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Empirical Research Paper

Overt obstacles and covert causes: An exploratory study of poor performance in megaprojects

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ABSTRACT

Megaprojects are plagued with failures and inefficiencies, often due to an inability to handle the obstacles that occur throughout the process. The present research deepens and extends our understanding of the obstacles and causes of poor megaproject performance by drawing on the 'circuits of power' as a theoretical framework for analyzing such projects. Empirically, we investigate what are regarded as some frequent obstacles occurring in megaprojects in the Australian and New Zealand context, such as coordination issues between stakeholders, poor estimates of the project, and inefficient contracts. Conducting 40 semi-structured interviews with different participants in the sector enables us to highlight that the overt obstacles were dependent on covert causes, such as fragmented industry, political push for projects and an owner-centric industry, respectively. For addressing these covert causes, we record innovative interventions such as delivery through precincts, creating a pipeline of projects, and raising awareness among contractors. We create a framework anchored in the circuits of power theory to show the relationships between overt obstacles, covert causes and suggested solutions. Infrastructure megaprojects can be set up for success by addressing the covert causes through proper interventions, such as changing culture and implementing innovations.

1. Introduction

An infrastructure is an essential service that helps to achieve the socio-economic development of an area. There is a strong correlation between the availability of infrastructure and economic growth (Queiroz and Gautam, 1992). Söderlund, Sankaran & Biesenthal (2017) highlight that public infrastructure projects in the form of transportation, energy, water supply, and telecom increase global economic activities. A report by McKinsey (Garemo et al., 2015) estimates that for the world to keep up with the expected GDP growth, there is a need to spend about US$57 trillion on infrastructure by 2030. These projects tend to be large-scale with significant amounts of both investment and numbers of stakeholders involved; therefore, they are commonly known as infrastructure megaprojects. These megaprojects play a pivotal role in social and economic development (Locatelli et al., 2017). Flyvbjerg et al. (2016) note that megaprojects represent the largest proportion of governmental expenditure on infrastructure and development, hence their successful design and delivery can have significant implications for public finances. Thus, megaprojects warrant both scholarly and practitioner attention (Brunet, 2020).

The large size and complexity of megaprojects makes it difficult to discern which actors influence their delivery and the success of the project (van Marrewijk et al., 2008). Moreover, due to the large-scale nature of these projects, failures in managing them effect the economy and stakeholders, as well as larger socio-economic developments. When these projects fail to deliver on their stated objectives, they often fail big, resulting in mega-failures. As a typical example of such a failure, the billion-dollar cost overrun of the 2004 Athens Olympics is often cited (Flyvbjerg, 2007), a debt that contributed to the Eurozone economic crisis in Greece. While this shows an extreme example of failure the costs of which escalated, it is not atypical: megaprojects have a high probability of failing. Flyvbjerg et al. (2003) studied 258 large infrastructure projects in 20 countries and concluded that 9 out of 10 megaprojects fail to deliver on their planned objectives. When measured against their

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envisioned cost of completion, time of completion, quality and safety objectives, and even revenue predictions, these projects were unsuccessful (Davies et al., 2009). Megaprojects can be categorized as high-risk endeavors with a high probability of failure, which can have a significant impact.

Significant infrastructure development often entails megaprojects, despite these having a high failure rate. Efficient management in completing these projects and achieving planned socio-economic development is of prime importance; hence, research that enquires into how to manage these projects is of considerable value. The present research aims to deepen and extend our understanding of the obstacles and causes of poor megaproject performance by helping the sector devise strategic interventions to improve performance. Thus, this research aims to engage with issues of governance, collaboration, and relational issues in the wake of Marsden and Reardon's (2017) identification of these as key to infrastructure megaproject success. Empirically, we investigate some frequent obstacles in megaprojects in the Australian and New Zealand context through semi-structured interviews with the five sectors of the megaprojects ecosystem namely delivery agencies, consultants, construction companies, business advisory organizations and industry associations. More specifically, we look at the interaction between overt obstacles such as coordination between stakeholders, estimates of the project, and contracts, in order to explore their covert causes. Thus, the research seeks to address the research question: what circuits of power relate to failure in infrastructure megaprojects? The research question frames our analysis of data collected from the Australian and New Zealand context to understand how to deliver projects better.

In the next section of the paper we critically review existing research on megaproject performance, particularly the obstacles and causes of poor performance. We also introduce the theoretical framework of circuits of power (Clegg, 1989) and discuss why it is a suitable lens with which to study the overt obstacles and covert causes of poor performance. The third section describes the context of the empirical findings and discusses the various research choices adopted in collecting and analyzing data. The fourth section elaborates the findings relating to three obstacles in megaproject performance, namely, coordination between stakeholders, estimates of the project, and contracts. In the fifth section the empirical findings are situated in relation to the existing literature, using the circuits of power theoretical framework to discuss the covert causes underlying the more overt obstacles of failure. The final section summarizes the findings, highlights the contributions and provides future direction for research and advocacy.

