# Inter-organisational governance in megaprojects: a systematic review and an agenda for future research

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## Abstract

*The review analysed 4,536 titles. 781 papers were selected for the title and abstract review after applying exclusion criteria and 81 papers were identified for the full review. Gioia method was applied to extract the first-order and second-order concepts and aggregate dimensions. The thematic analysis illustrates that megaprojects are delivered through multi-party settings and the governance is regarded as dynamic, processual and anchored in multiple levels. Megaproject governance mechanisms include informal and informal approaches. Committed leadership, collaboration, stakeholder management and culture are key components to enable the governance mechanisms.*

*The main challenges in the implementation of a complex infrastructure project are not technical but are rather those related to how to govern the work in a complex inter-organisational setting that brings together a diverse set of actors who differ in their values, culture and goals.*

## SECTION 1 Introduction

Governance of projects has been established as an important aspect that affects performance. Project governance provides the structure through which the objectives of the project are set, the means of attaining those objectives are determined and the means of monitoring performance are determined (Turner, 2006). Association for Project Management (2019) defines governance as "the framework of authority and accountability that defines and controls outputs, outcomes and benefits from projects, programmes and portfolios. The mechanism whereby the investing organisation exerts financial and technical control over the deployment of the work and the realisation of value." (APM, Association for Project Management, 2019, p. 212). The traditional approach to project governance aims to achieve organisational goals or company strategies based on stakeholder relationship management and a governance framework of essential project-oriented or organisational factors, such as value systems, responsibilities, rules, processes, and policies (Ahola et al., 2014). Megaprojects, however, reach far beyond the traditional scope to a higher level and wider range of the governance domain, from which the internal and external environments, governance structure, and other factors are radically evolutionary and coevolved (Li et. al, 2018).

Megaprojects are defined as large-scale, complex ventures that typically cost US$1 billion or more, take many years to develop and build, involve multiple stakeholders, are transformational, and impact millions of people (Flyvbjerg, 2014). Turner & Xue, (2018) suggest that mega-projects are complex and being complex are nonlinear. Small changes in input can lead to large changes in output, so to expect megaprojects to achieve early and effectively arbitrary time and cost estimates is pie in the sky (Turner, 2022). Recent studies on megaprojects indicated that complex infrastructure projects become more commonplace despite their performance problems (Flyvbjerg, 2014). Although large and complex infrastructure projects play a vital role in any society, their cost overruns, schedule delays, and exaggerated benefits are the norm rather than the exception (Locatelli et al. 2017).

Some efforts have been made by the industry to respond to the poor performance issue in megaprojects delivery. In 1994, the United Kingdom government commissioned the Latham Report - Constructing the Team. Latham identified industry inefficiencies and urged reform in the industry. He advocated partnering and collaboration by construction companies. A key concept was that through teamwork the construction industry could delight its customers (Latham, 1994). In May 2018, the Institution of Civil Engineers launched P13 Blueprint as a new approach to infrastructure project delivery which promotes the delivery of infrastructure through the creation of an integrated delivery enterprise, formed from client organisations, key suppliers, advisors and sponsors. The Blueprint focuses on the three most significant areas where the enterprise model is expected to change existing ways of working. They are governance and alignment; creating the right commercial environment; and skills, behaviours and leadership (*P13 BLUEPRINT 02 P13-Blueprint*, n.d.).

Efforts have been made to improve megaprojects delivery performance over the years both from the academic and practice sectors. The governance of megaprojects faces the challenge of governing an internal complex supply chain of multiple firms and governing the network of external stakeholders. A megaproject can be viewed as a dynamic network of organisations that combines the resources, capabilities and knowledge of the participating actors to fulfill the needs of the owner. In addition to the project goals each actor is motivated by their own objectives or expectations. As these objectives and expectations may conflict, megaprojects face several challenges not evident in the contexts of projects carried out by individual firms.

Despite the agreement that governance is one of the key factors impacting megaproject delivery, there is however no consensus among scholars on understanding the mechanisms of

governance in megaprojects. This research aim is to systematically review and evaluate the current state of the literature on governance in megaprojects. The literature review question is therefore identified as:

- ***What are the important aspects and mechanisms of governance in megaprojects?***

## SECTION 2 Research Methods

Informed by Denyer and Tranfield (2009) and Tranfield et al. (2003), a systematic literature review was undertaken in three stages. First, a planning stage identifies the needs of the review and develops the protocol, which defined the overall strategy, the keywords, and its interactions in the search for articles. Second, the development stage selects articles for data extraction, assessment, and data synthesis. Third, a dissemination stage connects the research findings with ongoing conversations in the academic literature and with practice through accessible material for practitioners.

### 2.1 Planning Stage

Keywords on the subject have been identified based on the outcome of the scoping study. The strategy was to include a wide range of words and synonyms, in which the keywords were grouped into categories: megaproject synonyms and governance synonyms. The keywords were organised into a search string which was used to search the papers on academic databases. The search string included all Megaprojects synonyms such as ("large scale project*") AND ("governance").

### 2.2 Development Stage

A systematic search for academic papers was carried out on the online database EBSCO from all years until January 2022. Careful consideration has been given to choosing EBSCO online database as there were a number of databases available to choose from. Though online databases such as Web of Science and Scopus gives a large number of papers, EBSCO provides relevant papers on business studies. The search output of Scopus and Web of Science with EBSCO was checked and found that EBSCO has captured the relevant papers.

Search terms were finalised following the assessment from scoping study outcome and trial and error method for capturing the right papers. The first search related to Megaprojects and Governance re-turned 4,536 papers, selecting the field as AB Abstract or Author-Supplied Abstract re-turned 2,848 papers. Exclusion criteria have been applied as Peer Reviewed Papers (901), Academic Journal (882) and English language (781).

Titles and abstracts of each of the 781 papers were exported to Mendeley. Each of the papers was analysed according to the inclusion and exclusion criteria as shown in Table 1 reducing the number from 781 to 84. Three papers were removed due to duplication issues. The final list contained 81 papers that were filtered from the initial search of 4,536. Although the abstract of the 81 papers fit the inclusion criteria, 7 of them were found non-relevant after reading the full paper.

