CHAPTER 12

A COLLECTIVE-ACTION PERSPECTIVE ON THE PLANNING OF MEGAPROJECTS

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12.1 Introduction

Prevailing perceptions that capital-intensive developments of long-lived infrastructure such as railways, airports, and recreation facilities such as Olympic parks—so-called megaprojects—underperform have fueled two views. One view claims that promoters underestimate cost and schedule targets because of strategic misrepresentation and optimism bias (Wachs 1989; Flyvbjerg et al. 2003), lack of planning (Merrow et al. 1988; Morris 1994), or the use of rigid buyer–supplier contracts (Stinchcombe and Heimer 1985). Another view is common too—that megaprojects cannot be planned because the promoters are hostage to scope creep (Hall 1982; Shapiro and Lorenz 2000), escalation of commitment to losing courses of action (Ross and Staw 1986), and external events that they do not control (Altshuler and Luberoff 2003; Szyliowicz and Goetz 1995; Miller and Lessard 2000).

This chapter aims to move the debate forward using a collective action perspective. We argue that megaprojects are vast actor-networks formed to develop a new large-scale designed artefact: the infrastructure system. We also argue that high-order decision-making within these neworks is driven by the need to build interorganizational consensus at the core of the network. Consensus refers to the degree to which the collective goals and plans are agreed upon by all involved (Van de Ven 1976). The need to strike a consensus on high-order development decisions results from the distribution of the direct control over the independent resources that are critical to develop the new infrastructure, including land, finance, planning consent, political support, and knowledge

of needs-in-use. The promoter of the megaproject can expect resource-rich actors to volunteer their resources only if the promoter shares the rights to directly influence high-order development decisions. Hence the development process is, perforce, consensus-oriented. As a result, the searches for mutually acceptable design solutions are ridden with interorganizational controversies. In other words, the core of the megaproject network, where high-order development decisions take place, is a consensus-oriented collective action or "pluralistic" setting (Denis et al. 2011).

In these settings, managers cannot rely on authority hierarchies (March and Simon 1958), markets (Ouchi 1980), or system integrators (Brusoni et al. 2001) to get things done. Rather, when authority to make interdependent decisions is distributed across legally independent actors, and thus the governance structure is relatively "flat," top managers must attend to the concerns of different actors so as to preserve a democratic decision-making process (Rothschild and Russell 1986). In other words, top managers have agency but cannot exercise it fully and must negotiate (Pfeffer and Salancik 1978).

The difficulties in reaching consensus when planning a megaproject are exacerbated because the planning decisions impair property rights under ambiguous pay-offs. Megaproject networks thus do not meet the known antecedents of cooperation, including a history of positive working relationships and mutual trust, a unifying higher-order goal, and the presence of a legitimate convener to draw together autonomous actors (Gray 1989; Ring and Van de Ven 1992; Thomson and Perry 2006). Another factor that makes it hard to strike consensus is the scarcity of resources to resolve disputes due to rigid deadlines and tight budgets. Complicating matters, the actor-networks formed to plan megaprojects are highly institutionalized and interdependent with the environment; as Rittel and Webber (1973) put it, "planning problems are wicked problems." And yet, the participants in a megaproject network need to be governed and action needs to be coordinated to achieve a system goal. Hence the two core research questions motivating this study are: i) what is the structure governing the planning stage of a megaproject?; and ii) what coordination mechanisms are available to carry the participating actors along and thus to sustain the planning stage?

This research adopts a multiple case-study approach with embedded units of analysis (Eisenhardt 1989; Yin 1984). Case studies allow researchers to incorporate contextual and temporal dimensions, and thus are suitable to explore novel ideas (Eisenhardt and Graebner 2007). The research site consists of four megaprojects in the UK—a pluralistic society with a strong regime of property rights and institutionalized mechanisms to enable any actor to contest the promoter's plans for a new infrastructure. The units of analysis are controversies between the megaproject promoter and resource-rich actors unified by the system goal.

The analysis reveals that the source of the interorganizational controversies is a conflation of three factors: i) differing preferences for one-off planning decisions; ii) scarcity of resources to resolve conflict; and iii) the promoter's reluctance to let the performance targets slip to preserve legitimacy to operate in the eyes of third parties. The juxtaposition of cooperation efforts with tough bargaining and political activity creates a real risk of actors defecting. This in turn leads to inefficient processes and ambiguous outcomes.

The central contribution of this study is a model that proposes how the interplay between the four mechanisms to coordinate cation sustain the highly fragile developments.

The rest of this chapter is organized as follows. First, it reviews literature on consensus-oriented developments. Then it introduces the research methods and the analysis. It concludes with a discussion that puts the sustainability of a highly fragile consensus-oriented community of production at the center of the performance debate on megaprojects.

12.2 Background: Consensus-Oriented Developments

Interorganizational collaborations are central to management scholarship because they are critical to find solutions to complex problems wherein a single actor does not have all the information-processing capacity and resources to solve the problem (Van de Ven 1976; Gray 1989). One stream within this large body of literature relates to consensus-oriented developments of new products. This literature is informed by studies of communities of production that emerge voluntarily to produce open-source software and science. In these settings, known coordination mechanisms include boundary organizations (O'Mahony and Bechky 2008), boundary infrastructures such as models, prototypes, working groups (Tuertscher et al. 2014), and meritocracy-based authorities (O'Mahony and Ferraro 2007).

The planning stage of a new megaproject differs, however, from the aforementioned settings in important ways, and thus create opportunities for advancing organization and management theory. First, goal congruence among the claimants to planning decisions is dubious. The institutional environment forces the promoter to work with actors fully supportive of the goal, as well as with actors who demand a high price for their cooperation. This in turn rules out the use of meritocracy-based authorities to resolve emerging disputes.

A second factor complicating the emergence of norms of cooperation is time pressure dictated by electoral and regulatory cycles.[1] Consensus building cannot be rushed, as holding lengthy talks is necessary to allow actors to make sense of complex problems and communicate to coordinate collective action. Hence time pressure amplifies risk perceptions and leads to bargaining and political activity (Ring and Van de Ven 1992; Gersick 1994).

Finally, large infrastructure developments cannot rely on modular design structures to circumvent difficulties in striking a consensus. Modularity reduces interdependency between design choices, which attenuates rilvary, encourages voluntary contributions of resources, and limits the impact of uncooperative behaviour (Baldwin and Clark 2000; Baldwin and von Hippel 2011). In contrast, when many independent actors share a right to directly influence the development of an *indivisible* asset, the design choices qualify

as an Ostrom's (1990) shared resource; that is, they juxtapose low excludability (of participation in the decision-making process) with high rivalry (of preferences for the decision) (Gil and Baldwin 2013). Hence the risk is high that a collective development of an indivisible asset unravels if some of the claimants to planning decisions opt to free ride by refusing to compromise and cooperate.

Difficulties notwithstanding, large consensus-oriented collective action arenas can be sustainable if the governance structure is i) polycentric—that is, decentralized across multiple centers of decision making and power with capacity for mutual adjustment—and ii) robust for high-level authorities to respect local rule and for local claimants to respect high-level rules. This is the central argument in Ostrom's (1990) theory of self-governing natural shared resources, such as forestries and fisheries. Gil and Baldwin (2013) extend this argument to collective developments of capital-intensive assets for shared use. They do so through a study of a capital program to develop a fleet of state school buildings with limited resources (time, money) and multiple claimants (national and local governments, school teachers).