2. Literature review

Infrastructure megaprojects worldwide experience poor performance resulting in cost and time overruns. The symptoms of poor performance are due to multiple obstacles in these projects, such as a change in law, delay in land acquisition, approval and permit risks, technology risks as well as project disputes (Iyer and Sagheer, 2010; Grimsey and Lewis, 2002). Infrastructure megaprojects involve diverse heterogeneous stakeholders, both internal and external, which presents significant demand on the need for effective coordination between them (Hu et al., 2016; Molla, 2020). While proper coordination between internal stakeholders can improve economic activity and resource allocation (Thekdi and Lambert, 2014), coordination between external stakeholders can improve land-use and prevent public riots (Ma et al., 2017; Ninan et al., 2020). Another obstacle in the performance of infrastructure megaprojects is poor cost estimates. Cost estimates play a major role in the decision-making process of the government (Nijkamp and Ubbels, 1999). Poor estimates affect the project viability ranking resulting in a lost opportunity to assign resources appropriately and the sanctioned projects unable to recover their costs (Cantarelli et al., 2010). Inefficient contracts can raise the costs of infrastructure services as they fail to allocate risks effectively (Akintoye et al., 2003). The higher infrastructure costs resulting from inefficient contracts are passed on to customers and taxpayers (Marques and Berg, 2011). Efficient contracts can lead to more sustainable infrastructure development because of the lifecycle optimization incentives (Lenferink et al., 2013).

Isolated instances of the relationship between obstacles and causes are recorded in the literature. Bray and Sayeg (2013) argue that government interference leads to optimism bias in demand forecasts in order to legitimate project initiation. Ng and Loosemore (2007) also stress the role played by political push/interference. For Denicol et al. (2020) optimism bias, as well as strategic misrepresentation, escalating commitment, governance issues, technological novelty and complexity, are all causes of poor performance in megaprojects. Other causes of poor performance that have been noted include industry fragmentation (Berggren et al., 2001) and exposure to financial risks (Grimsey and Lewis, 2002).

The relationship between overt issues and covert causes has not been explained in the literature through the application of an inclusive theory. Power theories, particularly the circuit of power theoretical framework, can help make sense of the relationship between overt issues and covert causes and thereby enable us to plan megaprojects better. Clegg and Kreiner (2013) claim that, in the past, researchers of infrastructure megaprojects have excluded consideration of topics such as power, politics and conflicting interests, even when they are crucial to project success. Power occurs in multiple dimensions, represented by myriad concepts, different interpretations and diverse theories, making it one of the most 'essentially contested' (Lukes, 1974) subjects in political science. Multiple scholars have mapped the different forms and dimensions of power (Lukes, 1974; Clegg et al., 2006; Fleming and Spicer, 2014). Although there is a basic model of episodic power that is widely used in the literature, modeled on Dahl's (1957) idea of one agency getting another agency to do something that they would not otherwise do, Haugaard (2010) has broadened the definition of power to include a family of power concepts, each bearing resemblance to each other but not exactly coterminous.

The most common distinction between the different forms of power is between overt and covert dimensions of power (Fleming and Spicer, 2014). Overt power involves the direct exercise of power easily observable when some agency seeks compliance with its directives on the part of some other agency, such as an individual, a team, an organization, or even a material artifact. The basic idea is that of Dahl's, exercising *power over* some subject or entity. The exercise of power is always embedded in the social fabric on which it acts, providing a covert dimension to power. Covertly, there may be an institutional mobilization of bias (Schattschneider, 1962) inherent in structures of power that implicitly privilege a certain order of identity, be it gender, ethnicity, class, language, religiosity or some intersection of these. Covert power cannot be observed as easily as episodic exercises of power because it tends to be congealed into more enduring institutional structures, practices and taken-for-granted ideas. Covert power, as that which is least observable, can be much more efficient and economical than overt power that has to be exercised (Lukes, 1974). Clegg (1989), in his circuits of power theory, highlights that overt power operates in an episodic circuit and covert power operates through social and system integration circuits. Clegg (1989) uses the idea of circuits of power to represent the ways in which power may flow through different modalities. Relatively simple is transitive power, where one agency seeks to get another to do what they would not otherwise do. Such power is oriented towards securing outcomes. Agencies constituted within social relations strive to configure these relations so that they present stable standing conditions for securing preferred outcomes. Agencies seek to configure and reconfigure other agencies seeking to assert their agency, doing so through configuring relations that transmit agency through various generalized media of communication (Ninan, 2020). All this is quite straightforward and familiar from Lukes' (1974) dimensional account of power.