Table 1: Exclusion and inclusion criteria

| Items | Exclusion/Inclusion Criteria |
|---|---|
| Exclusion Criteria | • The search terms are not in the abstract<br>• The paper is not peer-reviewed paper<br>• The paper is not from an academic journal<br>• There is no abstract available<br>• The article is not in English |
| Inclusion Criteria | • The concept of a megaproject must be essential for the intervention and therefore explicitly mentioned.<br>• Governance mechanisms or challenges must be the objective or one of the objectives of the paper.<br>• We found that some of the peer-reviewed, and academic empirical works were not included in the ABS ranking and therefore ranking was not used as exclusion criteria. |

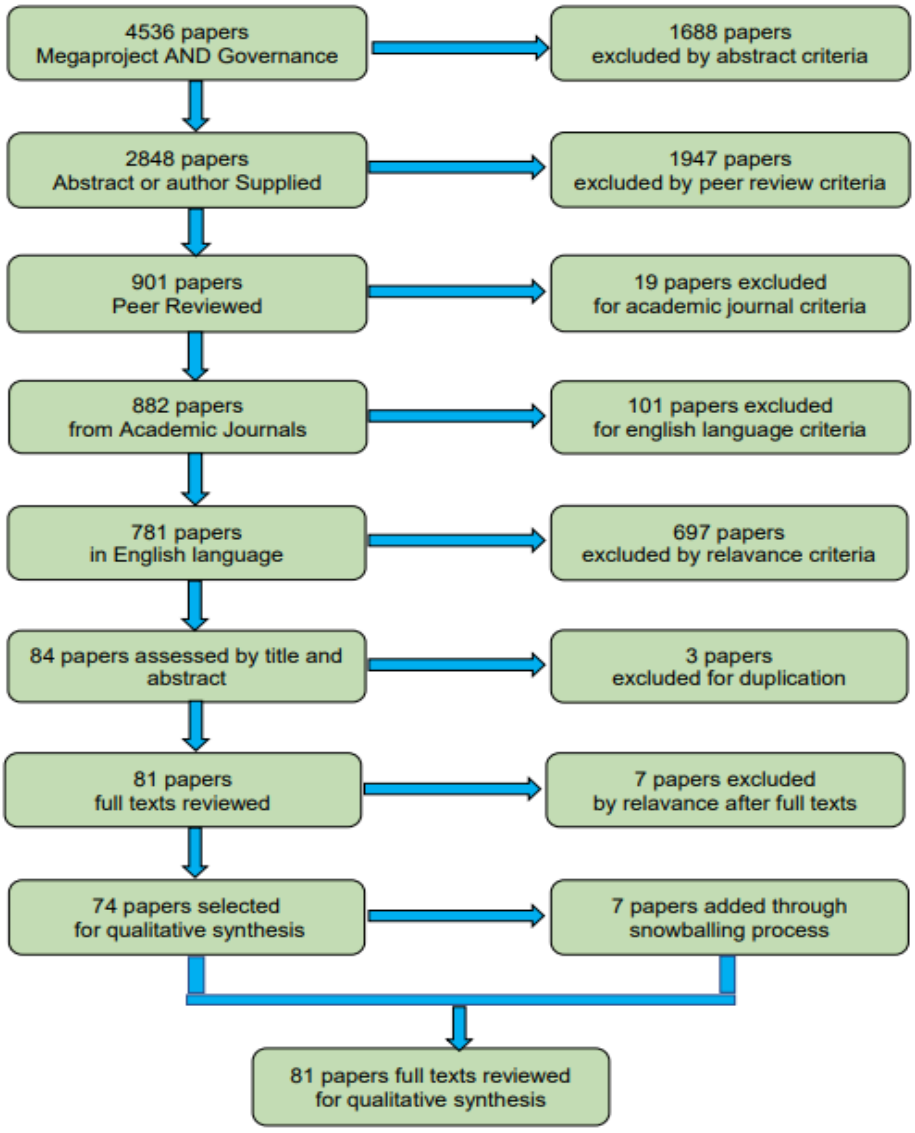


Figure 1: Systematic literature review process map

Using an extraction sheet on Microsoft Excel, relevant information related to descriptive data (title, authors, journal, year, and so forth), and information that answered the research questions (aims and objectives, governance mechanisms and challenges, key themes) was extracted in a structured fashion. The source of each of the papers was analysed and presented in table 2 below shows the number of papers from each of the journals. 7 papers were added from the snowballing process.

Table 2: No. of papers reviewed from various journal

| **Journal** | **No of papers reviewed** |
|---|---|
| International Journal of Project Management | 28 |
| International Journal of Managing Projects in Business | 9 |
| Journal of Management in Engineering | 8 |
| Project Management Journal | 4 |
| Journal of Construction Engineering and Management | 4 |
| Construction Management and Economics | 3 |
| Engineering, Construction and Architectural Management | 2 |
| Journal of Modern Project Management | 2 |
| Public Works Management & Policy | 1 |
| Administrative Sciences | 1 |
| Australian Journal of Public Administration | 1 |
| International Journal of Innovation and Technology Management | 1 |
| Journal of Environmental Planning and Management | 1 |
| Journal of Organisation Design | 1 |
| Leadership and Management in Engineering | 1 |
| Management In Health Care | 1 |
| Polish Journal of Management Studies | 1 |
| Proceedings of the Institution of Civil Engineers - Transport | 1 |
| Public Administration | 1 |
| Public Administration Quarterly | 1 |
| Public Money & Management | 1 |
| Technological and Economic Development of the Economy | 1 |
| **Total** | **74** |

The papers were analysed to understand the trend in publication of papers about the megaproject's governance. The result revealed that the interest in megaproject governance is increasing in recent years. The details have been presented in the figure 2 below. An in-depth analysis of each of the papers has been carried out. Key themes under first-order concepts,

second-order concepts and aggregate dimensions have been identified by applying Gioia analysis. The key issues identified under each of the sub-themes have been discussed and synthesised to inform the subsequent empirical research question.