Developments of school buildings are, however, capital projects with benign goals which are amenable to unify hetereogenous actors. In contrast, megaprojects are capital-intensive enterprises with controversial and ambiguous system goals. And yet, the control of the resources necessary to achieve the goal is invariably distributed across independent actors. Whilst these actors have hetereogeneous preferences and interests, they are unlikely to commit their resources unless they directly influence the planning decisions.

Complicating matters, megaprojects are hard to fully decompose. For example, a railway includes tracks, rolling stock, and stations; likewise, an airport includes concourses, runways, and walkways. These components are technologically coupled and draw finance from a central budget. Hence the decisions to plan each component are interdependent. Planning a megaproject thus involves building concurrently multiple interdependent consensuses albeit limited goal congruence. As local controversies surface when planning for one component, pressure mounts to relax local performance targets for that component. Because local slippages set tricky precedents and threaten global targets, governing bodies face a catch-22 situation: if they govern by diktat, the risk of defection rises, whereas too much decentralization creates a risk of things spiraling out of control. This tension leads to what I term "highly fragile developments," and I turn now to discuss their sustainability.

12.3 Research Design, Sample, and Methods

This research uses a comparative case study design (Eisenhardt 1989) in which cases are treated as independent experiments that confirm or disconfirm emerging theoretical insights in replication logic. To advance theory and yield more generalizable and

robust insights (Yin 1984) I built a diverse and polarized sample as recommended for process-focused inductive studies (Siggelkow 2007). The sample includes four mega-projects: Heathrow airport's terminal two (T2); London Crossrail, a high-capacity underground railway; London 2012 Olympic park; and the UK's second high-speed railway (HS2). These cases are summarizsed in Table 12.1.

This sample allowed varying three fundamental attributes of the development process for a capital-intensive infrastructure. First, the cases differ in the level of technological decomposability of the infrastructure system. Figure 12.1 illustrates this in a stylized way.

An Olympic park is suggestive of a large decomposable system from a technological perspective. It comprises a set of stand-alone venues including a stadium, a pool, and a velodrome. Connecting the assets to one another are underground utilities. But the utility systems are "slaves" designed to pick up the effects of changes to the high-value venues.

In contrast, the technological structure of a railway system is far less decomposable. All stations connect to the same high-value functional components (tracks, control, and signaling systems), and must accommodate the same train cars. In turn, an airport suggests a hybrid technological system. Some components are physically integrated—for example, the tunnels that connect concourses—but other components, such as the car park and hotel, are not.

The sample also varies in the structure of participation of the planning process. The HS2 scheme is entirely publicly financed. Hence high-level development decisions mainly involve the central and local governments and public agencies that own interdependent assets. In contrast, Heathrow T2 is wholly financed by its private owner, BAA.[2] But as a monopolist, BAA must share the right to develop the new terminal with the regulator, and the main user in this case STAR Alliance, a global network of airlines. The other two cases involve public and private finance. The higher the number of claimants to the planninf decisions, and the more diversified they were, the more difficulties we could expect in reaching consensus.

Third, the sample varies in the extent to which tight deadlines constrained the planning process and thus the development decisions. The London 2012 immovable deadline exerted massive pressure to make decisions. The other schemes faced no immovable deadlines, but pressure was still high, whether due to politicians' will to see things done before general elections (the cases of Crossrail and HS2 first phase) or due to the regulatory cycles in the case of BAA. Amplifying the pressure to make decisions was a history of three failed bids to win the Olympics contest and two failed attempts to get Crossrail off the ground.

12.3.1 Units of Analysis

The embedded units of analysis were incidences of salient controversies over high-level development decisions in the planning stage. Thirty-five controversies were cognitively filtered out by the respondents. Controversies trigger difficult questions. Should the parties search for a local design solution commensurate with the local performance targets set *ex ante*, or should they let the targets slip to facilitate the search for a consensual solution?

Table 12.1 High-level description of the sample of cases, interviewees, and archival database

Cases	London 2012	Heathrow T2	Crossrail	High-speed 2
Higher-order shared goal	Build an Olympic park and catalyze urban regeneration of east London	Build a new airport terminal for the STAR Alliance (STAR)	Connect east and west of London with a high-capacity train	Connect London to Birmingham (first phase); Birmingham to northern regions (second phase)
Key promoters	UK government; London governments; BOA; LOCOG‡	BAA, Regulator, STAR Alliance	UK government, London Government	UK Government
Time pressure during planning	Massive ~2 years (5–7) to totally redo planning after the victory of London's bid	High ~4 years (5–8) to plan before starting a new regulatory cycle (quinquennium)	High 4 years (1–5) to redo planning so as to start the Parliamentary process before the 2005 elections 2005–08 (Parliamentary process)	Massive (first phase) ~4 years (9–13) to plan so as to finish the Parliamentary process before 2015 elections Moderate (second phase) ~6–7 years to plan (2010–16/17)
Global target for the project budget	Gradually relaxed 2004, £4.2 billion (final prices, no VAT) 2007, £9.3 billion (final prices inc. VAT) 2013, £8.9–10.2 billion (different sources)	Gradually relaxed 2005, £1.0–1.5 biilion (possibly 2005 prices) 2008, £2.0 billion (07/08 prices) 2014, £2.6 billion (cash prices)*	Gradually relaxed 2002, £9.8 billion (2002 prices) 2008, £15.9 billion (final prices)† 2014, £14.8 billion (cash prices)	Gradually relaxed 2010, ~ £30 billion (2009 prices) 2012, £32.7 billion (2011 prices) 2014,£42.6 billion (2011prices) + HS3, Crossrail2
Global target for the project timescale	Immovable Summer 2012	Relaxed and made "soft" 2005, open in 2012 2010, open "gradually" in 2014	Relaxed and made "soft" 2003, fully open in 2016 2012, 2017–19	Under pressure 2026, first phase 2030-33, second phase
Interviews (Units of Analysis)	Thirty-six (eleven controversies)	Nineteen (five controversies)	Thirty-three (nine controversies)	Thirty-five (twelve controversies)

Number and description of organizations interviewed	Eight: London2012 (bid company); ODA (promoters' agent); LOCOG (games operator); OPLC (park operator); Transport for London (TfL); CLM (programme manager); Land Lease (private developer); Network Rail (owner of UK rail infrastructure)	Five: STAR Alliance; Air Canada; BAA; HETCo and Balfour Beatty (private design and build companies)	8: CLRL (promoters' planning agent);Crossrail, (promoters' delivery agent); Network Rail; UK Treasury; Transport for London (TfL);Canary Wharf (private funder); Bechtel, Transcend (consultants)	11: HS2 Ltd (promoter's agent); Manchester City Council (MCC); Greater London Authority (GLA); Transport for London (TfL); Borough of Camden; Transport for Greater Manchester (TfGM); Network Rail; UK Treasury; Manchester Airport; CH2MHill, AECOM (consultants)
Archival data: Total number of documents (except news articles) organized by categories	Total number of documents: 469 Strategy and planning documents: 260 Financial reports: 6 Formal communication: 5 Newsletters and PR documents: 111 Design documents: 16 Meeting minutes: 71	Total number of documents: 114 Strategy and planning documents: 74 Financial reports: 6 Formal communication: 19 Newsletters and PR documents: 8 Design documents: 4 Meeting minutes: 3	Total number of documents: 122 Strategy and planning documents: 74 Financial reports: 2 Formal communication: 6 Newsletters and PR documents: 23 Design documents: 9 Meeting minutes: 8	Total number of documents: 66 Strategy and planning documents:22 Financial reports: 2 Formal communication: 20 Newsletters and PR documents:12 Design documents: 8 Meeting minutes: 2

* Inflation in construction prices was nil between 2008 and 2013.