Episodes are always interrelated in complex and evolving ways, contingent on the temporalities of the here-and-now, the reconstitutions of there-and-then, on reflective and prospective glances of everyday life

(Schutz, 1967). The infinity of power episodes stretches into a future that has no limits, with feedback loops having an impact on overall social and system integration. The important question is whether episodic outcomes tend rather more to reproduce or to transform the existing architecture, geometry and design of power relations. Social integration is framed by the rules of the game that fix meaning and the legitimation of sense-making typically embedded within social, cultural, bureaucratic and technological forms that are taken-for-granted (Lawrence et al., 2011). Through the circuit of social integration episodic outcomes serve either more or less to transform or reproduce the rules fixing extant relations of meaning and membership in organizational fields; as these are reproduced or transformed, they fix or re-fix obligatory passage points as the circuitry of extant power relations. Obligatory passage points are yardsticks against which to measure the acceptability, appropriateness, and legitimacy of actions (Callon, 1986). Thus, power theory encompasses both overt power and covert power, and both of them are related. In this way dispositional matters of identity will be more or less transformed or reproduced, effecting the stability of the extant social relations that had sought to stabilize their powers in the previous episodes of power. As identities are transformed then so will be the social relations in which they are manifested and engaged. Changes in the rules fixing relations of meaning and membership can facilitate or restrict innovations in techniques of disciplinary and productive power, which, in turn, will more or less empower or disempower extant social relations stabilizing the episodic field, recreating existing obligatory passage points or creating new ones, as the case might be.

Organizational power theories, specifically those that focus on dimensions and circuits of power, can help us understand the relationship between overt obstacles and covert causes of failure in projects, to make projects more cost-effective, relevant and efficient. The circuits of power framework is especially applicable to megaprojects in infrastructure that typically entail collaboration amongst a large number of distinct agencies, including contractors, subcontractors, government, institutional actors and financial interests. It has previously been used to address the important role played by religious symbolic work as social integration triggering system integration work, expanding the power capabilities of individual actors leading a project (Biygautane et al., 2020).

3. Research method

To answer our research questions, we chose a qualitative research methodology. Scholars suggest using such a methodology when the aim is to gain familiarity with an area, generate new insights (Scott, 1965; Ariño et al., 2016), or generate theories from practice (Benbasat et al., 1987). In the process, we adopt an inductive approach to gain a rich, grounded, local, and lived understanding of the obstacles and causes as seen by professionals in the field. The aim of an inductive approach is to draw inferences about the processes required to improve performance (Siggelkow, 2007). Such inductive research aims to study a phenomenon in context and makes no declarations about statistical generalizability. Hence, we do not claim that we have untapped universal generalizations of the causes and cures of poor performance in megaprojects.

We sought to study the Australia New Zealand context to understand the obstacles and causes of poor performance, due to its representative similarity to other continents, such as Europe and the Americas. Australia has significant infrastructure spending at around 9.8% of its GDP being accounted for by the infrastructure sector (Fisher, 2018). The value of megaprojects increased from AUD 50 million in 1990 to AUD 500 million in 2000 but by 2015 these were worth AUD 8 billion (Ryan and Dufield, 2017). In the New Zealand context, there are multiple megaprojects (costing more than one billion dollars) in different sectors such as the New Dunedin Hospital project, the Interisland Ferry Replacement Project, the Central Interceptor Programme, and the Transmission Gully Motorway among others (New Zealand Infrastructure Commission, 2020; Mathur et al., 2021). The performance of megaprojects in Australia and New Zealand along with the UK is comparatively better than many other countries however there is significant room for improvement. In their study of 28 completed projects in Australia, Ryan and Duffield (2017) note that contractors revenue ranged from a 1% profit to a 43% loss. The contractors blame the owner of the project for misleading information and raise claims concerning unforeseen circumstances resulting in mistrust and poor performance for all stakeholders involved in the project. We situate this study in an Australian and New Zealand context that been subject to numerous industry reports and research papers calling for new approaches to replace old models for achieving success in the new world of megaprojects (Dunn et al., 2015; Datta, 2020).

Data was collected through open-ended semi-structured interviews with 40 prominent participants in the context of Australia and New Zealand infrastructure megaprojects (See Table 1). The interviews were conducted between September 2018 and September 2019. Through the interviews, we investigated the different risks which materialized in the life cycle of infrastructure megaprojects. We also asked respondents about examples of such risks from their experience and sought possible solutions. Follow up questions were asked to investigate their responses in greater depth. The interview participants belonged to different infrastructure sectors, such as delivery agencies, consultants, construction companies, business advisory organizations and industry associations. Thus, we collected data from people able to contribute knowledgeably to our research agenda given their experience, place of expertise and sector, as per the recommendations of Bono and McNamara (2011). In order to ensure frank responses to our questions, we assured complete confidentiality to the participants and assured them that their personal and organizational identities would not be disclosed, in accord with our university's ethics agreement.