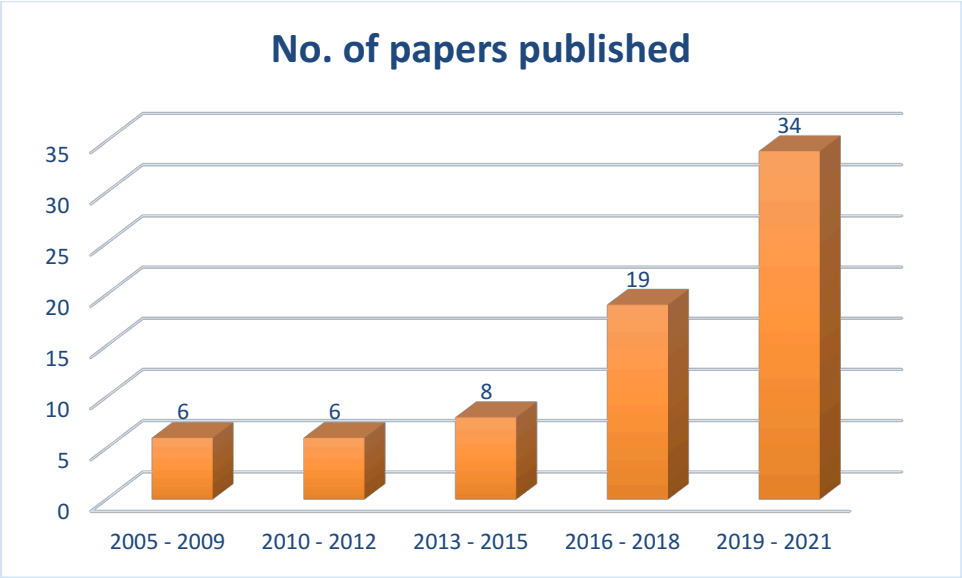


*Figure 2: Number of papers published between 2005 and 2021*

## SECTION 3 Thematic Analysis

Thematic analysis was carried out by using the methodology of Corley and Gioia (2004) to enable a more rigorous and transparent analysis of the qualitative data, as this is a key challenge for interpretive research (e.g., van Maanen, 1979). This methodology was refined in subsequent papers and described in detail by Gioia et al. (2013). It provides a structured method for deriving themes from data, and the characteristic three-stage analysis scheme and has been used recently in a wide range of studies in major journals including the Academy of Management Review, Organisation Studies, Human Relations and Administrative Science Quarterly (N. Turner et al., 2020).

The findings of the review were listed under the first order concepts. The first-order concepts are then summarised into second-order concepts and then finally clustered into aggregate dimensions as (1) aspects of governance; (2) mechanisms of governance; and (3) enablers of governance. Governance mechanisms were summarised under formal and informal governance. The key messages under each of the themes are discussed below.


1st Order Concept
2nd Order Concept
Aggregate Dimension
• Inter-organizational networks as a means to develop and deliver complex products and services
• Responding institutional complexity by adopting inter-organisational perspective
• Project System Organisation as megaproject delivery models prototype the configuration of inter-organisational relationships
Inter-organisational
• Understanding the process of translation of governance framework
• Governance as technical, strategic and institutional level
• Governance as institutional, organizational and project level
Multi-level
Aspect of governance
• Project development processes and environments are dynamic
• Adjusting governance strategies in a timely manner could lead to successful project delivery
• Evolution of governance to align the project purpose, value creation and value distribution
Evolutionary
• Multi-party project alliance to respond institutional complexity
• Enhanced value and improved long-term service outcomes may be achieved by the introduction of alliancing concepts
• Governance, culture, and trust provides a platform which firms may foster collaboration in alliance contract
Alliance
• Partnering as a key to keep project on schedule and on budget;
• Allocating risks between the parties
• Addressing governance, accountability and performance monitoring in partnering
Partnering
• Project governance variables impact project performance
• Governance controls the accountability
• Business policy approach for project governance
• The need for continuous improvement and change is prominent
• Flexible and balanced approach to governance
Process
• Institutional framework for the institutional governance of the relationship between private and public actors
Institutional framework
Formal Governance
megaprojects
• Governance structure impacting solutions to risk sharing
• The choice of appropriate governance structures for public infrastructure projects is a major challenge
• Governance structure fit has significant positive impacts on Contractors Joint Venture performance.
Contract
• Enhanced governance routines are desirable in programmes and projects that exhibit high degrees of complexity and scale
• A 'light on process, heavy on performance' approach, underpinned by a comprehensive assurance framework and strong financial control, drove the projects forward.
Assurance
• State controls of projects of societal importance
• Governmental governance could significantly contribute to megaproject performance
Governmental Governance
• Aligning the project with client strategy
Goal alignment
• Deploying best project management practices
• Principal program organization factors to manage a megaproject
Programme management
• Network view of governance
• Governance in project network
• Dimensions of distance in a project network
• Self-organising networks in large infrastructure projects
• Temporary network
Informal network
• Trust and contract to support collaborative behaviour
• Trust can supplement the weakness of contract by forming flexibility with different strength of ties
• Trust as a governance mechanism
• Role of trust in megaproject success
• Trust as a facilitator of positive relationships among project stakeholders
Trust
Informal Governance
• Inter-organizational behavior determines the effective adoption of relational mechanisms
• Role of various governance mechanism in influencing relational behavior
• Relationship management for improving relationship quality and achieving project success
Relationship Management

