

This file was downloaded from BI Open, the institutional repository (open access) at BI Norwegian Business School <http://biopen.bi.no>
It contains the accepted and peer reviewed manuscript to the article cited below. It may contain minor differences from the journal's pdf version.

Sankaran, S., Müller, R., & Drouin, N. (2020). Creating a ‘ sustainability sublime ’ to enable megaprojects to meet the United Nations sustainable development goals. *Systems Research and Behavioral Science*, 37(5), 813–826. <https://doi.org/10.1002/sres.2744>

Copyright policy of Wiley, the publisher of this journal:

Authors are permitted to self-archive the peer-reviewed (but not final) version of a contribution on the contributor's personal website, in the contributor's institutional repository or archive, subject to an embargo period of 24 months for social science and humanities (SSH) journals and 12 months for scientific, technical, and medical (STM) journals following publication of the final contribution.

<https://authorservices.wiley.com/author-resources/Journal-Authors/licensing/self-archiving.html>

Creating a 'sustainability sublime' to enable megaprojects to meet the United Nations Sustainable Development Goals

Shankar Sankaran
Professor Organizational Project Management
School of the Built Environment
University of Technology Sydney
UTS City Campus, P.O. Box 123, Ultimo, NSW 2007, Australia
Past President: International Society for the Systems Sciences (ISSS)
Email: shankar.sankaran@uts.edu.au
Phone: +61295148882

Ralf Müller
Professor of Project Management
BI Norwegian Business School
0484 Oslo, Norway
Adjunct Professor
School of the Built Environment
University of Technology Sydney
UTS City Campus, P.O. Box 123, Ultimo, NSW 2007, Australia
Email: ralf.muller@bi.no
Phone: +46706891040

Nathalie Drouin
Executive Director, KHEOPS
Professor, Université du Québec à Montréal
Associate Researcher ENAP
4750, avenue Henri-Julien
Office 5128.2, 5th floor
Montreal (Quebec) H2T 3E5
CANADA
Adjunct Professor
School of the Built Environment
University of Technology Sydney
Editor-in-chief, IJMPB
514 849 3989 #3949
Cell. 514 378-9820

Abstract:

Despite cost and schedule overruns and benefits shortfalls, megaprojects (which are large-scale projects that typically cost over a billion dollars and take years to develop and build) continue to be promoted and built creating a megaproject paradox. Prominent megaproject scholar Bent Flyvbjerg (2014) argues that this could be motivated by four ‘sublimes’ – technological, political, economic and aesthetic that drive new megaprojects being put forward despite their poor performance. Recent evidence shows that better governance practices are helping to improve the overall performance of megaprojects.

Despite the United Nations setting 17 sustainable development goals (SDGs) to be achieved by 2030, there are severe shortfalls in initiatives from governments, public organizations and private businesses endangering the achievement of targets set for these goals. In addition, time is running out to achieve these goals with only a decade left. The current initiatives contributing to these goals appear to be focused on individual SDGs even though many of these are interrelated. This article proposes that if politicians, engineers and scientists, businesses leaders and design thinkers could be motivated by a ‘sustainability sublime’ to create megaprojects that contribute to SDGs, it could benefit both the society and the planet. It also argues that a more integrated view of UN SDGs and a suitable governance structure should be applied to ensure that megaprojects created as a result of the sustainability sublime deliver benefits towards achieving UN SDGs.

Keywords: Megaprojects; UN Sustainable Development Goals; Sustainability; Integrated Governance; Viable Systems Model; Sublime

Creating a ‘sustainability sublime’ to enable megaprojects to meet the United Nations Sustainable Development Goals.

Introduction

Despite cost and schedule overruns and benefits shortfalls, megaprojects (which are large-scale projects that typically cost over a billion US dollars and take years to develop and build) continue to be promoted and built creating a megaproject paradox. Prominent megaproject scholar Bent Flyvbjerg (2014) argues that this could be motivated by four ‘sublimes’ – technological, political, economic and aesthetic that drive new megaprojects being put forward despite their poor performance. Recent evidence shows that better governance practices are helping to improve the overall performance of megaprojects (Denicol et al, 2020).