We used grounded theory (Strauss and Corbin, 1990) to analyze the data collected from the participants. We first open coded the data, during which we went through each of the interview transcripts looking for obstacles, causes, and solutions. We recorded and assigned a category to each of them that emerged from our data. Hence, we were able to create broad categories such as ‘fragmented industry.’ As a result of this systematic coding and categorizing of incidents, we were able to arrive at the list of obstacles, causes and solutions. We followed this up with the axial coding of data to find the relation between the overt obstacles and covert causes. Then subsequent coding of the remaining data allowed us to check whether the data fitted the codes created, refining the codes in the process. Refining codes in this process increased the validity of the findings and grounded the new theory in data. We followed this with a theoretical review, complying with the suggestions of Strauss and Corbin (1990) to connect our data with theory.

4. Findings

We asked the respondents about the different challenges they faced in regard to infrastructure megaprojects, using semi-structured interview questions. While there were multiple challenges highlighted, we will focus on the main themes – coordination issues, poor estimates of the project, and inefficient contracts. We discuss each of them separately below.

4.1. Coordination issues between stakeholders

Infrastructure projects require coordination between multiple agencies, including both internal and external stakeholders such as different contractors, specialized agencies, and institutional service utilities located under, over or adjacent to the project site (Whyte and Lobo, 2010). Stakeholders such as utilities are not obliged to support the project and are not accountable to the Detailed Project Report prepared for the project (Ninan et al., 2020). The complexity regarding coordinating for utilities was emphasized by one of the respondents, as below.

Table 1
Details of interview respondents.

Sl. no	Organization category	Designation	Country
1	Architectural firm	Director	Australia
2	Business advisory firm	Director	Australia
3	Business advisory firm	Project Director	Australia
4	Business advisory firm	Technical Director	Australia
5	Business advisory firm	Director – Transportation Projects	Australia
6	Business advisory firm	Director	Australia
7	Construction organization	Director- major projects	Australia
8	Construction organization	Projects Director	Australia
9	Construction organization	CEO	Australia
10	Construction organization	Technical Director	Australia
11	Construction organization	Director	Australia
12	Engineering consulting	Principal	Australia
13	Engineering consulting	Project Director	Australia
14	Engineering consulting	Director	Australia
15	Engineering consulting	Major projects Director	Australia
16	Engineering consulting	Technical Director - Sustainability	New Zealand
17	Engineering consulting	Regional Leader - Operations Consulting	Australia
18	Engineering consulting	Consultant- Major projects	New Zealand
19	Engineering consulting	Planning Leader	New Zealand
20	Engineering consulting	Director - Environmental Planning	Australia
21	Engineering consulting	Director - Infrastructure and Transportation	New Zealand
22	Engineering consulting	Advisory Leader	Australia
23	Engineering consulting	Consultant	Australia
24	Engineering consulting	Principal | Asset Management Leader	Australia
25	Engineering consulting	GM Business Development	Australia
26	Engineering consulting	Client Director	Australia
27	Engineering consulting	Principal	Australia
28	Financial Services	Project Director	Australia
29	Financial Services	CEO	Australia
30	Financial Services	Director	Australia
31	Government central agency	CEO	Australia
32	Government central agency	CEO	New Zealand
33	Government central agency	Secretary	Australia
34	Government central agency	Deputy Secretary	Australia
35	Government central agency	Director	Australia
36	Government delivery agency	Project Director	Australia
37	Government delivery agency	Legal council	Australia
38	Industry association	Board member	Australia
39	Industry association	CEO	New Zealand
40	Telecoms Infrastructure	Chairman	Australia

> "So obviously utilities are slightly different because there are certain areas where you know, like you can't rely strictly on the 'dial before you dig' because they are never correct anyway, so there's an element of you know, that there's going to be some stuff there, but the problem with utilities is often what's there that needs to either be moved or be remediated".

Moving or remediating utilities require close coordination with utility agencies. However, the objective of the utilities is to ensure the continuous and trouble-free operation of their service; hence, they tend to see megaprojects as an irritant interfering with their operation. The head of an infrastructure construction agency reported

> "Being in the hands of utilities who are busy trying to supply power to the city or trying to keep the water system running. Major projects to them are just an irritant on the margin and in many cases those utilities won't even talk to government agencies. What chance have I got as the contractor?"

One of the causes of the poor coordination is the fragmented nature of the construction industry. The contractor handling the construction of the project has to coordinate with the contractor of the utility agency as highlighted by one of the respondents during the interview,

> "The contractor that we've contracted isn't the contractor that's allowed to do anything. It's got to be somebody who's authorized by the utility so, obviously, for the utilities that's not a priority for them. They've got other things that they need to be working on. So again, it's all playing into that whole delay issue."