† £15.9. billion (final prices for a completion date around 2016) is about £11.1 billion at 2002 prices (assuming 3.5% discount factor).

‡ British Olympic Association (BOA); London Organizing Committee of the Olympic and Paralympic Games (LOCOG) and International Olympic Committee (IOC)'s watchdog.

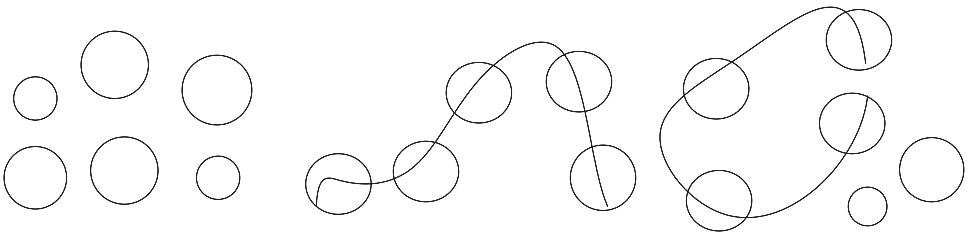

FIGURE 12.1 Stylized representation of different infrastructure design structures.

Should the planning process proceed if the claimants cannot converge? Which actors have legitimacy to influence the local development decisions? Seeking answers for these questions was essential to understand the governance of these developments in the planning stage. The HS2 case allowed gathering data concurrently with the ongoing planning efforts.

12.3.2 Data Collection

Data collection started in 2011 when I obtained access to the top management team (chairman, chief executive, and seven executive directors) of the Olympic Delivery Authority (ODA)—the public agency established to develop the Olympic park in 2005. This team reported to a top governing body formed by a four-party coalition: the national and London governments, the British Olympic Association (BOA), and LOCOG, the operator of the games and the International Olympic Committee (IOC) watchdog. The ODA attended the Olympic board meetings but had no power of veto.

Between 2011 and 2014 I leveraged the access granted to the ODA to, first, access top managers of other development partners for the Olympic park, and second, to negotiate access to the other schemes using the logic described previously. In a snowball fashion (Biernacki and Waldorf 1981), for all cases, I also interviewed directors of the suppliers contracted to produce a design, build, and manage the works.

In total, 121 formal interviews of up to two hours long were conducted by myself and doctoral students, and were tape-recorded. Non-disclosure agreements were not signed, but we always asked permission to use quotes and whether to keep the source anonymous. Some respondents gave us free rein to use the transcripts, whereas others occasionally asked us to stop the recorder and disallowed the use of particular quotes. Follow-up interviews were conducted to probe deeper into particular issues, double check a verbal account, and bridge gaps in the database.

To gather extra data and allow for member checks (Lincoln and Guba 1985) the emerging findings were shared with respondents, and a few were invited to give presentations and stay for lunch. We welcomed a total of thirteen guests, and for each visit produced detailed hand-recorded notes of the seminar talks and lunch conversations.

To improve the accuracy of our data and the robustness of the conceptual insights (Jick 1979), the verbal accounts were triangulated against archival sources (Miles and

Huberman 1994). The planning process for any large infrastructure is well institutionalized in the UK, and thus many planning documents are available online or become available through the Freedom of Information Act. Key documents included minutes of board meetings, formal communications, design change logs, and reports announcing performance targets and plans to achieve the goal. In the case of BAA, we examined annual corporate reports, master plans, and consultation documents. The controversies between BAA and STAR were documented in reports produced by the regulator and in letters between BAA, STAR, and the regulator.

Information on the internal project documents was played against reports produced by third parties. Hence we combed through reports produced by the National Audits Office, Parliamentary committees, government watchdogs, and other third parties. Other sources of data were articles and interviews with top managers in professional outlets, such as *New Civil Engineer, Construction News*, and articles in the national press, particularly for controversies that had fallen in the public domain.

12.3.3 Methods

I took a processual approach to theorization (Langley 1999) guided by the core question: how to sustain a fragile, consensus-oriented development. Subsidiary questions included: what is the governance structure?; where do interorganizational controversies come from?; and how are they resolved? Following recommendations for inductive reasoning (Ketokivi and Mantere 2010), factual accounts were produced that provide a contextualized and chronologic understanding and guard against account bias (Miles and Huberman 1994) and tendencies for revisionism and self-aggrandizement (March and Sutton 1997).[3]

To first shed light on the governance structure I used Design Structure Matrices (DSMs)—a tool from design theory that allows representing a complex system into a square matrix by capturing interdependencies between its constituent elements (Steward 1981). The cells along the diagonal of the DSMs represent high-order planning decisions (the names of the decisions are listed to the left of the rows to keep the matrix compact), whereas off-diagonal entries indicate the presence of interdependency between decisions. If the DSM has an entry in row i, column j, the decision concerning element i has a direct impact on the decision concerning element j. Hence the decisions represented in the diagonal cells have inputs entering from the top and bottom decisions, and outputs leaving from the left and right sides.

DSMs have been used to model the task structure to produce a detailed design but not the structure of the planning process or a capital-intensive development, and thus an original protocol for the content of the DSMs was required. The aim of the exercise was not, however, to exhaustively model the planning process. Rather, it was to investigate the structure governing the high-level decisions. Hence, for the components that lodged the sampled controversies, the DSMs capture the interdependencies between decisions on the local goal, budget, and key requirements directly impacted by the controversy, including capacity, footprint, and relevant subelements. For each DSM a companion matrix illustrates which actors directly influence the decisions and the forums where the issues are discussed.

The DSM analysis cannot, however, reveal how the issues are actually settled. Thus the DSM analysis was complemented with a qualitative analysis of the raw data using coding and tabular displays (Strauss and Corbin 1990). As I iterated between i) reviewing transcripts and extracting quotes or "thought units" (Miles and Huberman 1994), ii) using secondary data to verify the interview data, and iii) developing the argument, I gradually discerned a high-level pattern to resolve interorganizational the controversies. I stopped iterating between data and theory when theoretical saturation was reached.

I proceed next to analyze the data before discussing the conceptual framework. Figure 12.2 illustrates the DSM and organizational matrices for two cases, whereas Table 12.2 illustrates a tabular display produced to analyze how controversies were resolved.