Despite the United Nations setting 17 sustainable development goals (SDGs) to be achieved by 2030, there are severe shortfalls in initiatives from governments, public organizations and private businesses endangering the achievement of targets set for these goals. In addition, time is running out to achieve these goals with only a decade left. The current initiatives contributing to these goals appear to be focused on individual SDGs even though many of these are interrelated. This article proposes that if politicians, engineers and scientists, businesses leaders and design thinkers could be motivated by a ‘sustainability sublime’ to create megaprojects that contribute to SDGs, it could benefit both the society and the planet. It also argues that a more integrated view of UN SDGs and a suitable governance structure should be applied to ensure that megaprojects created as a result of the sustainability sublime deliver benefits towards achieving UN SDGs.

This article is structured as follows. First, a literature review is presented to set up the research question. This is followed by a discussion on what is preventing the delivery of UN SDGs. A brief discussion on the recognition for the need of systems literacy in project management follows. Next, it discusses various governance strategies that have been presented in the literature to improve the integration and governance of UN SDGs. Then it proposes a governance model for megaprojects supporting the delivery of the UN SDGs based on Stafford Beer’s Viable Systems Model. Finally, limitations of this proposal are presented with ideas for future steps.

Literature Review

According to Flyvbjerg (2017, p.2.) megaprojects are ‘large-scale, complex ventures that typically cost over US\$ 1 billion or more, take many years to develop and build, involve multiple public and private stakeholders, are transformational and impact millions of people’. Although megaprojects do bring some benefits to society, in the long run, they also create displacements transforming ‘landscapes rapidly, intentionally and profoundly in very visible ways’ (Gellert & Lynch 2003, p.15). They also often ‘disappoint their sponsors [people who promote and finance them]’ (Merrow 2011, p.12)

Despite criticisms about the performance of megaprojects more of them continue to be built. They are getting even bigger, leading to what Flyvbjerg calls the ‘tera era of trillion-

dollar projects' (Flyvbjerg 2014, p.6). Why are more megaprojects being built despite these criticisms and 'social and biogeophysical' displacements (Gellert & Lynch 2003, p.16)? Flyvbjerg et al. (2003) attribute this to a 'megaproject paradox' as despite their poor performance (substantial cost overruns and benefits shortfalls) more of them are getting built. He proposes four sublimines (Flyvbjerg 2014) that drive the reason for more megaprojects being built. The term 'technological sublime', used by Flyvbjerg (2014), was first used by Frick (2008, p. 239) to describe the San Francisco-Oakland Bay Bridge quoting Nye (1994, p.xvi) who used the term 'technological sublime' to describe 'repeated experiences of awe and wonder, often tinged with an element of terror, which people have had when confronted with particular natural sites, architectural forms and technological achievements'.

According to Flyvbjerg (2014, p.8), the first sublime is technological, 'the excitement engineers and technologists get in pushing the envelope for what is possible in "longest-tallest-fastest" types of projects' (e.g. Burj Khalifa in Dubai <https://www.burjkhalifa.ae/en/>). Second is the political sublime, 'the rapture politicians get from building monuments to themselves and for their causes, and from the visibility this generates with the public and media' (e.g. Statue of Unity near Ahmedabad in India to honour a freedom fighter <https://statueofunity.guide/>). Third is the economic sublime, 'the delight business people and trade unions get from making lots of money and jobs off megaprojects, including money made for contractors, workers in construction and transportation, consultants, bankers, investors, landowners, lawyers, and developers' (e.g. Westconnex in Sydney, Australia, <https://www.westconnex.com.au/>). Fourth is the aesthetic sublime, 'the pleasure designers and people who love good design get from building and using something very large that is also iconic and beautiful' (e.g. Golden Gate Bridge in San Francisco, US, <https://www.goldengate.org/>).

