012). In extreme cases (the US) up to 85 per cent of this critical infrastructure is in private ownership (OECD 2008). In these cases, the state retains the right to intervene, regulate or - in extreme cases - expropriate assets to steer the development of the NIS in a manner that is compliant with the state's objectives (Braithwaite and Drahos 2000, Majone 1997).

Within the seemingly paradoxical scenario of austerity led growth, the NIS risen to the fore of policy initiatives. Organisations such as the OECD (2007 a,b) and WEF (2015) have all highlighted a collective failure by many leading industrialised states to invest adequately in their NIS especially when compared to the leading, emerging Asian economies. Importantly, conventional fiscal strategies that push public infrastructure as a strategy to offer a direct growth stimulus to the economy have been eschewed to be replaced by broader micro-economic themes. As such, the strategies deployed within the context of austerity seek to offer a stimulus less through direct public sector involvement (which is in any case constrained by the public sector austerity) and more

through short term stimulus to the economy via increased private sector investment in NIS and through longer term improvements in economic efficiency. As such the policy narratives emerging reflect the logic of the competition state that is of improving the quality of the NIS as a means of aiding the competitive positioning of the state and assisting its integration into the global economy (Cerny 2010). Indeed policy narratives on infrastructure are all heavily surrounded by the rhetoric of competitiveness.

Stimulating investment in NIS within an era of public sector austerity depends upon the ability of the system to generate (or offer the potential of) commercially sustainable infrastructural business models (Davis et al 2010, Gil and Beckman 2009). As traffic based models, this depends upon generating sufficient traffic at market (or regulated) determined user charges. However private sector investment into Greenfield investment in infrastructure (which has been the focus of the national and international policy initiatives) are subject to a high degree of risk due to high sunk and capital costs, strong regulatory frameworks, unpredictable traffic flows and the relatively long time frame between investment and revenue flows (Flyvberg 2007, Weber and Alfen 2010). For this reason, state action within NIS cannot be excluded either as financial support to militate against the capital risk or through reform of soft infrastructure (defined here as the enabling institutions for the NIS that facilitate and shape its form and structure). As public sector austerity has curtailed the state's direct financial involvement so policy narratives (at both national and international levels) have focussed on reform of soft infrastructure (Niskanen 1991) as a means to enabling non-state financing of the NIS (for a review of the main issues see Glykou and Pitelis 2011). In practical terms, the state will seek to generate a soft infrastructure system that balances the needs of the state (notably with regards to criticality) and those of commercial investors in the evolution of NIS.

Whilst the above themes are not exclusive to the UK, a simple observation of policy since the launch of the UK government's austerity programme in 2010 underlines how these themes have found resonance within the state's infrastructuring strategy. Concurrent with the launch of the Austerity programme was the re-launch/re-positioning of the Treasury-based body –Infrastructure UK (which eventually subsumed into the Infrastructure and Projects Authority) to push for a coherent framework for the development of the UK NIS through a formal strategic planning process under the National Infrastructure Plan (NIP). It is an assessment of this strategy to which this paper now turns.

The UK NIS and the National Infrastructure Plan: Towards 'Sustainable Polycentrism'

The transformation in the governance of the UK NIS over the past four decades has been widely acknowledged (see for example Stern 2014) with the shift towards a more structurally, spatially and functionally complex infrastructure system being a key legacy of this process. Path dependencies shaped by the progressive liberalisation and privatisation of the UK NIS since the 1980s (for a review see Hall et al. 2012) have eroded the positivist state's strong welfarist approaches that dominated UK infrastructure strategy for much of the post-war period and have steered the system towards a more market based polycentric structure (Helm 2009). This transformation in governance has coincided with a consensus amongst both government and business that the UK has persistently under-invested in its public infrastructure. A plethora of reports (see for example CBI 2013, Helm et. al 2009 and TIF 2012) have highlighted the scale of the under-investment where investment in public infrastructure fell from 8 per cent of GDP in 1970s to 1.5 per cent in the 2000s (see CBI 2013). This expected to fall further to 1.4 per cent of GDP by 2020: less than half the 3.5 per cent (around £ 45 bn a year) the OECD (2015) estimates it needs to invest.