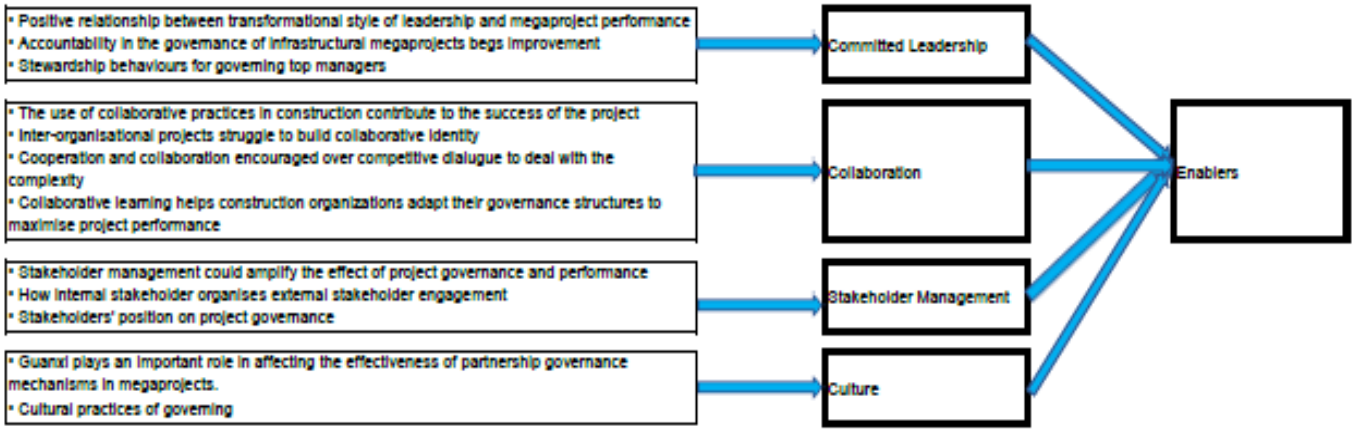


Figure 3: Results of coding using the Gioia method

## 3.1 Aspect of Governance

### 3.1.1 Inter-organisational governance

The UK construction sector has long been characterised as fragmented with much of the industry continuing to be structured and constrained by the contracting model that emerged in the early 19th century with the emergence of the professions. Over the years, we have seen a growing interest in the use of inter-organisational networks to develop and deliver ever more complex products and services (Brady, 2011). Matinheikki et al., (2019) study contribute to the trend in institutional theory of hybrid organising of responding to institutional complexity by adopting an inter-organizational and temporary-project perspective.

The systematic literature review demonstrates that megaprojects are delivered through multi-party organisations. Denicol et al., (2021) present a project system organisation (PSO) conceptual framework, which charts the architecture of megaproject organising, from intra to inter-organisational design, and ultimately to system-level design. The PSO provides a structure to design megaproject delivery models and prototype the configuration of inter-organisational relationships.

### 3.1.2 Multi-level governance

Although infrastructure projects have been studied for decades, most studies have emphasized economic or contingency-based perspectives. Of those studies, some researchers have focused on governance frameworks for public infrastructure projects and their impact on shaping the front-end phase of those projects. Yet, little is known about the way actors translate and enact those governance frameworks into practice (Brunet & Aubry, 2018). Management of projects in an institutional context could be viewed on three functional levels technical, strategic, and institutional level (Morris and Geraldi, 2011).

A sensemaking perspective is mobilized to empirically study how project actors perceive the effects on government efficiency, legitimacy, and accountability of Quebec's (Canada) governance framework (Brunet, 2021). Results highlight the specificities and tensions between these three objectives, exploring the positive accounts, potential improvements and dynamic aspects associated with each. Using a multilevel perspective, results show that each level is related to a central objective: the institutional level with legitimacy, the organisational level with accountability and the project level with efficiency. Tensions are found within each level but more importantly between them, as some objectives oppose the others, making it challenging to attain an overall equilibrium.

#### 3.1.3 Evolutionary governance

Megaprojects carry high risks and many uncertainties, are difficult to coordinate, and involve many stakeholders. Traditional project management concepts and strategies have been proven to be less than efficient for modern megaprojects. The literature tends to treat governance issues as being static, but project development processes and environments are dynamic. To a certain extent, project governance could effectively resolve some limitations that traditional project management shows, including the clarification of responsibilities, privileges, and benefits between participating stakeholders. The governance regimes must adapt to the specific project and context, deal with emergent complexity, and change as the project development process unfolds (Miller & Hobbs, 2005).

Li et al., (2019) contribute to the development of a comprehensive conceptual governance model that quantifies governance status over the period of megaproject development and delivery. Gil, (2021) however analyses the challenges that he faced in the pursuit of a theoretical perspective with the power to predict and explain empirical regularities on megaproject behaviour, and thus capable of illuminating the pervasiveness of major cost and schedule slippages as well as scope creep.

### 3.2 Mechanisms of Governance

The thematic analysis identified governance mechanisms both formal and informal.

#### 3.2.1 Formal Governance

##### 3.2.1.1 Alliance and partnering

Public infrastructure projects must comply with the divergent and even conflicting demands of multiple institutional logic which often cause institutional complexity. Matinheikki et al., (2019) demonstrate how public buyers of a tunnel construction project formed a hybrid organisation of a multi-party project alliance to respond to institutional complexity. They delineate a process of temporary hybridization through which the competing logic of a bureaucratic state, corporate market, and multiple professions were combined within the temporary project alliance organisation. Such temporary hybridization not only focused on selective coupling with external demands but also mitigated internal tensions. Their findings emphasize a blended organisational structure, jointly formed governance and incentive systems, and the facilitation of social interaction to build a temporary yet sustainable hybrid organisation capable of combining conflicting institutional logics.

Alliance mechanisms have been introduced in megaprojects to improve the alignment of objectives, risk and reward between client and contractor (Galvin et al., 2021). However, the relational norms of alliances are not sufficient on their own to eliminate opportunistic behaviours. Their study shows that investing in mechanisms supportive of governance, culture, and trust provides a platform upon which firms may foster collaboration and limit self-interest-oriented behaviour amongst alliance partners. Their qualitative case study of a major project-based organisation reveals that governance, culture and trust are interlinked and complementary, and managers need to reflect holistically on their interactions to establish collaborative, rather than opportunistic behaviours.

#### 3.2.1.2 Process and institutional framework

The public and private participants (PPP) in infrastructure have developed practices and a mature institutional framework necessary for long-term, risky public-private commercial partnerships. Levitt & Eriksson, (2016) develop a governance model for infrastructure service delivery based on the interview with the 25 senior executives of public and private participants in PPP infrastructure projects. The concessionaire is a private entity in charge of financing, designing, constructing, operating, and maintaining the infrastructure service. The government supervises the infrastructure service, to safeguard the public interest. The government also provides an institutional framework, with contracts and authorities necessary for the interaction between the public and private actors. Qiu et al., (2019) however argue that a significant research gap exists in our understanding of how to govern institutional complexity in megaproject organisations. They conducted a case study of the Hong Kong-Zhuhai-Macao Bridge project in order to elaborate on when institutional complexity emerges and how institutional complexity affects project outcomes and shapes actors' behaviours. They found that institutional complexity stems from both external (macro-level) environments and internal actors (micro-level environments), and consists of regulatory, political, and social complexity and cultural, evolutionary, and relational complexity, respectively. In addition, they found that institutional complexity from the macro environments will result in constraint conflicts in megaproject organisations, whereas the different practices and identities of the project's various micro-actors will create organisational conflicts. Actors within the megaproject organisations choose different responses when faced with different types of institutional complexity.