The presence of multiple parties in a megaproject makes interface management very difficult (Ninan et al., 2019). The digital engineering lead of one of the companies active in the sector highlighted that,

> "One area of improvement discussed concerned the number of parties that are sometimes involved in business cases, and the role of the interface manager. Experts in specific disciplines are needed but when a large number of entities get engaged, the interface management can quite often get cumbersome"

A solution to this is to reduce the number of interfaces. Having accurate digital maps upfront of the multiple utilities near the project can speed up coordination. One of the respondents claimed,

> "A digital map of in ground utilities can provide significant efficiencies in the delivery path"

The digital map for an area can easily be created if multiple projects are planned in the same place. In such a scenario, the Government can take the responsibility of producing the map of digital utilities and contractors who would tender for projects in the area would apply for a copy of the map. After completion of the project, the contractor would submit any alterations and additions for the map so that the Government would have an up to date map for the utilities at minimum cost and for everyone to use. An innovation for reducing coordination hassles is designating precincts in which multiple projects are planned with the backing of the city administration. A respondent with vast experience in the feasibility of projects highlighted,

> "Special Activation Precincts are unique in regional NSW as they bring together planning and investment support services. This means that businesses will be able to establish and grow with certainty and confidence knowing that the right planning framework is in place"

4.2. Poor estimates of the project

Projects require a lot of information, and only an educated guess is possible in the short time of tendering upfront. The head of a contractor agency claimed,

> "In these large projects there's a confined tender timetable … You never have the time to know everything, so you have to make an educated guess, particularly around ground conditions, for example, contamination, utilities relocations. I think any work that's required in groundwork that's a time of peril and it's very hard to get right"

Lack of upfront planning can result in poor estimates of the project. A similar point was reiterated by one respondent,

> "Broadly speaking they [estimate risks] relate to ground conditions and the need to relocate utilities, in some cases key stakeholder or planning issues that were unresolved at the point where the contract was let and then had to be dealt with down the track by variations."

One of the causes for the poor estimates of these projects is a political push. The head of an infrastructure organization claimed that,

> "All of these things when projects go wrong tend to have been under-researched at the front end. And the main reason for that is governments are always in a hurry and they don't like to spend large amounts of money on a project without actually announcing the fact that they're actually going to do that project and when they announce that they're doing a project they're under pressure to say how much it will cost and when it's going to be opened"

It is generally seen that politicians announce infrastructure projects without any detailed planning. A senior official from a government organization claimed,

> "Part of the reason that School Infrastructure is having problems is Ministers go and announce opening school dates and he's like, I just have to be in the market doing it, I haven't thought through the procurement strategy. I think we've got to stop announcing stuff and slow down and look at what we've got in the pipeline"

Similar to the findings here, Carpintero and Petersen (2014) record that three public-private partnership projects in Madrid have experienced shortfalls in demand due to over optimistic forecasts that were constructed as part of election promises to secure votes. A solution to this is to get enough information regarding the project upfront during the tender stage itself. A respondent claimed,

> "So how do we fix. Part of that has got to be around, you know, making sure that before we go to Tender we've actually got the full complement of information that we can provide and we give our contractors the best available opportunity to actually price the risks that are inherent in the project. And then providing mechanisms within the contract that actually allows them to where they can to optimize their construction"

For addressing the issue of poor estimates in projects, creating a pipeline of projects is appropriate. A pipeline of projects would help government agencies spend sufficient time in the planning of the project and even prioritize projects considering their benefit to the society. This was emphasized by one of the respondents,

> "NZ [New Zealand] WellBeing approach within major infrastructure delivery discusses how projects could be prioritized with regards to potential impact"

Inadequate time at the front end of projects can result in constructability issues and poor return on investments (Oh et al., 2016). As suggested by a respondent, a pipeline of different projects would ensure more time is spent on each project and thereby, unwanted projects are not built, as below.

> "We do not do asset management very well. Instead, there is a tendency to look for a quick fix with new infrastructure, that can be show cased and have a ribbon cutting photo event."

4.3. Inefficient contracts

Contract performance in the construction industry is generally poor; inappropriate procurement strategies can lead to cost and time overruns in infrastructure projects (Noor et al., 2012). Information regarding the project's specifications and nuances is not shared with the contractors upfront at the contract stage. Often a contract with little information is shared with the contractor during the bidding stage, when the preferred contractor is selected. During the negotiation stage, the client tries to transfer risks to the contractor, and this affects the planned risk for the project as highlighted by one of the respondents during the interview,

> "We have to have a much more robust review process. My team gets involved in tender reviews and reviews of delivery. So, the tender is critical. There is a particular time of peril in contracting where you get announced as preferred. That's where the client tries to shift even more risk onto you and you know, you're in the euphoria of your preferred status and its now where the client wants you to make a little change, that impacts on your risk"

As per existing practices, the contracts are the same but administered differently. An executive director of an infrastructure organization active in Australia recorded,