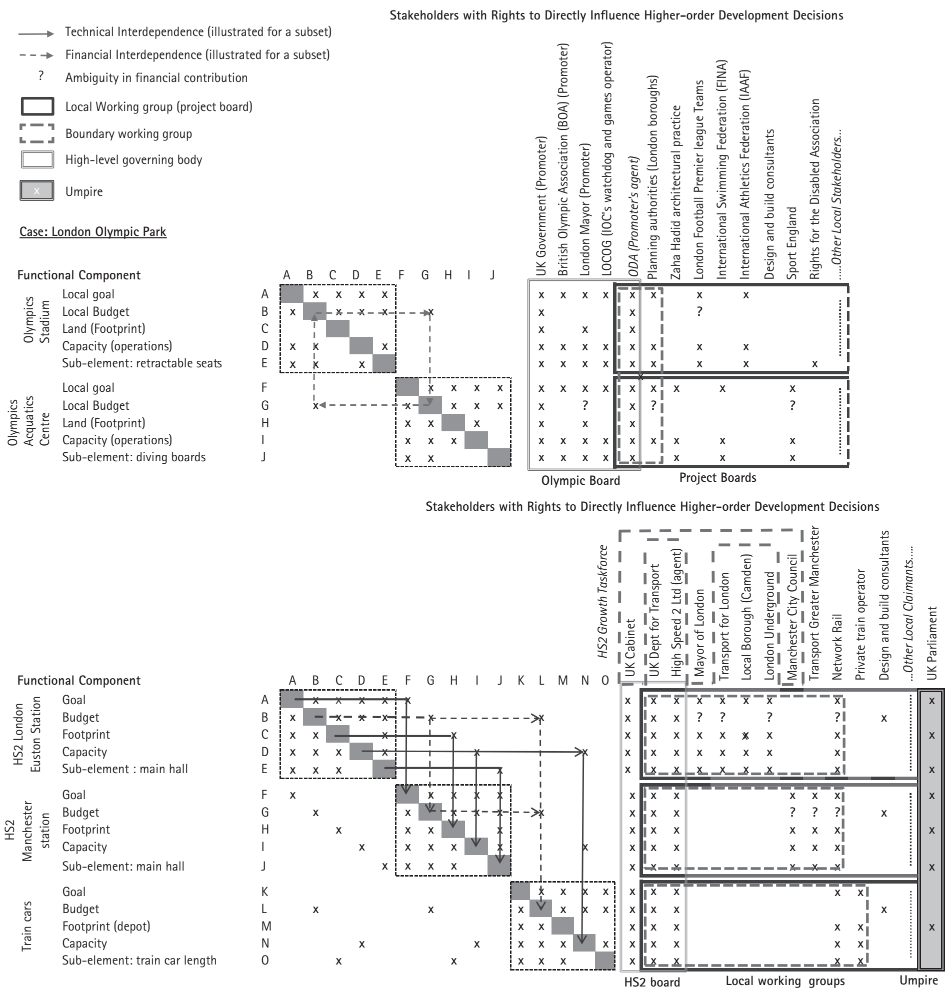

FIGURE 12.2 Excerpts of the design structure matrices and companion organizational matrices for the London Olympic Park and HS2 cases.

Table 12.2 Excerpt of tabular display analysing: Quality of the development environment and mechanisms used to resolve controversies

Case	Quality of the collaborative environment	Embedded controversy		Resolving the controversies: Quality of the negotiation talks	Locus of resolution	Problem solving	Design flexibility	Loosening targets
London Olympic Park	Plenty of evidence of intent to collaborate effectively; listen to stakeholders. A lot of it was listening to the communities, the grassroots…! Don't think anyone felt there was a hierarchy, there was a very healthy egalitarian challenge [ODA Official]. Reciprocity, I've never pushed to get that [need for greater flexiblity] changed or to bypass that because I know exactly what is to sit in their chair [LOCOG Official]. Mutual trustThis noble culture—sitting down on regularly, open, honest non-judgmental relationships, if something isn't going well stick it on the table—I think it's really important [ODA official].	Olympic station	Lack of goal congruence	Tough: no willingness to seek compromise. What's wrong with leaving an athletics center … Why do we have to publicly subside the richest clubs in the world? Why? It's public land … it costs a fortune to accommodate … Don't renege on your responsibility to public sport[ODA official].	Top governing bodyWe went back to the Board 3 times..there were no credible [football club] bids-full stop [ODA official]	Mutual compromised under time pressureWe needed to move ODA official]	YesFoundations sized for worst-case scenario; retractable seats (in last round)	Yes04,£282m (04 prices) 07,£422m (cash prices exc. VAT) 13,£537m (cash prices exc. VAT) 14,~£600m (cash prices excl. VAT)
			Divergences over sub-element (lighting)	Tough: efforts to leverage power imbalances. Broadcasters come to the party quite late … and start saying things like we want this and that … in a scheme of £7 billion, the retrofitting isn't a big thing [LOCOG Official].	Top governing body. They [IOC] aren't paying the bill [ODA official].	Unilateral concessions. We're having to embark on a fairly expensive change [ODA official].	No need for UK to be seen as leading on broadcast technology.	
		Aquatics centre	Sharp divergences over capacity budget, footprint.	Tough: efforts to leverage power imbalances. There was a lot of pressure to keep to the original budget … the architects wouldn't compromise an inch … it [budget] wasn't their problem … they threatened to walk away … they could have parted company from us … and we parted company from them [ODA official].	Top governing body	Compromises and tough negotiation. Quid pro quos: for example, aesthetic stay, but venue must shrink to a third of original size.	Yes. Temporary 15,000 seats in modular wings.	Yes. 2004, £75 million (2004 prices), 2007, £182 million (cash price exc. VAT), 2013, £229 million (cash price exc. VAT).
			Divergences over sub-element (dividing boards)	Tough: no willingness to seek compromise. We [ODA] said we weren't going to change the diving boards … they [FINA] sent an architect to prove they wouldn't work … LOCOG was playing a political game telling FINA we can change … they (LOCOG) wouldn't stand up to FINA, but we would [ODA Official].	Top governing body	Tough negotiation. Claimant (Aquatics Federation–FINA) caves in after much haggling, and new evidence.	No. Why buy this [roof] and don't buy the diving boards? … I always saw it as a sculpture really [ODA official].	

(*Continued*)

Table 12.2 Continued

Case	Quality of the collaborative environment	Embedded controversy		Resolving the controversies: Quality of the negotiation talks	Locus of resolution	Problem solving	Design flexibility	Loosening targets
High-Speed 2	Plenty of evidence of intent to collaborate effectively; shared higher-level goal:the high-level priniciples, we've never had an issue with [TfL official] … while I support the Government's aspiration … the currect proposal is inadequate [London of May or] willingness to meet face-to-face. I'm very happy to sit down … want to reassure Manchester supports about the plan [HS2 top official]. Mutual respect. They've [HS2 Ltd] got an idea of what they want to see and we too … We're both respecting each other [Manchester Council official].	London Euston system	Lack of goal congruence, and sharp divergences over plans.	Tough: people carrying cards close to the chest. We've asked can they [HS2 Ltd] share the cost data with us … and they won't share that with us … doubtless, they don't want us to be able to prepare ourselves to counter that [LGA official]. The process has worked somewhat like tennis. They [HS2 Ltd] will send us a proposal. We review it, pass it back, they look at it, pass it back [TfL official].	Umpire (or late deal). We'll petition because the design as it stands is awful [and] potentially unsafe … it's not a failure to converge, just failure to agree with each other's visions [TfL official].	Ongoing negotiations. Original scheme was a fairy-godmother scheme [HS2 offical]. Once bill is submitted … there might be a story of we'd think about this a bit more if you drop that [LGA official].	Yes. We asked HS2 Ltd to make passive provision for Crossrail 2 … so we can easily plug it into the development.	Yes. 2011, £1.1 billion, 2014, £2.1 billion. The principle that suggests that all the works at Euston are on the HS2 credit card has been accepted [TfL official].
		Manchester St.	Goal congruence, but sharp divergences over plans.	Moderate: genuine effort to seek consensus. We're engaged with the work that they [HS2] might be doing around station design … they're engaged with us or the wider regeneration program … our objective is always to try get consensus [Council elected leader]. They took our involvement very seriously … it did feel like we were really part of the process [TfGM official].	Difficult to predict. We don't want to petition, we want to do it here (Council elected leader).	Ongoing negotiations. If government devolves tax return, the Council can consider to pay for investment [Council position].	Unlikely. They [HS2] came up with the option that it was one station next to another … we see one integrated multi-model transport hub [Council official].	Yes (inevitable). 2011, £350m. But Council argues it will increase benefits. We aren't an open cheque book [HS2 official].