To counteract this trend –and against a background of public sector austerity and public policy discourses on growth (TIF 2012) – the UK government (in 2010) launched the National Infrastructure Plan (NIP): later replaced by the 2015 National Infrastructure Delivery Plan. The plan integrated a series of pre-existing (45 per cent of the 480 projects within the plan predated the NIP) and new hard (i.e. physical systems) and soft infrastructure (i.e. institutional based systems) projects (80 per cent of the projects were focused on soft infrastructure) into a single over-arching strategy to raise UK investment in its NIS to 3 per cent of GDP by 2015 (double the rate of 2010) (HMT, 2011, 2012): a figure that in practice was not met - indeed the figure fell back slightly to the aforementioned 1.4 per cent of GDP (HMT/IPA 2016). The plan targetted specific segments of the UK NIS through the prioritisation of hard (economic) infrastructure investments to be delivered largely by private finance sustained by user charges (the Treasury estimates that 70 per cent of the finance for the projects will be privately sourced (up to 2020) (HMT 2011, 2013)).

Embedded within the plan is the logic of the competition state through policy narratives focused on 'infrastructure as a growth catalyst' (Cerny 2010). This shift in policy discourse was manifested with a swing away from investment in social infrastructure (as prioritised by the previous Labour administration) towards economic infrastructure (HMT 2010b): though this was partially reversed in later plans (HMT/IPA 2015). The Government sought to utilize the NIP as a catalyst to generate a longer term broad re-infrastructure of the UK and of re-orientating, adapting and adding to the pre-existing stock of infrastructure (militating against the risk of system senescence and obsolescence) to reflect shifting demands upon the NIS (Hall et al 2012). The micro-economic interventionism of the NIP sought to drive a

‘sustainable polycentrism’ model of infrastructure development within the UK NIS with the state seeking to create coalescence between public and private interests largely through reform of the infrastructural governance system (Stern 2014).

‘Sustainable polycentrism’ is underscored within public policy discourse on the NIS as a non-discriminatory polycentric system reflecting a political consensus that the UK can only realise the NIP through creating an open system in terms of infrastructure ownership and control. Over the past three decades, the UK NIS has attracted substantial financing from both domestic and international sources through the opening up of the public infrastructure value system which extended non-state involvement in the NIS beyond its conventional role of construction towards infrastructure planning, maintenance, finance and management. As table 1, indicates by 2014 (from figures updated from an OFT dataset 2010), 60 per cent of the UK’s public infrastructure was in private ownership (though such a statistic says little regarding market structure as the privatized networks of still dominant incumbents have been the focus of infrastructure investment by both domestic and overseas investors (OFT 2010)) with 38 per cent owned by overseas investors. Much of this investment has been directed towards equity (i.e. buying shares in public limited companies with a substantial infrastructure asset base) and brownfield investment (i.e. investing in pre-existing infrastructure asset) rather than the greenfield investment (i.e. the financing of new build infrastructure) prioritised by the NIP. Indeed of the £15 billion invested in the NIS since 2010 (and up to 2014), 80 per cent has been in the form of equity investment (UK TI 2014). Greenfield projects between 2011 and 2015 were still largely financed by the state with the UK government providing up to two-thirds of funding for such projects (ICE 2014).