However, Söderlund et al. (2017) point out that although megaprojects, driven by these sublimines, are often criticized as being symbolic, such as the controversial Rogun Dam in Tajikistan (Menga 2018), they have also provided large-scale benefits that could not have been achieved by thinking small. As an example of such a beneficial megaproject Söderlund et al. (2017) point to the 'large-scale and pre-industrial canal projects' (p.4) such as the Bridgewater Canal, with its aqueducts constructed in England in 1761 (Nevell & Wyke 2011). The canal resulted in unprecedented economic and social development contributing to the industrial revolution. Next, we take a brief look at the Sustainable Development Goals (SDGs) set by the UN and their current state to discuss how megaprojects could serve as a strategy to help with their achievement.

UN SDGs

The member states of the UN adopted a shared blueprint in 2015 to achieve 17 SDGs by 2030. These goals 'recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests' (<https://sdgs.un.org/goals>).

Table 1 lists the 17 SDGs

Table 1 UN Sustainable Development Goals (<https://sdgs.un.org/goals>)

Goal	Theme	Aim
1	No Poverty	In all its forms everywhere
2	Zero Hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3	Good Health and Wellbeing	Ensure healthy lives and promote well-being for all at all ages
4	Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5	Gender Equality	Achieve gender equality and empower all women and girls
6	Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all
7	Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable and modern energy for all
8	Decent Work and Economic Growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9	Industry, Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10	Reduces Inequalities	Reduce inequality among countries
11	Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient and sustainable
12	Responsible Consumption and Production	Ensure sustainable consumption and production patterns
13	Climate Action	Take urgent action to combat climate change and its impacts
14	Life Below Water	Conserve and sustainably use oceans, seas and marine resources for sustainable development
15	Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16	Peace, Justice and Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17	Partnership for the Goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development

A quick glance at the aims of the various SDGs reveals that some of these may complement others while some could be in conflict. For example, SDG 8 (decent work and economic growth), which has an economic imperative, may make it difficult to address SDG 13 (climate action), which requires tackling climate change. On the other hand, SDG 1 (no poverty), which aims to eradicate poverty, would support SDG 2 (end hunger). From a project management perspective, the 17 goals seem like a Work Breakdown Structure (Devi & Reddy 2012) to divide the goals into manageable parts. This, however, goes against taking a systemic view of projects due to the interrelationships between the goals, which could support or stand in the way of achieving them (Williams et al. 2005). Goal 17 (partnership for the goals), however, seems to have been set up to encourage a more holistic approach and play an integrative purpose through partnerships.

This division of goals has prompted scholars to critique the lack of integration of the SDGs. Corbett and Mellouli (2017), who studied the implementation of SDG 11 (sustainable cities and communities), investigated two information systems used by a smart city to manage water quality and green space. They then proposed a model for an integrated ecosystem to manage the interaction between administrative, political and sustainability spheres and their interrelationships to support the implementation of the smart cities project.

Constanza et al. (2014) also recommend an 'articulation and measurement of an overarching goal' (p.13) to which several goals could contribute. They suggest setting up a hierarchy of goals that can help integration. They propose that SDGs 7-12 could result in efficient allocation to 'build a living economy'; SDGs 1-5, 10, 16 and 17 could contribute to 'fair distribution protecting capabilities of flourishing'; and SDGs 6 and 13-15 to a 'sustainable scale to stay within planetary boundaries'. Nunes et al. (2016) who analysed SDG 3 (health and well-being) demonstrate that it could, in fact, be related to all the other SDGs and propose that the SDG agenda 'requires an operational approach to implementation that emphasizes integration across the agreed goals and objectives' (p.11). Stafford-Smith et al. (2017) add that the implementation targets are 'largely silent about interlinkages and interdependencies among goals' (p.912), which could lead to 'perverse outcomes, where achieving human development in the short term may undermine the capacity of the global life support system' (p.932), citing Griggs et al. (2013). Therefore, an integrated view of these goals could help the achievement of intended results avoiding unintended consequences. Monkelaan (2019) suggests that one way to help with the integration is to establish effective governance practices for the UN SDGs.