#### 3.2.1.3 Contract

Megaprojects are complex, but people use constructs inappropriate in complex situations for their management, particularly contractual arrangements based on principal-agent governance and conventional project management, which is good at solving puzzles but not at enlightening mysteries (Turner, 2022). Conventional project management emphasizes control at the expense of innovation. In cases of high uncertainty, innovation is required as unexpected events occur. Comparative analysis shows that project governance provides a structured mechanism to identify and address risks as they occur. While centralised, single-agent governance was adopted in the form of Project Management Headquarters (PMH) in Yi-wan Railway project, an alliance governance structure was used in the NGTR project. The former enabled top-down risk allocation whereas the latter encouraged proactive solutions to risk sharing (Guo et al., 2014).

The choice of appropriate governance structures for public infrastructure projects is a major challenge for governments (Dhanshyam & Srivastava, 2021). They derive conditions under which specific governance structures maximise welfare. Their analysis reveals that PPPs induce optimal innovation and maximise welfare if governed through revenue-sharing concessions for user-payment type services and fixed-price annuity type contracts for no-user-payment type services.

Construction joint ventures (CJVs) have become one of the major organisational forms utilized in large-scale projects. However, because of the complexity of CJVs, the management of CJVs is much more difficult than that of usual projects undertaken by a single construction firm. Ineffective management and cooperation in JVs usually lead to poor performance. The investigation confirmed that governance structure fit has significant positive impacts on CJV performance (Lin & Ho, 2013).

#### 3.2.1.4 Assurance and governmental governance

Effective and robust governance of major projects and programmes in the public sector is crucial to the accountability of the state and the transparency of state spending (Vo et al., 2021). Delivery confidence of the major projects and programmes delivered under UK government have been increased during the time they are assured. This would suggest that "enhanced" governance routines are desirable in programmes and projects that exhibit high degrees of complexity and scale.

The UK Olympic Delivery Authority (ODA) transport team was responsible for providing safe, reliable, and efficient transport during the London 2012 Olympic and Paralympic Games, and for leaving a positive transport legacy. Many organisations such as Transport for London, Network Rail, and the Highways Agency worked together on this task. A 'light on the process, heavy on performance' approach, underpinned by a comprehensive assurance framework and strong financial control, drove the projects forward. The project was delivered under budget and ahead of time (Kershaw, 2012).

While the governance of Western megaprojects is indirectly influenced by governments through legislation and regulations, the Chinese state actively oversees and controls projects of societal importance. To provide clarity on the role of the state in Chinese megaprojects, Zhai et al., (2020) carried out a case study focusing on EXPO 2010 Shanghai. Their analysis revealed that through a project-specific organisation Construction Headquarters (CHQ), the Chinese state executes administrative strength, forces authorities to temporarily integrate their processes for the benefit of the project, influences contractor and resource selection decisions, induces leadership accountability, and promotes shared project values.

#### 3.2.1.5 Goal alignment and programme management

Based on a theory derived from management literature, Hjelmbrekke et al., (2017) outline a framework combining a project's business case and governance functions with the business model of the design team. This was tested in two major projects and evaluated in three expert workshops. The research reveals that the business model of the design team focuses on efficiency rather than on the client's strategic objectives. The framework presented shows the promising capability of aligning the project goal with the client's strategy.

A dedicated project team applied innovative project management skills to deliver four complex public health infrastructure projects concurrently at Gold Coast, Queensland within the approved budget, time and quality (Hawkins et al., 2016). Fast-tracking of project delivery effectively reduced timeframes through risk managing the concurrent delivery of health service planning, project definition plans and schematic and developed design processes, which are traditionally completed as sequential programmes of work. Their research describes the best practice project delivery methodology. It explores an ethos of teamwork and partnering that created opportunity and integrated risk management priorities, which gave comfort and confidence to the Queensland Government and all key stakeholders.

Programme management is increasingly regarded as a key approach to improving the performance of a construction megaproject through the coordinated management of its constituent projects. Hu et al., (2015) argued that previous studies have seldom provided a pragmatic program management framework that can fully address the requirements of clients in managing construction megaprojects. They identified 12 principal program organisation factors based on a case study of the Shanghai Expo construction which are grouped under three main categories (environmental capability, core capacity, and motivational capability of the client's program organisation to manage its construction megaproject), are identified as (1)

contextual understanding, (2) program strategy, (3) program leadership, (4) scope management, (5) program governance, (6) matrix organisational structure, (7) program management office, (8) use of project breakdown structure and work breakdown structure tools, (9) partnering with key stakeholders, (10) technology management, (11) communication management, and (12) team building.

### 3.2.2 Informal Governance

#### 3.2.2.1 Informal Network

Many of the challenges of implementing large multi-firm projects are captured in the multi-dimensional concept of distance between firms in a large project's actor-network (Ruuska et al., 2009). They develop a distance framework that includes three dimensions: firm attributes describing actors' characteristics, network attributes describing the distance in the relationships among the actors in the whole project network, and project practices increasing or decreasing distance among project network's actors. Ruuska et al., (2011) suggest that in the governance of large multi-firm projects, any of the prevalent governance approaches that rely on market, hierarchy, or hybrid forms, is not adequate as such. Their analysis suggests four changes in the prevailing perspective toward the governance of large projects. First, there should be a shift from viewing multi-firm projects as hierarchical contract organisations to viewing them as supply networks characterised by a complex and networked organisational structure. Second, there should be a shift in the emphasis of the predominant modes of governance, market and hierarchy towards novel governance approaches that emphasize network-level mechanisms such as self-regulation within the project. Third, there should be a shift from viewing projects as temporary endeavours to viewing projects as short-term events or episodes embedded in the long-term sphere of shared history and expected future activities among the involved actors. Fourth, there should be a shift from the prevailing narrow view of a hierarchical project management system towards an open system view of managing in complex and challenging institutional environments.