12.4 Analysis

The analysis examines first the structure governing the high-level development decisions and then the sustainability of these highly fragile developments in the planning stage.

12.4.1 The Polycentric Structure Governing Megaproject Planning

Polycentricity is an intuitive approach to structure large arenas of consensus-oriented collective action. The idea is to decentralize governance across a nested structure of centers of decision-making and power and shared rules constraining and enabling action (Ostrom 1990, 2005). In agreement with this literature the DSM analysis reveals systematic efforts to decentralize governance. To substantiate this claim I use the cases of the Olympics and HS2, which vary substantially in the technologcal decomposability of the infrastructure system. I first examine the decision-making structure as revealed by the DSM analysis, and then the governance structure as revealed by the organization matrices.

The DSM matrices for the two cases both show densely populated clusters of off-diagonals “x”. These clusters show how the high-level development decisions for any particular component are closely interdependent to one another—a finding that is intuitive: the decision on the goal of a functional component whether it is a sports venue or a railway station is closely intertwined with the development decisions on the capital budget, the footprint (land needed), and the functional requirements for that component and vice versa.

As expected, the DSM matrices for the two cases differ in regards to the degree of interdependency across component clusters. In the case of the Olympics park, the high-level development decisions for one venue are independent of those decisions for another venue. Thus the Olympic park DSM is sparsely populated off the component clusters. The important exception is the interdependency between the local budget decisions, since increasing the capital budget for one venue potentially leaves less money available for the other venues. More interdependency exists between the components clusters in the HS2 case. First, the goals for each station need to be congruent; second, the budgets for the stations are also interdependent due to equitability concerns and global constraints; and third, system-wide technological constraints create interdependency between the decisions on the local requirements. Hence the HS2 DSM is densely populated off the component clusters.

However, the organizational matrices for the two cases are remarkably similar. In both cases, the matrices show a decomposed structure of local working groups (so-called project boards), each one restricted to produce a mutually consensul design solution for the component of interest. Project board membership is open to the resource-rich local actors,

including local governments and influential interest groups, but not to actors opposing the scheme or to resource-poor local actors (although consultation reaches all groups).

At the highest level, both organizational matrices show a top governing body restricted to the organizations that form the coalition of promoters; this governing body has direct influence over all the high-level development decisions. The omnipresence of the top governing body reflects the fact that the promoter of the project centrally controls the global targets (cost, schedule) that constrain all the local decisions. The agent of the promoter attends all the decision-making forums in a "boundary spanning" role (Tushman 1977).

Furthermore, both organizational matrices reveal middle-level decision-making forums created to help resolve the local issues. In the Olympics case, for example, a boundary organization was created, including the ODA, the executive agent of the coalition of promoters, and the four local governments with future jurisdiction over the Olympic park. The governance structure of the HS2 is also nested. Hence, in each city its leaders created boundary organizations open only to the officials of HS2 Ltd, the promoter's agent. And the promoter, the UK Government, in turn created another boundary group, the HS2 Growth Taskforce, which reached out to the elected leaders of all cities with city-centre stations.

12.4.2 Building Consensus

The analysis of the controversies reveals the difficulties in building local consensus within the design solution spaces constrained by the performance targets set *ex ante* of the collective development effort. The promoters' agent has a mandate to keep to the initial targets, whereas the local claimants insist that the budgets and/or timescales are too tight. This means that the top governing body has to constantly step in to resolve the issues with the local claimants.

The HS2 case is telling. The promoter and local claimants are unified by the goal of using the HS2 station developments to catalyze urban regeneration. But the local claimants argue that government is not supplying enough money to develop world-class stations integrated with public transit systems and the urban fabric. To make their case, the cities have commissioned masterplans. But under pressure to keep to the targets, HS2 Ltd recommended plans to government not fully endorsed by the cities. It was then up for Cabinet,[4] a level above, to decide the next move. One official explained: "HS2 Ltd, if you like, are the infantry out there; actually doing what they're told by [central] government. So HS2 Ltd get all the fights, appear to have all the fights, are the bad boys, but they're really only doing what they're instructed to do." Crucially, in all cases, the top governing bodies have less decision-making power than could be assumed *prima facie*. De jure, the promoters have power to impose a reasonable solution if a local group reaches impasse. But invariably the top governing bodies shy away from governing by diktat when local impasse surfaces. This was true for T2 ("if something gets talked, it gets changed," said a STAR person), and for the publicly financed schemes. Hence the

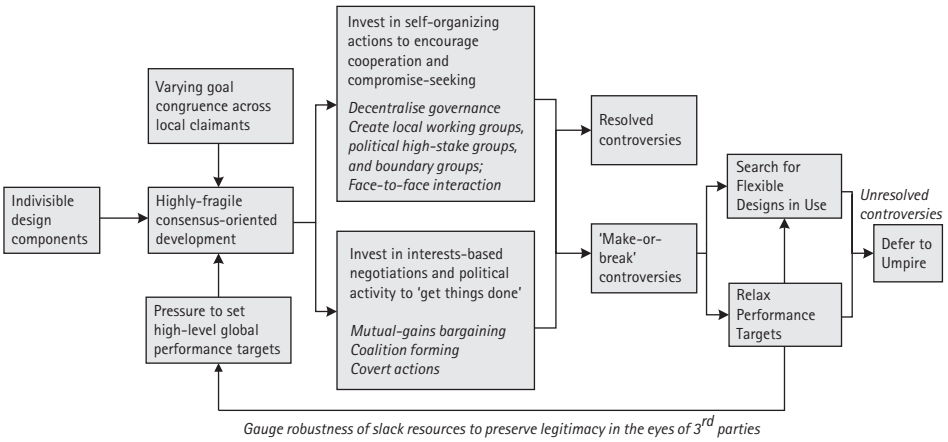

FIGURE 12.3 Sustaining highly fragile consensus-oriented developments.

search for possible solutions relies, on the one hand, on the willingness of all parties to compromise and reciprocate. On the other hand it involves multi-gains bargaining and political activity until the claimants succeed to cut out a deal.

The coexistence of deliberative processes and interest-based negotiations makes these developments highly fragile. I turn now to discuss a pattern of four high-level coordination mechanisms that emerged to sustain them. Figure 12.3 illustrates the emerging logic.

12.4.3 Relaxing Performance Targets

Megaprojects are capital-intensive enterprises. The goals are controversial and trigger much opposition from actors in the environment. Other actors may be unified by the goal, but still disagree over the best way to achieve the goal. The ensuing disputes between the promoter, opponents, and others create ambiguity in the value of forging ahead and uncertainty in requirements. To attenuate ambiguity, the promoters invariably make commitments to performance targets at the onset of the planning effort. One non-elected official said that

> they [politicians] love announcing projects … our guidance is "no matter what your press people say … don't be drawn towards providing a spot figure; it's foolish, you've just created a hostage to fortune to yourself."