Although the SDG goals have been taken up by member nations, the UN SDG progress report (UN SDG Report 2020) states that 'support for implementing the SDGs have been steady but fragile with major and persistent challenges' (p.57). These are attributed to lack of financial resources, trade barriers and lack of data. The progress has also been hampered recently by the COVID-19 lockdown. There are efforts being made to scale up SDG implementation and several strategies have been proposed to achieve this (Nhamo & Mjimba 2020).

In this article, the authors would like to propose that one possible way to scale up the initiatives and also taking an integrated approach to work across the SDGs, would be

through megaprojects with effective governance practices as a way to move forward. Hence the following research question is addressed in this article:

Research question:

How can we initiate megaprojects to accelerate the achievement of UN SDGs?

And a corollary question:

If such megaprojects were to be initiated, how can we establish a governance model to ensure that they will work across UN SDGs to deliver the expected benefits?

Discussions

A review of current initiatives being pursued to support the achievement of the UN SDGs was carried out by the authors by reviewing the annual reports of the SDGs at the UN's website. Although these reports contain data about achievements against targets for each of the SDGs and shortfalls, they do not contain sufficient information on the size or value of the initiatives being undertaken. Reports by countries against SDGs also did not provide such data. After reviewing several documents available to the public on the UN SDG site, a review of successful case studies of projects carried out by member nations (SDG Case Studies) was examined. The case studies did not provide complete data on projects; however, they provided more details on the initiatives. On examination of more than twenty case studies, it was found that several of them appear to be small initiatives focusing on a few goals.

Subsequently, a literature search was carried out using the search terms 'projects' or 'initiative' and 'UN Sustainable Development Goals' using Google scholar out of which 45 articles and some news items were selected for review.

The review of these articles provided some examples of major projects funded towards UN SDGs. For example, the European Commission (EU 2016) invited major projects, each costing US\$ 56-85 million between 2014 and 2020 to tackle climate change. There was no further evidence available on how many of these were undertaken. The news items revealed that several organizations across the world such as Disney, Tesla, L'Oreal, Fujitsu, PepsiCo and Eni have taken on major initiatives within their organizations to tackle climate change that contributes to SDG 13 (Davis 2019; Busco et al. 2017).

The following initiatives were found from news items by Davis (2019) and Berman (2017) are highlighted as example of large-scale or ambitious projects undertaken to take climate action contributing to SDG 13.

1. Carbon Engineering Canada's negative emissions facility funded for US\$68 billion by Occidental Petroleum, Chevron and BHP (<https://carbonengineering.com/>)

2. Disney's 50-megawatt solar facility on a 270-acre land in Florida to reduce greenhouse emissions by 50%. (<https://cleantechnica.com/2019/02/22/disneys-new-270-acre-solar-farm-can-power-two-of-its-theme-parks/>)
3. The development of electric cars led by Tesla and followed by others.
4. Unilever setting a target to reduce per-production-tonne CO2 emissions by 40% from 2008 to 2020
5. L'Oréal committing to 'zero deforestation' by 2020 by supporting farmers from Malaysia and Indonesia to produce certified sustainable palm oil.
6. Fujitsu setting a goal to reduce carbon emission levels of year 2000 by 70% by 2050.

From the review reported so far it is evident that there is still a need for more major initiatives to be undertaken to achieve all the UN SDG targets. This is supported by the UN Secretary General's Roadmap (UNSGR 2020) for financing future projects between 2020 and 2030. The report highlights the need for 'significant public and private investment' to bring the SDGs and 'goals of the Paris Agreement to life' (p. 1). The financing gap to achieve the 'SDGs in developing countries is estimated to be US \$2.5 to 3 trillion per year' (p. 1). Surprisingly, the report also points out that achieving the SDGs could bring immense financial benefits and alleviate unemployment.