Kujala et al., (2021) carried out a study to create a framework to analyse approaches for coordination, adaptation and safeguarding of exchanges in inter-organisational project networks. They found that the focal organisation may have had a significant role in the design of governance, but governance also emerged from the network structure of companies and the interactions among them. The management of major inter-firm projects requires a coherent, holistic governance framework to be effective. However, most existing models of project governance are limited to a narrow selection of contractual, structural or procedural aspects, and further neglect contextual factors, such as key characteristics of a project and its partners.

Large projects are predominantly carried out in inter-organisational networks that temporarily unify the efforts of multiple firms to work towards a shared goal, such as the construction of a complex infrastructure asset. (Ahola, 2018) argued that while earlier research has highlighted multiple features that are salient to these inter-organisational projects (IOPs), and discussed how they are managed, research that would systematically address the differences amongst IOPs is still in its infancy. Drawing on a review of existing research on project organising and network research, he proposes a typology of IOPs consisting of three ideal network types: market-based network, dyad-driven network, and integrated core network.

#### 3.2.2.2 Trust

The development of trust is a major challenge for the governance of public-private infrastructure megaprojects. Contractual pre-arrangements should provide a blueprint for

collaborative behaviour and trust development, but the characteristics of megaprojects challenge such arrangements (Ruijter et al., (2021). Drawing on the theory of relational governance, Q. Li et al., (2018) carried out a study to determine the nexus of inter-organisational trust, principled negotiation, and joint action in cost performance. The results show that inter-organisational trust has direct and indirect positive effects on improving cost performance.

Wu et al., (2020) aim to investigate the relationships between the different strengths of ties (strong ties and weak ties), types of trust and project performance in megaprojects. The results show that both strong ties and weak ties have positive impacts on trust in megaprojects, but weak ties have a more significant positive effect than strong ties. These findings provide evidence regarding the strength of ties governance being a part of the effective strategy in improving megaprojects' performance. This study however has some limitations. For example, the strength of ties and trust between organisations is a dynamic process in megaprojects. This study does not conduct an in-depth analysis of the evolution mechanism and investigate the different levels of trust at different stages of the megaproject.

A great deal of literature has pointed to the importance of trust as a facilitator of positive relationships among project stakeholders. Trust is argued to enhance a variety of intra-organisational relationships, including project team dynamics, top management support, and coordination across functional departments. Likewise, trust is argued to improve the inter-organisational relationships among principal actors in project development, such as contractors, owners, and suppliers (Pinto et al., 2009).

#### 3.2.2.3 Relationship Management

Current literature on relationship management has focused on formal mechanisms such as contracts but has neglected the inter-organisational behaviour that determines the effective adoption of relational mechanisms in the context of megaprojects (Zheng et al., 2018). The relational behaviour of project participants is crucial to the success of a megaproject. Zheng et al., (2019) argued that although project governance has been widely studied with the aim of improving participants' relational behaviour, limited research examines the distinct effectiveness of various governance mechanisms in influencing relational behaviour, especially in megaprojects. Through examining three varieties of governance mechanisms, contract, trust, and institutional support, a hierarchical moderated regression analysis has been used to explore the impact of each of the governance mechanisms in facilitating the relational behaviour of megaproject participants and further team performance. Results unveiled that both contractual term specificity and its interaction with trust can facilitate relational behaviour.

### 3.3 Enablers of governance

#### 3.3.1 Committed Leadership

Leadership styles and governance have been found to have a significant relationship with project performance (Al-Subaie et al., 2021). A study of various leadership styles and governance with project performance for emerging economies such as the Middle East is carried out by Al-Subaie et al., (2021) using data from 157 senior managers from megaprojects in Qatar. The result shows a positive relationship between the transformational style of leadership and megaproject performance. It also establishes a positive relationship between project governance and megaproject performance.

Newlove-Eriksson, (2020) studied accountability in safety management in newly tunnelled lines in London Stratford station and Stockholm Station City. Differences in origin, national

and regional significance, and specific governance features of these megaprojects are identified. Both megaprojects span decades, with turnover and lack of institutional memory posing further challenges for accountability and safety. A major finding is that complementary to standard risk analysis, accountability in the governance of infrastructural megaprojects begs improvement.

### 3.3.2 Collaboration

Construction organisations are increasingly cooperating in what is often referred to as a "collaboration network" that enabled them to share risks, pool resources and explore opportunities to jointly participate in managing large-scale projects (Liu et al., 2015). Brunet & Forgues, (2019) investigate a case of collective sensemaking about the project success of the multifunctional amphitheatre of Quebec (Canada). According to the respondents, the main success factors of this project can be attributed to a clear governance structure; proven project management and construction methods; the use of emerging collaborative practices in construction (such as building information modelling (BIM) and lean construction); an adapted policy for procurement; as well as a code of values and ethics shared by all stakeholders.

Inter-organisational projects struggle to build a sense of joint belonging and a culture of cooperation (Hietajärvi & Aaltonen, 2018). To extend existing knowledge of how collaborative identity is formed in inter-organisational infrastructure projects, a study is carried out to understand how the specific characteristics of temporary organisations influence identity formation activities. A case study of the first Finnish infrastructure alliance project identifies six key activities supporting the formation of collaborative project identity: (1) articulating a joint vision for collaborative project identity; (2) converging on mutual conceptions of collaborative project alliance philosophy; (3) attaining a shared collaborative mentality; (4) designing ways of working with multiple identities; (5) attaining distinctiveness and (6) legitimizing activities. The findings indicate that identity formation activities are context-dependent, and that the formation of organisational identity differs between temporary and permanent organisations.

### 3.3.3 Stakeholder Management

External stakeholder engagement is crucial for delivering value to diverse stakeholders in inter-organisational projects, however, it is not straightforward to organize this in a way that adds value. Lehtinen & Aaltonen, (2020) explores how internal stakeholders organize external stakeholder engagement in inter-organisational projects. The research based on the case study of two infrastructure projects in Northern Europe identified three organizing solutions based on governance, values and dynamism. While governance-based solutions provide an overall structure for organizing external stakeholder engagement, value-based solutions ensure genuine cooperation and dynamism-based solutions facilitate timely organizing.