Table 1: The Ownership Structure of the UK NIS
(% ownership)

	Private	Public	Foreign PLC	UK PLC	Not for profit
Airport	46	20	32	2	0
Energy	11	4	33	52	0.3
Ports	57	5	8	10	20
Telecoms	2	0	0	98	0
Rail	0.3	49.2	0.2	0.1	50.2
Tolled	62.2	33.9	12.9		0.9
	-				

Adapted from OFT 2010

Whilst the UK NIS is not a fully open system (there do remain limited restrictions on infrastructural ownership and control derived largely from European legislation (see Hall et al 2012)), it has increasingly developed in a meta-national direction drawing on a global pool of investment funds, infrastructural capabilities and know how (OFT 2010). However the NIP was formed in the aftermath of the 2008/09 financial crash where the conventional bank based sources of finance into the UK NIS dried up as Banks (notably RBS and Bankia (a Spanish institution) looked to repair balance sheets, respond to banking reforms and avoid exposure to long term projects (NAO 2010, 2015). As a response, the UK government sought to diversify infrastructure funding via engaging with overseas Sovereign Wealth Funds from China, Kuwait and Qatar as well as the state backed Japanese Bank for International Cooperation to invest in the UK NIS. To date (2015), investment by overseas investors follows the broad market trends of focusing on buying into the equity of the pre-existing system and not Greenfield projects (UK TI 2014).

Domestically, the state has also worked to draw in UK Pension Funds into the NIP.

Historically these funds not invested more than an average of 1-2 per cent of their portfolio in infrastructure assets (Della-Croce 2012): this is low compared to the 15 per cent invested by Canadian and Australian funds in such assets. By 2010, UK Pension funds had only committed £2bn of £1tn of assets under their management to UK infrastructure (HMT 2013). By 2020, the UK government seeks to raise around £ 20 billion into NIP related projects from Pension Funds though, by the end of 2014, the sector had only committed to 5 per cent of this target figure. The reticence reflects a desire to avoid construction risk and therefore by-pass Greenfield investment. Indeed of the £330 million committed by the autumn of 2013, none was directed to new projects. Moreover the anticipated move towards amalgamating the £ 190 billion in local government pension schemes have been slow to evolve.

In practice, polycentrism is highly variable across the UK NIS with some segments having business models built around state regulation (most notably the major backbone infrastructure still being under the control of large ex-incumbents) (see table 2) to either militate against the effects of natural monopoly and/or to ensure the necessary investment in the system (see for example Stern 2014). In terms of the NIP, this variable polycentrism can run counter to the open system strategy which is meant to drive the evolution of the NIP. This has had its most obvious manifestation where incumbents have been successful in securing state-funded elements of the NIP as exemplified by the case of BT (the incumbent telecommunications operator) facing little competition when winning the rural broadband contract (NAO 2013a) and - in energy - where incumbent control and rising user charges that

have led to issues over the funding of infrastructure (Helm 2012). As proximity matters in infrastructure, a polycentric market structure does not mean that assets are substitutable (for example ports may specialise in specific types of cargo (OFT 2010)). In the case of concessions or franchises, the state may promote exclusive rights where polycentric structures are unlikely to deliver the desired investment.

Table 2: Sector network structure and regulatory form

	Energy	Telecommunication	Transport
Services	Polycentric system across gas, electricity and oil. Gas and electricity are controlled via regulation	Polycentric operation though subject to universal service obligations. Fixed and mobile	Polycentric across maritime, air, land-based transport. Subject to legitimization
Nodes	Generation – polycentric system based round six generators; regulated private ownership in gas and electricity	Private exchanges alongside regulated access to incumbency resources	Ports: – privately owned; competition between ports both domestically and with overseas ports. Airports: private and polycentric system – especially at regional level. Key national hubs regulated.
Links	Backbone – controlled by National Grid – regulated cash flows with government support Local access networks: price regulated regional monopolies	Backbone - polycentric but with regulated cash flows and targeted government support Fixed local loop - strong control Mobile – polycentric – network sharing	Road – largely state owned with limited private involvement Rail: state owned and regulated cash flow and government support