This makes us wonder how we can encourage the development of larger-scale projects that work across the SDGs. One possible approach is to look at a new type of megaproject, not at the billion-dollar scale at which megaprojects are discussed in the literature, but equally complex and impactful (Zhai et al. 2009) with willing 'participation of widely disparate actors' (Biesenthal et al. 2018). It is suggested that in order to promote such projects specifically targeted at sustainable development, we need to think about drivers that could promote such megaprojects similar to the four sublimas described by Flyvbjerg (2014). We need to find a way to create a *sustainability sublime* to motivate politicians, engineers/scientists, business leaders and design thinkers to drive megaprojects, which could help integrate the UN SDGs to achieve the set goals by 2030.

The sustainability sublime will differ from Flyvbjerg's (2014) four sublimas. Its focus will be on a real concern related to sustainability aimed towards the future of the planet. In addition to engineers (in the technological sublime) scientists need to be included in driving megaprojects championed by science. Design thinkers will also have to be motivated to deliver elegant solutions using design thinking approaches. While the projects driven by the original sublimas resulted in large-scale infrastructure and elegant buildings the sustainability sublime would have to deliver projects based on the vision of the SDGs.

However, megaprojects could also be problematic as has been discussed before. One of the ways to tackle this would be to look for appropriate governance mechanisms to ensure that they deliver intended benefits (Pelham 2019; Er, Pollack & Sankaran 2013). Joslin (2017), who carried out research linking project governance and project success, concluded that

‘stakeholder-oriented governance is correlated to project success’ (Joslin 2017, p.168). A PWC report on successful capital project delivery also confirms megaprojects using a governance framework with five elements can lead to project success: These are (PWC 2014):

1. Clearly define the project
2. Foster transparency in project performance
3. Establish internal accountability
4. Craft effective contracting strategies
5. Establish rigorous communication and reporting processes

Similarly, OECD’s report which investigates the effective delivery of a large infrastructure project in Mexico proposes that an ‘adequate governance model, effective and efficient management of procurement, integrity safeguards to reduce opportunities for corruption, and a comprehensive communication strategy are all critical elements of successful megaprojects’ (OECD 2015, p.16)

Based on these discussions on the link between corporate and project governance and success in projects and megaprojects, it is imperative that a workable governance structure needs to be established for megaprojects supporting the delivery of UN SDGs.

Next, publications on governance models and strategies to deliver SDGs are discussed to build a viable governance model based on previous research recommending such a model for megaprojects (Müller et al. 2021). This also takes us to a discussion on the link between systems literacy and project management and how project governance approaches based on systems approaches could enable a systemic view to govern megaprojects.

Systems Literacy and Project Management

Systems literacy ‘is a coordinated ongoing action to create a greater awareness and understanding about “Systems” in our lives, in the world, nature, society, science and art, schools and universities and engineering beyond and with that awareness and understanding an ability to make informed decisions and communicate using systems approaches’ (<https://systemsliteracy.org/>)

Project management as a discipline has its roots in science and engineering due to its evolution as a ‘best practice’ from lessons learnt from the development of weapons during World War II as well as large-scale engineering projects, such as the Alaskan Oil Pipeline, that adopted the practices used by defence (Morris & Hough 1988). The original practice of project management developed as a guide by the Project Management Institute (PMI 1989) following the System Development Lifecycle advocated by ‘hard systems’ approaches based on systems analysis (Cleland & King 1975). The success of a project was evaluated using what is called the ‘Iron Triangle’ (Oisen 1971) based on meeting the constraints of time, cost and quality within which projects had to be executed. However, this very narrow means of measuring project success was questioned by many scholars of project management (Atkinson 1999).