Despite the importance of stakeholders in project governance, project management literature lacks an inclusive framework that defines the roles, relationships and positions of internal and external stakeholders inside and outside of the organisation's governance structure (Derakhshan et al., 2019). The review of project governance literature reveals that three contexts are influencing an organisation's approaches toward stakeholders: success, megaprojects and ethics. The developed conceptual framework illustrates that organisations are in direct contact with external stakeholders at the organisational level and project level. Strategic decisions made at the organisational level are operationalised at the portfolio level and influence the approach towards external stakeholders at the project level.

### 3.3.4 Culture

Governance mechanisms are crucial to the success of joint-venture (JV) megaprojects. Based on the transaction cost economics and relational exchange theory, Xue et al., (2017) present a case study of Chinese JV megaprojects to explore the impact of governance mechanisms in promoting cooperation and restraining opportunism. They investigate how guanxi, as a contextual variable, affects the effectiveness of different governance mechanisms when dealing with cooperation and opportunism in JV megaprojects. The findings suggest that guanxi plays an important role in affecting the effectiveness of partnership governance mechanisms in megaprojects. In the low guanxi scenario, both contractual and relational governance mechanisms effectively increase partner cooperation, and contractual governance mechanisms also help restrain opportunism. However, in the high guanxi scenario, only relational governance mechanisms play an effective role in resolving the JV social dilemma.

van Marrewijk & Smits, (2016) explore the cultural practices of governing through a one-year ethnographic field study of the Panama Canal Expansion Megaproject. They found five cultural practices influencing the governance of this megaproject: (1) ritualizing the bid-winning ceremony, (2) changing teams, (3) struggling over governance structure, and labelling according to (4) national and (5) organisational cultures.

## SECTION 4 Discussion

The well-described failures of implementing large infrastructure projects on time and budget using traditional turn-key contracts and competitive tendering approaches have led to a search for better delivery methods, such as project partnering, integrated project delivery, or project alliance (Lahdenperä, 2012). Historically project governance has been defined as static and referred to the structure put in projects but in recent years scholars arguing governance as dynamic, processual and anchored in multiple levels – project, organisation and institution (Brunet and Aubry, 2018; Brunet, 2019).

Governance is a multi-level phenomenon that facilitates interactions between organisational actors within and across organisational levels. (Biesenthal & Wilden, 2014) suggest that future empirical research should focus on investigating project governance concerning different suggested organisational levels. Level-specific research offers the ability to draw context-specific conclusions and explain actions and practices, about the roles and responsibilities of particular organisational layers.

Formal governance of large-scale construction projects involves the development of a set of principles, responsibilities, processes, and structures (Müller et al. 2016). Galvin et al., (2021) argued that in recent years, megaproject sponsors have gradually moved away from traditional, adversarial forms of contracting and focused more on collaborative approaches that encourage cooperation. The result has been an increasing reliance on various forms of non-traditional contracts to deliver megaprojects, including alliances, relational contracts, or public-private partnerships –as these contractual forms enable participants in the contract to ‘share the gain and share the pain’ (Lloyd-Walker Mills, & Walker, 2014).

The literature review suggests that the principal-agent governance approach is not suitable for megaprojects. Alliance contracting is required in more complex situations, especially where there is uncertainty about both the end product and the method of achieving it. Conventional project management is good at solving puzzles, but not at enlightening mysteries encountered in complex situations (Turner, 2022). Alliance contracting techniques can result in improved

long-term service outcomes through enhanced governance structures and greater value for money (Clifton & Duffield, 2006)

Performance of an integrated project delivery (IPD) is very much like a high-performance team however with a couple of subtle twists: the project alliance is more fragile than traditional high-performance teams as it operates under the constraints of multiple parent organisations with divergent interests, and the composition of the alliance team is subject to relatively frequent changes (Galvin et al., 2021). The implication for the success of complex projects is that a holistic and integrated approach is required to establish and maintain collaboration between alliance members and that this requires continual efforts throughout the phases of the project. Looking forward, the role of the IPD is critical and it would be beneficial to study how alignment or misalignment amongst this group impacts the functioning of the alliance contract.

All major inter-firm projects require the alignment and coordination of several participating firms. The key challenge is managing the set of firms participating in a given project. Since no actor has total control and authority over all others, firms are suggested to balance authority and responsibility in inter-firm projects among stakeholders (von Danwitz, 2018). Research on inter-organisational networks is often concerned with the performance implications of different network forms. Ahola (2018) argues that a logical step forward would be to engage in empirical research addressing the performance of different types of networks. A further future stream of research could be directed towards uncovering different approaches to how multiple organisational actors can jointly contribute to both ex-ante and ex-post setting of project goals.

Inter-organisational relationship quality has been recognized as a key factor in the success of megaprojects because high-quality relationships facilitate communication, as well as the exchange of information and knowledge (Brunet, 2021; Davies et al., 2009; Wang et al., 2021; Wang et al. 2019). Because interactions between the stakeholders of megaprojects are complex, tensions are unavoidable (Pesmaa et al., 2018; Yan et al., 2021). In particular, value and goal conflicts have hampered inter-organisational relationship quality (Locatelli et al., 2020). Therefore, managing relationship quality has become a prominent challenge for project managers (Lu & Guo, 2019). Zheng et al., (2018) suggest that relationship management is a beneficial way to support project success in the construction field (Solis et al. 2013), especially in mega-projects that involve numerous stakeholders, complex stakeholder interrelationships, conflicting interests, and considerable uncertainty.

The formation of a shared collaborative project identity particularly in complex inter-organisational project settings involving members from diverse firms and non-business organisations often with conflicting goals, values, norms, practices, cultures and identities that need to be overcome to develop the joint working practices, goals, processes and identity that are specific to that alliance project (Hietajärvi & Aaltonen, 2018). Galvin et al., (2021) discuss how governance, trust and culture need to be strongly aligned for collaboration to establish, as any weakness in one of those mechanisms is potentially inviting the return of opportunistic behaviours.

Governance is recognised as the foundation for driving systematic industry reform. Effective governance enables owners and investors to manage the complexity of their infrastructure investments and their relationships with stakeholders and, in particular: articulate and deliver true value; champion long-term socio-economic outcomes over short-term tactical objectives and; engage with stakeholders in a joined-up way that works for the whole programme (P13 BLUEPRINT 02 P13-Blueprint, n.d.).