> "We all have the same contract, but we all administrate it differently. Yeah, so same clauses are identical clauses, but what we do with them is different. So, our contractors know that they can have a conversation with us, and we will actually look … the contract says this but there's some merit to what you're saying. Let's see. Let's have a look at that and … you don't meet the threshold, very sorry, end of conversation. That's just not going to work long term. It just doesn't work"

After a period of time, contractors start to price the risk of poor contracts and the associated behavior of the client in future bids, rendering the existing model of contract administration unsustainable. Thus, contractors across the industry start understanding how these projects are delivered, then even the lowest bidder starts increasing their prices, accounting for this factor in their costings. A senior official claimed,

> "Because you're going to get to a position where contractors just don't want to work for you anymore. Or the price is just going to go through the roof because they've got a price for the risk, isn't it? Yeah, and then that drives the price up for everybody across the board and that's not sustainable"

One of the causes of poor contract administration in the industry is the use of the same contracts for different services. The deputy secretary of a government body claimed that,

> "The *** [name of the hospital] hospital contract is appalling, right. Treasury wanted to control the project and they control the project procurement and they control the procurement by controlling the contract. So, we took convention center contract and we have turned this into a fully outsourced clinical services hospital deal. It looked like Bride of Frankenstein by the end! It was terrible and I knew it was going to go horribly wrong from the beginning"

The construction industry is very owner-centric, with most decision-making and power residing with the owner, i.e., the client or the government. Describing the nature of the client in the contracts, one of the respondents claimed,

> "I often think that the aggressive transfer of risk to private sector reflects a degree of laziness on the government's part, but if you can get away with it in a buyer's market, why wouldn't you be lazy if they're dumb enough to suck up this risk, why wouldn't you?"

A solution for this is that contractors need to be aware of the client's behavior and push for changes in the industry. The director of an infrastructure funding agency highlighted that contractors have to obtain as much information as possible from government regarding quantifiable information in the contract.

> "It's really about going as hard as you can at the Government on the risks that actually are quantifiable and are known."

From the semi-structured interviews, we observed that poor

performance exists in megaprojects due to overt obstacles such as coordination issues, poor estimates and inefficient contracts. Through axial coding, we were able to relate these overt obstacles to covert causes such as a fragmented industry, a political push for infrastructure projects, and an owner-centric industry, respectively. We were also able to isolate solutions suggested by the participants, such as delivery through precincts, creating a pipeline of projects, and raising awareness among the contractors. These three different overt obstacles, covert causes, and suggested solutions are consolidated in Fig. 1.

Thus, by mapping the overt obstacles and the covert causes, it is possible to have a more in-depth investigation on suggested solutions such as changes in the institutional and regulatory environment. It should be noted that the three overt obstacles described above were the ones that were most commented in our interviews and may not be universally generalizable to other contexts.

5. Discussion

The findings section record some of the obstacles and causes we observed in the Australian and New Zealand context. It should be noted that there are other obstacles that are not discussed and even in the obstacles discussed, there are other causes; however, the aim of this research was not to uncover all the obstacles and causes. Instead the research aimed to uncover some of the covert causes or institutional issues that shape the obstacles we observe episodically and thereby theorize the relationship between obstacles and causes. While there are isolated instances where obstacles and causes are discussed separately in the literature, we argue that understanding the relationship between overt obstacles and covert causes would help the industry tackle the obstacles better.

For understanding the relationship between overt obstacles and covert causes, the circuit of power (Clegg, 1989) theoretical framework is adapted and used, as shown in Fig. 2. The circuit of power framework shows the relationship between overt and covert power and can help us understand the overt obstacles and the covert causes. We recorded overt obstacles leading to poor performance in megaprojects as coordination issues, poor estimates, and poor contracts. Each of these are episodic power issues concerned with specific instances of coordination, estimation and contracting. From the project management point of view these are individually arising buggeration factors. However, different covert causes are responsible for these overt obstacles. It was seen from our investigation that coordination issues were attributed to the fragmented nature of the industry; poor estimates were attributed to the political push of these projects, while inefficient contracts were attributed to the owner-centric nature of the industry.

These obstacles and causes were present in all megaprojects, leading to repeated poor performance outcomes, as the industry goes in circles without addressing them. An improvement in performance of infrastructure megaprojects would be possible through strategic intervention and, in this case, addressing the covert causes that lead to overt obstacles. The fragmented nature of the industry can be addressed by delivering projects through precincts. Precincts bring together multiple stakeholders and help in achieving a coordinated infrastructure delivery. They improve social integration in a largely disintegrated field of practice. Through precincts, the multiple fragments of the infrastructure industry are brought together, thereby addressing the overt coordination issues responsible for poor performance.