As the project management discipline developed it was realised that several factors including stakeholder satisfaction and benefits realisation need to be considered to measure the success of projects thus leading to a more systemic view of projects in their environment (Müller & Jugdev 2012). The project management standards have also evolved, due to these developments, paying more attention to softer factors such as human resource management, communications and stakeholder management (PMI, 2016). Recently, the attention of project management scholars and practitioners has turned to the study of the inherent complexity in projects (Pich et al. 2002) and dealing effectively with complexity in megaprojects (Hu et al. 2015; Locatelli et al. 2017; Pitsis, Clegg, Freeder, Sankaran & Burdon 2018). The need for a systemic approach to deal with complexity in projects has prompted universities teaching project management to introduce courses to project management students that teach various systems approaches such as the iceberg model (events, patterns, structures, mental models), system dynamics (causal loops and stock-and-flow diagrams), system archetypes, soft systems thinking, viable systems models and complex adaptive systems (Sheffield et al. 2012). Such courses have also used examples from infrastructure megaprojects to develop stakeholder engagement strategies using soft system approaches (Ninan et al. 2019)

A systemic view of project management has been developed by Müller et al. (2019a), who propose a seven-layered model of Organizational Project Management ‘as the integration of the primary (project management)-related activities of an organization into a cohesive network of activities which, by themselves and in their interactions, can be understood, planned and managed for the benefit of the organization and its stakeholders’ (p.1.)

Their seven-layered model has 22 elements as shown in Table 2

Table 2 Layers and elements of OPM (Müller et al. 2019a, p.9)

Layer No.	Layer Name	Element 1	Element 2	Element 3	Element 4
1	Philosophy	Process-oriented	Project-oriented	Project-based	
2	OPM Approach	Multi-project approach	Organizational PMO	Projectification	
3	OPM Governance	Paradigm	Model	Governmentality	Governance of Project Management
4	Business Integration	Portfolio Strategy	Portfolio Management	Portfolio Optimization	Benefits Realization
5	Organizational Integration	Programme	Megaproject	Project	
6	Project Governance	Roles and Institutions	Policies	Relations	Methodology
7	Project Management				

All the elements of this model could be useful for the UN as an organization to consider. From the perspective of this article, however, we will discuss only the essential elements of the OPM model that are relevant to the development and governance of megaprojects to contribute to the UN SDGs. A more detailed description of the model and its elements can be found in an article published in the *Project Management Journal* for further reading (Muller et al. 2019b).

Layer 1 – Organizational Philosophy: It will be beneficial for the UN to adopt a project-oriented approach to implement initiatives delivering the SDGs using appropriate project management structures even though the UN is a process-based organization. Project-oriented organisations value project management capability as a valuable resource. Project management should be recognised as a strategic tool to deliver the UN’s strategies towards the SDGs.

Layer 2 – OPM Approach: A project-oriented approach will require the UN to consider both its multi-project approach and OPM governance in Layer 2. A multi-project approach helps to develop appropriate strategies for the project-based part of the UN. The strategy that would fit in best to deliver SDGs is to treat projects to be carried out as a program of projects to achieve higher-level goals that work across SDGs. This will help to build ‘synergies emanating from the combination of individual objectives into a larger overall objectives’ (Müller et al. 2019a, p. 29). A project management office working across all projects needs to be considered. It is expected this function can be undertaken by existing bodies of the UN that have oversight across all the initiatives. However, they may need to develop specific processes to balance the competing needs of the various projects. This will help to develop the overall capability of the UN to deliver these projects along with the member countries.

Layer 3 – OPM Governance: The UN needs to consider how projects across the SDGs will be governed. This will require setting up processes to meet the four principles of good corporate governance (Aras & Crowther 2010) to contribute to good governance principles of transparency, accountability, responsibility and fairness. The OPM Governance layer links the OPM Approach to the Business Integration layer and helps to make appropriate decisions on the type of business strategies to be developed. In the case of the UN, these strategies would lead to selecting the most appropriate means to achieve the SDGs.