## SECTION 5 Conclusion

A systematic review of literature and analysis of their findings by applying Gioia method has helped to summarise the key themes as listed below in figure 4. The analysis revealed aspects of governance, governance mechanisms and enablers of governance as aggregate dimensions and number of second order concepts under each of the aggregated dimensions as presented below.

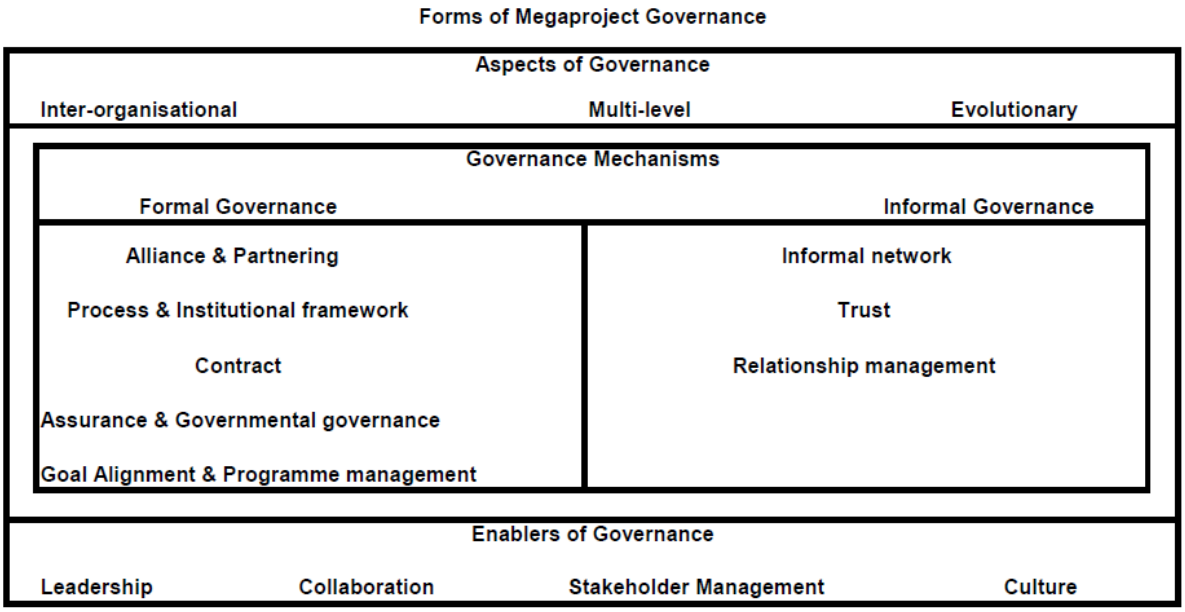


Figure 4: Forms of Megaproject Governance

The main challenges in the implementation of a complex infrastructure project are not technical but are rather those related to how to govern the work in a complex inter-organisational setting that brings together a diverse set of actors who differ in their values, knowledge, culture, traditions, goals, and business models (Kujala et al., 2021). One major finding in project governance research is that governance theories such as agency theory, transaction cost economics, stakeholder theory, shareholder theory, stewardship theory and resource dependence theory may be suitable for a simple project but do not address the challenges of complex megaprojects (Rodney Turner, 2022). Aligning multiple perspectives and interests to achieve a shared understanding of project goals and methods on how to reach those goals is extremely challenging.

Megaprojects warrant scholarly and practitioner attention as they involve high stakes and have major social, economic and environmental impacts. Achieving the targeted objectives and larger societal benefits of these projects within their designated scope, schedule and budget is still far from optimal (Flyvbjerg,2014). The enhancement of governance through both structures and less formal mechanisms is widely accepted as a potential solution to this problem (Denicol et al., 2020).

The role of the Integrated Project Delivery is critical, and it would be beneficial to study how alignment or misalignment amongst this group impacts the functioning of the alliance contract (Galvin et al., 2021). Value and goal conflicts have hampered inter-organisational relationship quality (Locatelli et al., 2020). Therefore, managing relationship quality has become a prominent challenge for project managers (Lu & Guo, 2019). A further future stream of research could be directed towards uncovering different approaches to how multiple

organisational actors can jointly contribute to both ex-ante and ex-post setting of project goals in inter-organisational networks (Ahola, 2018).

Various industry initiative including the Institution of Civil Engineers' P13 blueprint has recognised governance as the foundation for driving systematic industry reform (*P13 BLUEPRINT 02 P13-Blueprint*, n.d.). Governance is a multi-level phenomenon that facilitates interactions between organisational actors within and across organisational levels. Biesenthal & Wilden, (2014) suggest that future empirical research should focus on investigating project governance concerning different suggested organisational levels. Newlove-Eriksson, (2020) suggests that accountability in the governance of infrastructural megaprojects needs improvement.

Based on the thematic analysis of systematic review and the discussion above, I have identified the following topics for future research.

Table 2: Topics identified for future research

| **Topics for future research** | **Description** |
|---|---|
| Aligning multiple perspectives, values and goals in an inter-organisational megaproject | Analysis shows that the main challenges in the implementation of a complex infrastructure project are not technical but about how to govern the work in a complex inter-organisational megaproject. |
| How does alignment or misalignment among the member of Integrated Project Delivery impact the functioning of the alliance contracts? | Alliance governance mechanism has been used to deliver some of the megaprojects. It would be beneficial to study how alignment or misalignment amongst this group impacts the functioning of the alliance contract. |
| How does multiple organisational actors can jointly contribute to both ex-ante and ex-post setting of project goals? | Value and goal conflicts have impacted the inter-organisational relationship quality. A future stream of research could be directed towards uncovering different approaches to how multiple organisational actors can jointly contribute to both ex-ante and ex-post setting of project goals in inter-organisational networks. |
| Governance at different organisational levels | Megaproject governance operates in multi-level such as organisational, programme and project levels. Future research could be carried out on how governance works on various levels. |
| Improving accountability in the governance of megaprojects | Thematic analysis identified that the accountability in megaprojects needs improvement. Future research could be carried out on how to improve accountability in inter-organisational governance. |

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# Inter-organisational governance in megaprojects: a systematic review and an agenda for future research

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