The analysis confirms claims that promoters suffer from optimism bias (Flyvberg et al. 2003); as one respondent put it, "early on, people's eyes are much bigger than their stomachs."[5] As working groups struggle to reach consensus, the promoters push back on requests from local actors for relaxing the performance targets (cost, time). Promoters dislike slippages because they compromise equity and potentially compromise the

global targets. And yet, relaxing the performance targets is an invaluable mechanism to resolve the issues.

The Aquatics Centre is a good example. The budget was set at £75 million in 2004 prices—a figure insufficient to deliver an iconic venue. One year in planning, the budget had duplicated and continued on a rise. Unilateral attempts by the Olympic Delivery Authority (ODA) to bring the costs down infuriated local claimants who used political backchannels to force the ODA's hand. By 2008, a public outcry ensued after the budget spiraled to £242 million (final prices).

Throwing more resources into the "pot" (money, time, or both) relaxes the local solution space, but puts pressure on the global targets and affects the scheme's legitimacy in the eyes of the public. I turn now to analyze the value of buffers to mitigate the risk.

12.4.4 Global Buffers

Compiling registers of foreseeable events that can potentially cause overruns of the planning targets is an established practice (Cleland and King 1983). Once the potential impacts of the risky events are identified, simulations enable quantification of the best-case and worst-case scenarios at the onset of planning. The top governing body then faces a judgment call: either they set optimistic performance targets to increase the scheme attractiveness, or set more conservative targets that warrant more certainty to the targets. One respondent said:

> There's a bandwidth there … if we push it [the budget] too far, we won't get the project at all … so there's that game that goes on to try and find what the [UK] Treasury's real limits are, and how far can we really push it … it's a political decision.

In the T2 case, for example, BAA ruled out the use of large buffers, confident in the firm's ability to neutralize the public backlash caused by any cost or schedule overruns during planning and later on in delivery. And indeed, both targets slipped multiple times during the development life cycle. In contrast, in the other cases, the elected leaders had no appetite to let the public see the performance targets slipping multiple times. The London 2012 case is a good example. The £4-billion[6] budget (final prices, no VAT) in the bid was wholly insufficient to leave a sustainable legacy. Complicating matters was uncertainty in the design requirements that could only be resolved after the 2008 Olympic games. But by mid-2006, public pressure mounted to re-fix the budget, and the Cabinet settled on a large buffer (£2.7 billion) on top of a £6.5-billion budget (final prices with VAT). One official said:

> Treasury were really, really clear … big envelope and never knock on our door for money … actually they were right … we were then able to make decisions … rather than being petrified because we didn't have enough money to do what we needed to do.

However, large buffers do not outrightly eliminate conflict. The findings show that promoters scrutinize the use of contingencies to mitigate the risk of running out of slack in the last stages of project delivery. Hence the decision-making process in planning still unfolds constrained by tight targets, especially when the promoter is reluctant to let another slippage occur. This does not mean that the promoter can succeed in avoiding self-fulfilling prophecies: London 2012 exhausted its contingency by the end of the delivery, and Crossrail follows the same path (NAO 2014). I turn now to discussion of the role of flexible design structures.

12.4.5 Flexible Design Structures

Modular design structures are the backbone of communities of production that rely on voluntary contributions of resources to achieve a collective goal (Baldwin and von Hippel 2011). But modularity costs time and money to achieve. It is also less complicated to develop modular digital systems than large physical infrastructure. Flexibility in integral physical assets can nonetheless be built in through investments in safeguards, such as redundancies. As a limited form of flexibility, investments in safeguards are bound to be controversial (Gil 2007; Gil and Tether 2011). Still, the analysis shows that many controversies in the sample were resolved after the performance targets were relaxed to safeguard integral designs.

The case of the Olympics Aquatics Centre is telling. The bid proposed a massive venue with a wave-shaped roof. But as said, the cost forecasts quickly spiraled as the collective planning unfolded. To back down from the bid pledge was tricky, since the design concept had received worldwide acclaim. Complicating matters was a hard constraint on the minimum capacity of the venue. In the end the dispute was settled by using a safeguarded design, which consisted of building a small venue faithful to the original aesthetics and adding temporary modules to raise the capacity from 2,500 to 17,500 seats for the games.

The case of the Olympic stadium, in turn, illustrates the difficulties in negotiating flexible designs. From the onset of the planning stage the top governing body was divided over whether the stadium in legacy should host a football club or an athletics events. A football stadium was more viable in legacy, but would renege on the bid pledge. The alternative was to invest 20% more money into a dual-purpose venue with retractable seating. But football aficionados pushed back, calling it a "jack-of-all-trades." With time running out, the ODA proposed and the Olympic board endorsed a decision to forge ahead with a rigid design structure. The infighting between the dissenting parties continued until 2013, when an agreement was finally reached to invest £131 million to add retractable seating.[7]

In other incidences of controversies, an external party became involved in problem-solving— the mechanism discussed in the next section.

12.4.6 Arbitrating and Refereeing Disputes

In sports, an "umpire" is a person who acts as a referee and settles disputes between players competing to win. In planning megaprojects, autonomous actors also strive to win fights over the decisions that wil define the design. It turns out that the presence of a structure of nested umpires can put an end to emerging controversies that the claimants failed to self-resolve. Umpires can exist at different institutional levels. Some referees exist outside the project arena, whereas others can be a middle- or lower-level independent body created internally.

In the cases of Crossrail and HS2, the UK Parliament played the role of outside powerful referee. Every actor materially impacted by the plans was entitled to petition against the planning decisions of the promoter. Petitioners ranged from individuals and businesses unhappy with the outcome of the consultation, to resource-rich actors who shared the higher-order goal. These actors had in common disenchantment with the promoter's final plans, and trusted on Parliament to help them extract more concessions. One official said:

> HS2 didn't persuade us that our points were wrong nor did they persuade us that their points were right … [Petitioning] gives us the ability to correct what we feel is a mistake … that's ultimately about making your case that your vision is superior.

In the case of Heathrow T2, in turn, the industry regulator—an actor closer to the development process—played the role of umpire. The presence of the regulator was reassuring for both parties. As one BAA respondent said, "we're battling all the time … if the airlines don't like it, then they can bring in a formal dispute." And indeed, the airlines wrote several letters to the regulator complaining that the BAA was ignoring their needs—a claim which BAA contested. "Our job is to consult, not to get consensus … I can never get consensus on almost anything," said the BAA capital director. A level below, BAA recruited a retired director to play the role of arbitrator—the body which ruled that the design of T2 should allow for open and close gates at an additional cost for BAA of £4 million.

The presence of umpires brings advantages and disadvantages. Umpires resolve issues that deliberation and negotiation processes fail to resolve. But resorting to umpires is a source of late cycles of deliberation and knowledge creation that can lead to slippages in the performance targets, and is thus a source of much uncertainty in requirements during the planning process. The presence of umpires also fuels a lot of positional bargaining.

The Olympics case is the exception in that there was no powerful outside referee, since Parliament rushed to give the promoter planning powers immediately after London won the contest. To arbitrate emerging issues, the promoter set up an internal board with the local governments that had lost planning powers. But a level above there was no umpire. "You've got powerful figures all over the place … you can't govern," said one

official (Norris et al. 2013). Facing a hard deadline, substantive slippages in the cost forecasts ensued.