The emphasis within the UK’s NIP upon sustainable polycentrism has stimulated a widespread reform of the UK soft infrastructure system to militate against the underlying risks within infrastructure investment which can undermine business model sustainability (HMT 2012, 2013). Academic (Besley 2013) and practitioner (see for example CBI 2013) research has demonstrated that the pre-NIP soft infrastructure system inflated costs structures due to the fragmentation of construction industry, complex procurement and

planning rules (Helm 2009). The reform of the supporting institutional architecture of the NIS is focused on reducing construction cost, increasing the diversity of funding sources, effectively balancing risk and reward between public and private sectors (Helm 2011); shifting to changes in public needs (Hall etc. 2012); delivering projects on time and on budget (see Flyvberg 2007) and lowering the cost of procurement and increased speed of planning (see for example NAO 2013b). An explicit goal has been to amend planning systems with the aim to reducing project cost by 15 per cent (£2-3 bn per annum) through a planned pipeline of projects; reducing uncertainty caused by infrastructure costs and improving the procurement process but also through increasing project planning skills in government and lower regulatory burdens (HMT 2010a). A summary of the main shifts within the UK soft infrastructure to support the UK NIP are highlighted in table 3.

Whilst such reforms can reduce costs within infrastructural business models linked to the NIP, there is a consensus that such cost savings are incidental to model sustainability. In public infrastructure – where monopolies have been a common governance system – business models reflect the time lags and risks between construction and operational phases. For the CBI (2013) amongst others, the anticipated risk allocation between public and private sectors within the NIP is stymying model sustainability. Whilst the state has committed £300 bn to NIP related projects to 2020 (HMT 2012, IPA 2015) - of which £100 bn on specific projects where the project is commercially viable, can be started quickly, needs state guarantees and offers value for money for tax payers – this is a maximum 20 per cent of funding needed. This suggests that sustainability for key projects will be limited on the current anticipated allocation of risk between public and private sectors. In the UK (and

within the NIP) Greenfield investment has built around three models of state/non-state actor interaction: private finance with explicit public regulation and/or implicit public support; public resources and public-private partnerships (PPPs) (NAO 2010, 2011). PPPs – in their highly varied forms - have been common in Greenfield investment (especially within social infrastructure about 80 per cent of all PPPs) through risk apportioning between parties (Osborne 2002, Kee and Forrer (2008).

Table 3: UK Infrastructure Initiatives (Post 2010) – UK’s Infrastructural Architecture

Initiative (date launched))	Function
Infrastructure UK (2010 -2016)	The Treasury based unit seeks to channel private investment in to UK infrastructure (merged into Infrastructure and Projects Authority from 2016)
Green Investment Bank (2012)	Funding (£ 3 bn) offered by government to enable channelling of private funds into infrastructure projects that support environmental sustainability.
UK Loan Guarantee Scheme (2012)	To make available £ 40 bn of loan guarantees on chosen infrastructure
Major Infrastructure Planning Unit (2011- 2016)	Based within the Planning Inspectorate the role is to fast track major infrastructure projects (merged into Infrastructure and Projects Authority from 2016).
National Planning Policy Framework (2012)	Simplify planning framework to make policy less complex.
Private Finance 2 (2012)	Reform of programme government becomes minority shareholder and process of contract negotiation speeded up and planning more transparent.
Centre for Protection of National Infrastructure (2007)	A government authority which provides protective security advice to businesses and organizations across the NIS.
Infrastructure Resilience Programme (2011)	Based within Cabinet Office, to enable public and private sector organizations to build the resilience of their infrastructure, supply and distribution systems to disruption from all risks (hazards and threats)
Major Projects Authority (2011)	The aim is to improve value for money from large projects.
Infrastructure Commission (2015)	The aim is to promote long term planning and greater time consistency in Infrastructure development.
Infrastructure and Project Authority (2016)	The aim is to combine overlapping government expertise in financing, delivery and assurance of major economic projects

The Limits to Sustainable Polycentrism in the UK NIP

The most widespread criticism made by both practitioners and academics (notably Helm 2013) is that the NIP is not a coherent functionally systemic approach to the development of the NIS as it focuses on standalone projects. The political economy of a growth strategy in a period of endemic austerity has pushed to the front of the NIP those projects that are able to be started quickly with credible and sustainable business models with private sector dominance and minimal state resource. According to Helm (2013) local needs have overridden national needs with little focus on the requirements of the national system creating the risk of spatial inconsistency. Traffic based business models cannot be viewed in isolation as these are value systems whose sustainability is driven by traffic flows created by or flowing into other parts of the system. Whilst functional complexity was an explicit theme within the NIP in 2011, its prominence has been downplayed within successive statements which focus on creating common frameworks for managing and planning interdependencies.