Another solution to improving performance by addressing the covert cause of the political push of infrastructure projects is to create a pipeline of projects. A pipeline of projects can ensure that all projects have completed necessary due diligence and thereby address the overt obstacle of poor estimates being responsible for poor performance. The pipeline introduces a degree of order into the planning of project, enabling contractors to socially integrate partners and provision into the future rather than scrambling after projects and partners that are available. Integrating the future into present projections is extremely important. Additionally, in addressing the covert cause of the owner-centric industry, there is a need to raise awareness amongst contractors to address the overt obstacles of one-sided contracts, seemingly always devised in favor of the client or the government. The contractees need greater social integration. Thus, as seen in Fig. 2, solutions are suggested which can directly address the covert causes and thereby bring in a change in the performance of infrastructure megaprojects.

Strategic interventions raising awareness of contractors or using precincts to create greater system integration can be part of the covert dimension creating a favorable environment for infrastructure delivery (Cunha et al., 2018). These are ways of resetting power relations, by changing the disciplinary practices and techniques of project management that constrain and channel action driven through normatively sectional interests (Foucault, 1977). Our findings are similar to Denicol

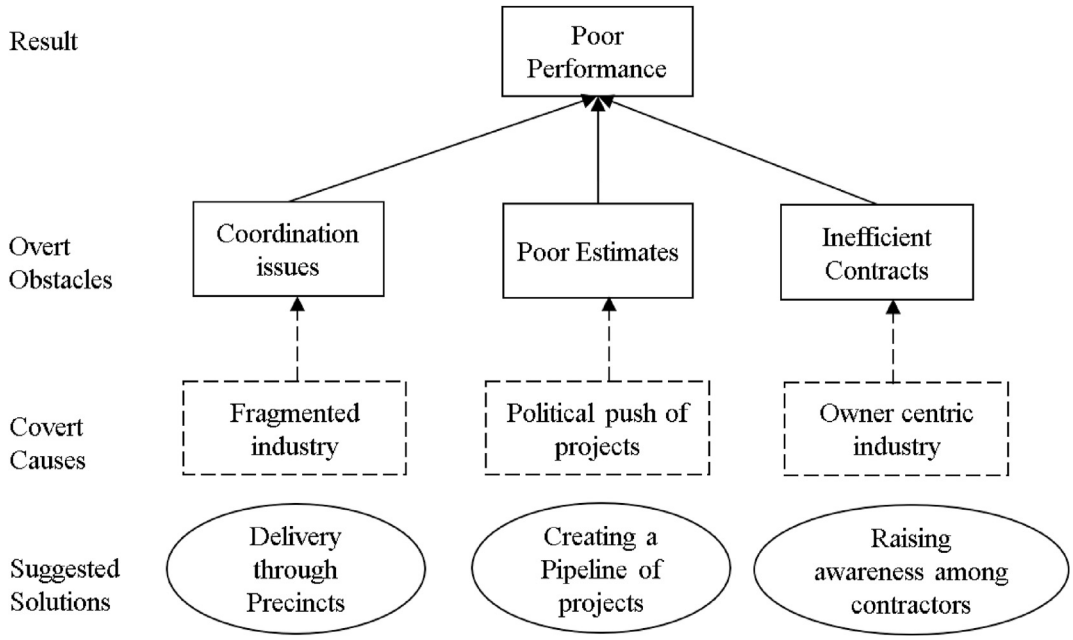

Fig. 1. Overt obstacles, covert causes, and suggested solutions.

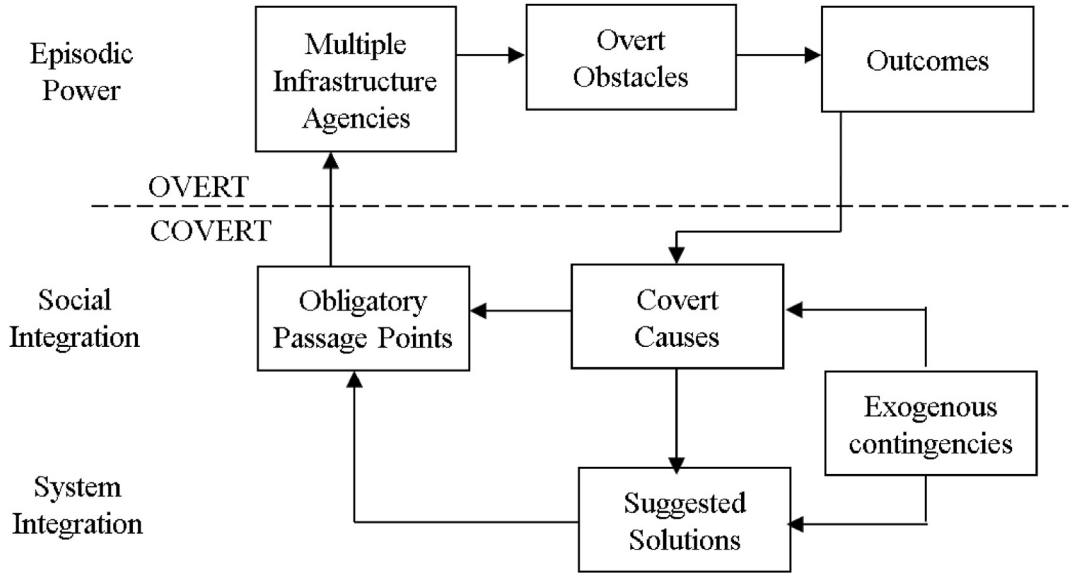

Fig. 2. Model of circuits of infrastructure megaproject and proposed solutions.