In summary, a megaproject creates a large consensus-oriented collective action problem that is partially decomposable in different subproblems that matter to different local actors. I identify four high-level mechanisms to keep the development organization afloat. Slippages of targets facilitate local searches. Global buffers mask slippages. And flexible designs neutralize local conflict. Taken together, these mechanisms resolve most controversies. But there are limits to the amount and number of times that resources can be thrown in the pot to resolve controversies. Hence, as a safety net, unresolved issues can be deferred to an umpire.

12.5 Discussion

I return now to the central question of how to sustain the highly fragile organizations formed to plan a capital-intensive infrastructure. In consensus-oriented developments, top management cannot unilaterally choose which decisions and tasks they centralize at the top versus delegate to lower levels, and no "heavyweight managers" (Clark and Fujimoto 1991) exist empowered to overthrow local decisions. However, top management cannot also work as a "rubberstamping hierarchy" (Rivkin and Siggelkow 2003) because only they have direct centralized control over the high-level resources that constrain all the local searches.

Polycentric governance attenuates the management complexity by limiting the membership of the local working group to the promoter and the local actors directly impacted by the solution to the local problem. Still, even in infrastructure systems that are technologically decomposable the subproblems remain interdependent because of the global performance targets set unilaterally by the promoter at the onset of the planning process. As local groups tend to optimize locally due to self-interest (Knudsen and Levinthal 2007), pressure mounts to relax the local performance targets during planning. This creates a conundrum for the promoter's top management: if the promoter adheres to the performance targets it set upfront, it increases the risk of defection from the organization and of loss of critical resources during planning. In turn, if the promoter relaxes the local targets it threatens the legitimacy of the development in the eyes of the public and other third parties.

12.5.1 Relaxing Performance Targets and Flexible Designs

I discuss these two mechanisms together, as slippages in the performance targets were also a prerequisite to produce flexible design structures. Slippages in the performance targets "inject oxygen" that is critical to sustain a highly fragile development. If the initial targets turn out unrealistic as planning unfolds, and promoters would still adhere to

them, the local problems would remain intractable. In other cases, relaxing the performance targets is a prerequisite to allow for a risk-neutral flexible design solution with higher expected benefits for everyone.

Given that slippages in targets impair public legitimacy and fuel accusations of strategic misrepresentation, it is then reasonable to ask why the promoters make rigid commitments up front. Not doing so certainly sounds noble. But as Stone and Brush (1996) argue, when organizations plan in ambiguous contexts, the need to meet premature calls for commitments is a prerequisite to develop the legitimacy necessary to acquire the resources without which the plans cannot forge ahead. Put differently, the commitments up front (assuming that they are true to what bounded rational actors know at the time) dampen the ambiguity surrounding the value proposition and facilitate the ensuing resource acquisition process. Once the resources are acquired, a consensus-oriented search for local solutions ensues within a solution space constrained by those commitments. And yet, the analysis shows that it is hard to predict the outcome of consensus-oriented discussions when the decisions are long-lived and thus the stakes are high. Hence the initial commitments frequently turn out overly optimistic.

These insights suggest a need for a more nuanced conceptualization of performance in the context of the consensus-oriented arenas formed for megaproject planning. In extant studies of communities of production, homogeneity of logics and modularity dampen rilvary in the design preferences. This attenuates interorganizational conflict and the need for cooperative behavior. The problem is then one of coordinating work, and performance evaluation revolves around the efficiency of the process and the effectiveness of the solution. In contrast, if the consensus-oriented development is highly fragile, the development process is bound to be inefficient, as local searches will require much iteration and time-consuming negotiations. Bargaining will also create winners and losers, and will therefore lead to ambiguity on ensuing evaluations of the effectiveness of the outcomes (Lundrigan et al. 2015).

If process inefficiency and ambiguous outcomes are endemic to a consensus-oriented enterprise, this suggests that we cannot take for granted that these enterprises are sustainable. It thus seems fair to accept that it is legitimate for the promoter to relax the performance targets when it becomes clear that those same targets are creating intractable subproblems. Legitimizing slippages in the performance targets does not excuse promoters from being obliged to try to do a better job when setting the initial targets. But from the point of view of the actors participating in these consensus-oriented developments and unified by the system goal, positive performance revolves around the capability of sustaining the organization.

Hence what is new here is not that throwing more resources into the pot eliminates interorganizational conflict, but how to interpret this action. An organizational perspective suggests that a slippage of the initial cost and schedule targets—if it is commensurate with evolution in requirements during a consensus-oriented search for a design solution—is a legitimate mechanism to resolve emerging controversies. Hence an action to relax the performance targets does not express incompetence or Machiavellian misrepresentation. If relaxing the targets is necessary to carry the resource-rich actors along,

this action results from optimism bias when the promoter unilaterally sets the targets up front. This optimism is not intended to masquerade dishonesty. Rather, it is rooted in a belief that it will not be that difficult for self-interested actors to figure out mutually consensual solutions for shared problems. This optimism in consensus-oriented collective action leads to fallibility in predicting the outcome of collective searches, as it skews the forecasting error towards underestimating the cost and time necessary to achieve consensus. But were it not for this same optimism bias, people would not even try to collectively resolve shared problems.

Crucially, the premise that a group of self-interested actors can self-organize to resolve a shared problem is not universal. Classical studies of collective action called for centralizing decision-making power in the hands of government or private firms (Hardin 1968; Olson 1965). Since then, scholars of consensus-oriented collective-action arenas have counterargued that there are reasons to be optimistic (Gray 1989; Ostrom 1990; Beck and Plowman 2014). Specifically in the world of consensus-oriented infrastructure developments, Gil and Baldwin (2013) show that if goal congruence is high, slippages in the performance targets are not a prerequisite to build consensus even if the initial solution space is constrained. In planning megaprojects, low goal congruence exerts more pressure to relax the performance targets. For the participants in the decision-making process, however, these slippages are a legitimate cost to pay for democratically resolving interorganizational conflict. The trick for the promoter is not to overuse this mechanism which, in the eyes of third parties, raises issues of accountability and undermines the promoter's legitimacy to use the resources.

The claim that the sustainability of a consensus-oriented development is per se a measure of performance is in agreement with extant literature in consensus-oriented collective action. These studies place the emphasis on the sustainability of shared resources and, as a corollary, on the sustainability of the self-organizing community that governs the resource (Ostrom 1990). A consensus-oriented development that is sustainable produces a final design that will fold into a physical artefact that the participating actors will happily to share in use. Therefore, in a consensus-oriented development, the shared resources are the design decisions "in-the-making." If the development process is sustainable this shared resource is sustainable too. But the form of this shared resource will later evolve from design decisions "in-the-making" into a physical artefact that independent actors share in use. This suggests that the community of design production is sustainable too. But it will evolve into a community in use.

12.5.2 Global Buffers

Built-in contingencies are buffers that create organizational slack—spare resources that allow an organization to adapt successfully to internal pressures for adjustment or external pressures for change (Bourgeois 1981). The effects of slack resources on how organizations perform are, however, contingent on the environment and the performance variable of interest (Voss et al. 2008). From an efficiency perspective, for example, Cyert

and March (1963) argue that slack reduces political activity and bargaining, because with more resources available there is less conflict. But Bourgeois (1981) notes that slack can also create opportunities for self-aggrandizing managers to engage in politics and sub-optimal behavior, and thus for self-fulfilling prophecies.