Time consistency (or a perception of a lack of) has been a persistent theme of discourse on infrastructure policy with various parties (academic, political and business) seeking to depoliticise infrastructure policy by creating institutional frameworks that stand aside from the political cycle (see for example Besley et al. 2013). Whilst not making the process apolitical, limiting policy risks in the infrastructure means militating against policy discontinuities and arguing for a 25-30 year time frame for strategy completion. Whilst the intent of the NIP – as a strategic plan – was to offer greater time consistency (a process aided in part by a series

of independent regulators), it has in practice proved elusive as there is little consensus within the political market for many of the themes engendered within the plan. For example, there is emergent political resistance to financing 70 per cent of cost of the NIP through user charges against a background where such user charges have already risen substantially; a process especially evident in energy infrastructure. Evidence from industry (CBI 2013), the regulator (Ofgem 2014) and government (PAC 2014) indicates that 60 per cent of investors are still deterred by a lack of policy clarity and the risk of the politicisation of the process; despite a consensus on the need for re-infrastructure.

This time inconsistency is compounded by the discontinuities in capital programmes created as political cycles evolve which can often allow local, short term needs to override longer term, systemic requirements and by the absence of forums through which stakeholders can interact (Coelho et. al 2014, Pisu et al. 2015). This was typified by the shift of stance on some prioritised projects within the NIP which - under political pressure (due to marginal electoral constituencies) - have been brought back within the public sector budget. Such inconsistencies are also compounded by the strategy of self-imposed public sector austerity. The most notable inconsistency created by austerity has been the limited government finance to support higher risk projects - an immediate casualty of austerity were sharp reductions in government capital expenditure (NAO 2015) - leading to what is seen by business as an unsustainable re-allocation of risk between public and private bodies (CBI 2013). Overall since 2010, capital spending by the state has fallen by a third with much of the finance offered by the state being for is for development work not for project construction. As a direct result, the Major Project Authority (now part of the IPA) (in

evidence to Public Account Committee (2016)) suggested that more than a third of the projects within the NIP were of limited feasibility. Indeed the PAC (2016) raises further doubts as to time consistency of NIP programmes given long term pay back and costs when placed alongside other commitments of the state. (PAC 2016).

There is also ambiguity on the inter-relationships between the different strands of the UK's infrastructure strategy insofar as the relationship between those projects promoted within the NIP and those infrastructures deemed critical to the sustenance of the UK state is opaque (CPNI 2010). Given the government's desire to build them, it is evident (though left unstated by policy discourses) that NIP projects are key parts of the UK Critical Infrastructure System (CIS) insofar as their loss or absence could impact on UK territoriality. Whilst resilience is a theme embedded within the NIP (adding 1-2 per cent of the cost of a project) (HMT 2010), the issue of sustainability (as defined above) is missing. The overlap between projects within the NIP and CIS raises issues of the creation of sustainable business models for critical infrastructure and the extent to which the state would either underwrite or seek to intervene should these systems veer towards unsustainability. The UK has shown on occasions that it is prepared to contemplate state ownership for an asset where the business model has proved unsustainable. Again this issue is currently left unresolved in the NIP.