et al.'s (2020) claim that megaproject performance can be improved through both structural and less formal mechanisms. Prescribing solutions doesn't mean they will be adopted; they have to become stabilized as obligatory passage points stabilizing or institutionalizing innovative practices (Berger and Luckman, 1971) that seamlessly integrate subsystems and actions into routine business processes that become taken-for-granted (Silva and Backhouse, 2003). The multiple agencies involved in infrastructure megaprojects exercise control and contest these obligatory passage points (Clegg, 1989), thereby dictating whether the solutions prescribed to address the covert issues are adopted, creating overt changes. Both covert causes and suggested solutions can be seen as open systems open to influence by exogenous environmental contingencies as well as being open to endogenous changes in the dynamics of power relations (Smith et al., 2010). Research such as is reported here might, for instance, be such an exogenous contingency, as might government policy mandates or project learning from best practices on other projects (Pitsis et al., 2003).

It should be noted that overt obstacles shape the covert causes and vice versa. As argued by Söderlund and Sydow (2019), a project might influence the way the governance framework is applied, just as the governance framework shapes how the megaproject is carried out and managed by project actors. The efficiency of the sector can be improved by addressing the root causes, i.e., the covert causes instead of the overt obstacles. As highlighted by Ika (2012), there is a need to invest in strengthening different levels of institutions and tailoring the culture of the infrastructure sector, similar to the covert causes in this research, to deliver projects efficiently.

6. Conclusion

Through this research, we sought to investigate the systematic issues surrounding poor performance in megaprojects. We explored the causes behind these and the underlying issues with the industry that are attributed as the cause of poor performance. For this, we conducted 40 semi-structured interviews with different major stakeholders in the project setting, such as business advice, government, consulting, construction and industry associations. From the different obstacles from the project, we studied three main themes – coordination issues, poor estimates of the project, and inefficient contracts. The relationship between overt obstacles and covert causes are explained from a circuits of power theoretical perspective. We highlight that these overt obstacles were dependent on covert causes such as a fragmented industry, a political push of projects, and an owner-centric industry respectively. In addressing these covert causes, we recorded innovative interventions such as delivery through precincts, a pipeline of projects and raising awareness among contractors. We thus argue that we can set up infrastructure megaprojects for success by proper investments in changing culture and implementing innovations.

We make multiple contributions in this research to theory, policy, and practice. As a contribution to theory, first, we highlight how theories such as the circuit of power framework can help make sense of poor performance in infrastructure megaprojects and develop strategic interventions for improving performance. Second, we developed a theoretical process model that depicts how the episodic and systemic forms of power are interrelated through the overt issues and covert causes. Third, we record that the repeated poor performance in megaprojects is an outcome of the industry going in circles, in a circuitry fashion, without addressing the covert causes. As a contribution to policy, first, we highlight that using the theoretical process model policy makers can understand the covert causes behind the overt obstacles and strategically intervene through suggested solutions. Second, we highlight the importance of the multiple agencies involved in infrastructure megaprojects to stabilize the obligatory passage points ensuring that the suggested solutions are institutionalized as routinized modes of action. Third, investments to facilitate learnings from best practice or research recommendations, such as reported here might, for instance, be an exogenous contingency, which can strategically intervene the circuit framework to improve megaproject performance. As a contribution to practice, we highlight some of the covert causes and suggested solutions, even though not exhaustive, for improving megaproject performance. For example, the fragmented nature of the industry can be mitigated through the innovative project delivery model, i.e., precincts, the political push of projects can be addressed by creating a pipeline of projects, and the owner-centric nature of the industry can be changed by raising awareness among contractors. Thus, megaproject performance can be improved through these structural and less formal mechanisms.

There are some limitations to this study. We do not claim that the three obstacles and associated causes and solutions discussed in this article are comprehensive, and hence there are many more. However, our aim was to highlight the paths of all obstacles for poor performance, rather was to show how the circuits of power theoretical framework can help depict the relationship between overt obstacles and covert causes. Other theoretical frameworks can also be used to interpret overt obstacles and covert causes such as the work of Öberg et al. (2020) discussing

different tensions and their consequences as part of the 'patterns of tensions' model. It should also be noted that for simplicity, this research considers only one covert cause and suggested solution for each overt obstacle. Further research can examine the degree of interactions between multiple covert causes and suggested solutions. Future research can also study how one cause can trigger multiple other causes in the infrastructure megaproject system recorded in this research.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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