This study is inconclusive concerning whether global buffers are or are not a source of inefficiency, as we can only speculate about the outcomes had the buffers not been there. But in agreement with prior studies, the organizational slack created by the observed buffers was effective in facilitating local problem-solving. Indeed, many observed interoganizational controversies were resolved by letting the local performance targets slip. This would have been more difficult to do if management had no slack to absorb the slippages, and thus they would have no choice but to relax the publicly visible global performance targets.

Importantly, the slack created by global buffers is not a necessary mechanism to sustain a highly fragile development. The BAA case is a good example. This suggests a fundamental difference between private and publicly financed projects. Slippages in performance targets attract more public attention in the latter than in the former. This encourages elected leaders, their agents, and public policy to build in more slack resources in order to pre-empt bad news would the global resources not be enough to cope with the outcomes of consensus-oriented searches. Still there are limits to building slack, flexible designs, and letting the performance targets slip. This leads us to the role of structures empowered to settle disputes.

12.5.3 The Role of the Nested Umpires

In collective action literature the absence of affordable conflict-resolution bodies is a source of fragility in governance (Ostrom 1990). An absence of an independent arbitrator increases the risks of impasse, power battles, and political manoeuvring; but the presence of an alternative forum to resolve conflicts also potentially creates a negative precondition for the parties to self-resolve their differences (Reilly 2001). Thus the umpire is also a source of inefficiency. Untangling the pros and cons of an umpire is further complicated because it is a source of noise in the negotiations.

Bargaining tactics aside, the analysis shows that in the large consensus-oriented collective action arenas that the planning of megaprojects create, some controversies cannot simply be self-resolved in a reasonable amount of time. The umpire is therefore a pragmatic mechanism to reassure all dissenting organizations that they will not get stuck into stalemate if they cannot bridge the differences. The findings suggest that the umpires exist at different levels ranging from being a powerful outside referee imposed by the environment to a referee with power to settle disputes appointed by the participants of the planning process.

The need for internal umpires is in agreement with Ostrom's (1990) principle of robust governance that posits a need for affordable conflict-resolution mechanisms. More intriguing is the need for outside referees to sustain these consensus-oriented

arenas. The idea goes against Ostrom's argument that polycentric governance structures are more robust if they trust on the ability of the participants to self-govern shared resources.

This suggests that the planning of megaprojects creates consensus-orientated collective-action arenas that are too fragile to be left to their own devices. The crux of the problem is that the planning process cannot get off the ground unless the promoter makes premature commitments to performance targets up front. But the chances are low of getting the targets right given the large number of subproblems that will ensue once the consensus-oriented planning process starts. The decisions have high stakes because they are hard to reverse and are long-lived. Congruence around the system goal may also be low. As a result, some claimants to the planning decisions demand a high price for cooperation and rule out the idea of losing without a fight. Hence, presupposing that consensus can emerge for all local problems is unrealistic. Resorting to an external umpire recognizes the limits of self-governance when goal congruence is low and the problem is interdependent with the environment.

12.6 Conclusion

The motivation for this study is a conundrum about megaprojects. Do these enterprises underperform or not when the performance targets slip during the planning process which is seemingly par for the course? To shed light on this question, I start by arguing that the planning of a megaproject creates a highly fragile consensus-oriented actor-network. The task of this actor-network is to develop a one-off infrastructure system. The members of the network are resource-rich autonomous actors which will share the infrastructure in use. These members want to influence the planning decisions in exchange for commiting their resources.

The study shows that large infrastructures can be invariably decomposed into a system of functional components, each one relevant to a different group of local actors. This high-level decomposability enables the creation of multiple decision-making groups to solve different local subproblems. Whilst the governing structure shows a degree of polycentricity, the local subproblems remain interdependent. First, they are financially interdependent because the global performance targets constrain the solution spaces; and second, many technological decisions are interdependent because the components are hard to break apart into independent modules with clear, standard interfaces. The conflation of resource scarcity, low problem decomposability, and consensus-oriented decision making creates a wicked problem.

Evaluating the performance of a megaproject against the targets set at the onset of planning is therefore unduly harsh. It misses the point that the initial plans, insofar as they build upon assumptions that are true to what bounded rational actors know at the time and optimistic within reason, merely aim to get the ball rolling. These initial performance targets cannot, however, offer accurate forecasts as to the outcome of

consensus-oriented searches for solutions. If the initial performance targets were to be too rigid, the planning process would not be democratic. Paradoxically, excessive slippages of the performance targets create the risk of a development becoming a political football and getting trashed in the court of public opinion. Hence the sustainability of any large infrastructure development in planning cannot be taken for granted, and indeed many schemes collapse after years of planning work.

This insight helps to move forward the debate on the performance of megaprojects. It suggests that it can be unfair to associate slippages in the performance targets to underperformance *when* slippages are commensurate with the outcomes of consensus-oriented collective searches. This insight matters in the context of publicly financed schemes in which elected leaders, agents, and policy lean towards very large contingencies. The organizational slack that contingencies build in is effective to dampen conflict, but creates a risk of inefficiency, suboptimal behavior, and a self-fulfilling prophecy. Large contingencies up front also shift the burden of resolving emerging controversies to one party: the promoter. A shared understanding of how slippages in performance targets come about has potential to contribute to creating an institutional environment where accountability for slippages can be shared. This then allows shrinkage of built-in contingencies to mitigate their downside risks.

The most important limitation to the generalizability of the findings is the environment surrounding the cases. The UK context offers a stringent regime of planning laws designed to protect property rights, and the country's political and legal system gives elected leaders incentives to heed local interests. Even societies modeled after the UK legal and political system will not have the same institutions and dimension. Hence differences can be expected in the forms of organizing to plan large infrastructure systems.

In conclusion, this study shows that to sustain a highly fragile consensus-oriented development, management needs to know when to resolve the make-or-break issues by relaxing rules, building slack and flexibility, or deferring problem-solving to umpires. Striking the right balance between these coordination mechanisms is necessary to preserve both the internal democratic decision-making processes and the legitimacy in the eyes of third parties—two prerequisites to sustain a fragile development in an ambiguous context.

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Notes

1. In the UK, for example, the gap between general elections cannot exceed five years, and regulated monopolies tend to operate under obligations to produce a new capital plan every five years.
2. In 2012 the BAA changed its name to Heathrow Ltd, but here I have retained the BAA name for the sake of simplicity.
3. Four detailed factual narratives, one for each focal case, were produced using a Harvard-style teaching case presentation, and were circulated for comments.
4. The UK Cabinet is the collective decision-making body of the UK Government, composed of the Prime Minister and the most senior ministers who head the government departments.
5. Wachs (1989) and later Flyvberg et al. (2003) go far to claim that promoters "lie" or "strategically misrepresent." The claim is hard to refute, as it plays to common conceptions, but supporting evidence is skin-deep. One respondent said: "If you weren't optimistic, you wouldn't get into this sort of job … but in forty years of work I can't think of a single incident where people deliberately falsified the number."
6. This figure includes £971 million for venues, £89 million for conversion costs, £640 million for the Olympic infrastructure, £1,040 million for non-Olympic infrastructure, £700 million for local transport schemes, and £15 million bid costs. It excludes £766 million for land.
7. By October 2014, the costs of the stadium conversion had risen to £190 million, due to difficulties encountered by the contractors in installing a roof to cover the athletics track and the retractable seating.

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