Criticality and sustainability are often reconciled through various forms of PPPs though - in practice - these devices are used more for social than economic infrastructure. Where PPPs have been used in the provision of economic infrastructure they have proved highly

controversial. Hare (2013) alleges poor choices by - and poor value for - government which did little to cure the under-investment in the NIS. Within the context of Public Finance Initiative (PFI) (the UK's flagship PPP initiative), polycentrism has not been as marked as planned with many PFI contracts only attracting one or two bidders. This pattern has been reciprocated within the NIP where - in a number of PFI projects - incumbents (such as in the BT exemplar noted above) (NAO 2013b) have been given preference. Additionally, issues over criticality have raised concerns over the sustainability of globality within the NIS. Whilst the government maintains an open system for investment and ownership and NIS, there have been concerns expressed over aspects notably over the UK Parliament's concerns over Huawei's investment in the UK information infrastructure though these concerns were dismissed (ICS 2013). Chinese investment in infrastructure is often done as an export device as the investment is offered on the proviso that the recipient will use Chinese products, technology and/or expertise (CEBR 2014). Such investment patterns also reflect that overseas investors are more interested in equity and brownfield investment and not the Greenfield investment targeted by the NIP.

The focus on the NIP as a growth catalyst underplays the role that the NIS plays in state territoriality with the growth focus seeming to restrain the other interlinked territorial needs of an NIS of security, integration and control. The establishment of sustainable infrastructural business models - which lie at the core of the NIP - are challenged with meeting the multi-faceted requirements of the NIS for the territorial state but the political economy of the NIP is about what can happen quickly rather than what needs to happen strategically (PAC 2014). After five years, the NIP has had mixed results. Investment has

risen but this has mainly been equity and to a lesser extent brownfield investment and not the Greenfield investment that lies at the core of the NIP where the state – up to 2015 – remains dominant (HMT/IPA 2015) This may reflect that under the current proposed configuration of risk between public and private sectors viable infrastructural business models for projects within the NIP remain elusive.

Conclusions

The UK is attempting to undertake a widespread re-infrastructuring process set against a background of public sector austerity. Its experience highlights the difficulties in such a strategy as the UK NIP is more a growth strategy than a holistic framework for the development of the NIS. As a result it is – as a strategy for the NIS – incomplete. The model of sustainable polycentrism which is driving the strategy seems flawed with funds for Greenfield investment lacking and with key issues of consistency, criticality and complexity not being addressed in any systematic fashion. This suggests that as a strategy for its NIS, the NIP is at best incomplete. Of course, the UK is but one system and further analysis of these drivers across other similar systems is required not so much to test the validity of the framework but to assess how states are reconciling territoriality and polycentrism through adaptation in governance.

Bibliography

Armitt J (2013) *The Armitte Review – An Independent Review of Long Term Infrastructure Planning*. Report for the Labour Party UK, September.

Auster R and Silver M (1979) *The state as a firm: Economic forces in political development*.

Leiden: M. Nijhoff Pub.

Batten D and Karlsson C (1996) *Infrastructure and the Complexity of Economic Development*.

Berlin: Springer–Verlag.

Besley T, Coelho M and Van Reenen J (2013) Investing for prosperity: skills, infrastructure and innovation. *National Institute Economic Review*, 224(1): 1-13.

Braithwaite J and Drahos P (2000) *Global Business Regulation*. Cambridge Cambridge University Press.

Brown G, Carlyle M, Salmerón J and Wood K (2006) Defending critical infrastructure. *Interfaces*. 36(6): 530-544.

Canning D and Bennathan E (2000) *The Social Rate of Return on Infrastructure Investment*.

Working Paper 2390, Washington DC: World Bank.

Cerny P (2010) The competition state today: from raison d'Etat to raison du Monde. *Policy Studies*, 31(1): 5-21.

Chari V, Kehoe P and Prescott E (1988) *Time consistency and policy* (No. 115). Minneapolis: Federal Reserve Bank of Minneapolis.

Clark G, Dixon A and Monk A (2013) *Sovereign Wealth Funds: Legitimacy, Governance, and Global Power*. Princeton NJ: Princeton University Press.

Confederation of British Industry (CBI) (2013) *Connect More: CBI/KPMG Infrastructure Survey 2013*. Available at : www.cbi.org.uk (accessed 15th June 2014)

Centre for Economic Business Research (CEBR) (2014) *China Invests West*, Report, Centre for Economics and Business Research, UK.

Coelho M, Ratnoo V and Dellapiane P (2014) *The Political Economy of Infrastructure in the UK*. Report, Institute for Government, LSE/ESRC, UK.

Centre for the Protection of National Infrastructure (CPNI) (2010) *The national infrastructure*. Available at: <http://www.cpni.gov.uk/about/cni/> (accessed 24th May 2015)

Della Croce R (2012) *Trends in Large Pension Fund Investment in Infrastructure*, Working Papers on Finance, Insurance and Private Pensions. 29. Paris: OECD Publishing.

Estache A and Fay M (2007) *Current Debates on Infrastructure Policy*. World Bank Policy Research Working Paper Series. Washington DC: World Bank.

Flyvbjerg B (2007) Policy and planning for large-infrastructure projects: problems, causes, cures. *Environment and Planning B: Planning and Design*. 34(4): 578-595.

Gil N and Beckman P (2009) Infrastructure meets Business. *California Management Review*. 51(2): 6-29.

Glykou I and Pitelis C (2011) On the political economy of the state, the public-private nexus and industrial policy. *Policy Studies*. 32(4): 461-478

Graham S and Marvin S. (2001) *Splintering Urbanism. Networked Infrastructures, Technological Mobilities and the Urban Condition*. London: Routledge.

Hall J, Henriques J, Hickford A and Nicholls R (2012) *A Fast Track Analysis of strategies for infrastructure provision in Great Britain: Technical report*. Report, Environmental Change Institute, University of Oxford, UK, October.

Hammerli B, Renda, A, 2010, Protecting critical infrastructure in the EU, CEPS Task Force Report. Report, Centre for European Policy Studies, Brussels, Belgium.

Hare P (2013) PPP and PFI: the political economy of building public infrastructure and delivering services. *Oxford Review of Economic Policy* 29(1): 95-11

Helm D (2009) Infrastructure investment, the cost of capital, and regulation: an assessment. *Oxford Review of Economic Policy* 25(3): 307-326.

Helm D (2011) The sustainable borders of the state. *Oxford Review of Economic Policy*. 27(4): 517–535

Helm D (2013) British infrastructure policy and the gradual return of the state. *Oxford Review of Economic Policy*. 29(2): 287–306

Helm D, Wardlaw J and Caldecott B (2009), Delivering a 21st Century Infrastructure for Britain. Report, Policy Exchange UK. June.

Hokstad P, Utne I and Vatn J (2012). *Risk and Interdependencies in Critical Infrastructures: A Guideline for Analysis*. London: Springer.

Institute for Civil Engineers (ICE) (2014), State of the Nation. Report, Institute for Civil Engineers, UK, September.

Intelligence and Security Committee (ISC)(2013) Foreign involvement in the Critical National Infrastructure: The implications for national security, Report, House of Commons, Cm 8629, UK, June.

Kee J and Forrer J (2008) Private finance initiative—The theory behind practice. *International Journal of Public Administration*, 31(2): 151-167.

Kwak Y, Chih Y and Ibbs C (2009) Towards a comprehensive understanding of public private partnerships for infrastructure development . *California Management Review*, 51(2): 51-78.

Majone G (1997) From the Positive to the Regulatory State: Causes and Consequences of Changes in the Mode of Governance. *Journal of Public Policy*, 17(2): 139-67.

Mann M (1984) The autonomous power of the state: its origins, mechanisms and results. *European Journal of Sociology* 25(2): 185-213.

Massey D, 1993, "Power-geometry and a progressive sense of place", In *Mapping the Futures: Local Cultures, Global Ed.* Bird J, Curtis B, Putnam T, Robertson G, Tickner L (eds) *Change*, (Routledge, London) pp. 59–69.

National Audit Office (NAO) (2010) *Financing PFI projects in the credit crisis and the Treasury's response*. Report by the Comptroller and auditor General, HC 287 Session 2010–2011 UK. November.

National Audit Office (NAO) (2011) *Lessons from PFI and Other Projects*, Report, National Audit Office, London, UK, November.

National Audit Office (NAO) (2013)a, *The rural broadband programme*. Report, National Audit Office, UK, November.

National Audit Office (NAO) (2013)b *Planning for economic Infrastructure*. Report, National Audit Office, UK, October.

National Audit Office (NAO) (2015) The Choice of finance for capital investment. Report, National Audit Office, UK, June.

Niskanen W (1991) The soft infrastructure of a market economy. *Cato Journal*, 11(2), 233-238

Organization for Economic Co-operation and Development (OECD) (2007)a. *Infrastructure to 2030 (Vol. 1): Telecom, Land Transport, Water and Electricity*”, OECD International Futures Programme, Paris: OECD.

Organization for Economic Co-operation and Development (OECD) (2007)b, *Infrastructure to 2030 (Vol.2): Mapping Policy for Electricity, Water and Transport*. OECD International Futures Programme. Paris: OECD.

Organization for Economic Co-operation and Development (OECD) (2008) *Protection of ‘Critical Infrastructure’ and the role of Investment Policies Relating to National Security*. Paris: OECD.

Organization for Economic Co-operation and Development (OECD) (2015) Economic Survey of the UK 2015, OECD, Paris.

Office of Gas and Electricity Markets (Ofgem) (2014) State of the Market Assessment. Report, Office of Gas and Electricity Markets, UK, April.

Office of Fair Trading (OFT)(2010) Infrastructure Ownership and Control Stock Take. Report, OFT 1290, London, UK.

Orr R and Kennedy J (2008) Highlights of recent trends in global infrastructure: new players and revised game rules, *Transnational Corporations*, 17 (1): 99-130.

Ostrom E (2010) Beyond markets and states: polycentric governance of complex economic systems. *The American economic review*. (June): 641-672.

Pisu M, Pels B, and Bottini N. (2015) Improving Infrastructure in the United Kingdom , OECD Working Paper, ECO/WP(2015)62

Public Accounts Committee (PAC)(2014) Infrastructure Investment: the impact on consumer bills, Report, Public Accounts Committee, HC 406, UK, April.

Rinaldi S, Peerenboom J and Kelly T (2002) Identifying, Understanding and Analyzing Critical Infrastructure Interdependencies. *IEEE Control System Magazine*. (21): 11-25.

Stern J (2014), The British utility regulation model: Its recent history and future prospects. *Utilities Policy* (31): 162–172

Strange S. (1996) *The Retreat of the State: The Diffusion of Power in the World Economy*. By. Cambridge: Cambridge University Press

Stubb W and Cocklin C (2008) Conceptualizing a “sustainability business model”. *Organization & Environment*, 21(2);,103-127.

Taylor P (1994) The State as Container: Territoriality in the Modern World- System. *Progress in Human Geography*. 18(3): 151—62

The Infrastructure Forum (TIF) (2012) A Vision for UK Infrastructure’ , Report, The Infrastructure Forum, UK, June.

Her Majesty’s Treasury (HMT) (2010)a, *Infrastructure cost review*. London HM Treasury.

Her Majesty’s Treasury (HMT) (2010)b *National Infrastructure Plan 2010*. London: HM Treasury.

Her Majesty’s Treasury (HMT) (2011) *National Infrastructure Plan 2011*. London: HM Treasury.

Her Majesty’s Treasury (HMT) (2012) *National Infrastructure Plan Update*. London: HM Treasury.

Her Majesty’s Treasury (HMT)(2013) *Investing in Britain’s Future’*, Cm 8669, London: The Stationary Office.

HMT/IPA (2016) National Infrastructure Delivery Plan’ March 2016

.

UK Trade and Industry Office (UKTI), 2014, *'UK Inward Investment Report 2013/14'*,

London: UK Trade and Industry Office.

Weber B and Alfen H (2010) *Infrastructure as an asset class: Investment Strategies, Project Finance and PPP*. Chichester: Wiley.

World Economic Forum (WEF) (2015) *'Global Competitiveness Report, 2014-2015,*

www.wef.org