Layer 4 – Business Integration: The most important element in this layer will be benefits realization as this is a shortcoming of taking on a megaproject approach if it is not managed well. It is expected that the UN has established ways of approving and prioritising projects. A structured approach to benefits realization management (Bradley 2016) would also be required.

Layer 5 – Organizational Integration: Our focus is on megaprojects in this article and the aim would be to establish adequate organizational structures such as ‘rules, routines, resources and decision-making processes’ to guide the megaprojects (Müller et al. 2019a, p. 88).

Müller et al. (2019a) suggest that ‘against the background of ever-growing complexity, uncertainty and ambiguity of projects, existing governance systems seem to be inadequate [as projects become more complex]’ (p.193.) They refer to Jaradat (2015, p.56), who states that ‘a systemic perspective leads to better analysis, actions and corresponding development in governing complex systems’. In response to Jaradat’s call for a systemic perspective, Müller et al. (2019a) map the seven layers of OPM to the five levels of Beer’s Viable Systems Model (2003). Table 3 shows this mapping.

Table 3 Mapping of OPM Layers to VSM (adapted from Müller et al. 2019a: 195)

OPM Layer or Element	System of VSM	Purpose of System
Philosophy and OPM Approach	S5	Policy
OPM Governance	S4	Intelligence
Business Integration	S3	Control
PMO	S3*	Audit
Organizational Integration and Project Governance	S2	Coordination
Project Management	S1	Operation

The five layers of the VSM and their purpose are discussed in detail later in this article. This table is included here to show the correspondence between OPM and VSM. This article will use the five subsystems of the VSM model to propose a suitable governance model for the megaprojects that could help deliver the SDGs.

Although the OPM model provided by Müller et al (2019a) suits a variety of projects, we need to discuss how governance approaches to delivering SDGs for improving the current governance practices used in the UN has been discussed in the sustainability literature. The next section briefly reviews that literature.

Governance of Projects Delivering SDGs

Biermann et al. (2017) are of the opinion that the SDGs themselves ‘promise a novel type of governance that make use of non-legally binding, global goals set by UN member states’ (p.26) instead of being a top-down regulation or market-based approach. However, this also requires ‘formalization of commitments, the establishment of clear benchmarks, and the issuance of measurable pledges by governments’ (p.26).

Monkelbaan (2019) published a comprehensive book that provides a detailed overview of governance approaches for the SDGs and suggests an integrative approach. The integrative framework he arrived at by analysing five theories can help to propose a governance model for megaprojects supporting the achievement of SDG goals.

The five theories he addressed are:

1. Transition theory
2. Metagovernance
3. Polycentricity
4. Network governance
5. Experimentalist governance

Transition theory developed through a study of long-term 'nonlinear processes of social change in which a societal system is structurally transformed' (p.22). The SDGs can be viewed as small transitions that could lead to a 'great Transition towards sustainability' (p.22). Geels (2002) suggests that transitions can be studied using a multilevel framework in which innovations start as *niches* but can be blocked at a *regime* where existing legislation, networks, and dominant industries can work together to resist further development of the niches. However, changes occurring a higher societal level, or the *landscape* level, can exert pressures on the regime for change. This can help to breakdown resistance at the regime level to create a transformation driven by the niches that flows on to the landscape level. As an example, the increase in pollution levels due to CO2 emission acting at the landscape level can break down the barriers for the adoption of electric vehicles at the regime level supported by advances in battery technology that can enable electric cars to travel longer distances without a recharge. The Dutch Research Institute for Transition at Erasmus University has also produced a guide to a transition management system as a governance approach in the journey towards sustainable cities that can provide useful information to set up governance based on transition theories (Roorda et al. 2012).

Meta-governance tries to understand how hierarchical governance (of governments), market governance (of the private sector) and network governance (of the civil society) relate to each other and set up relationships to coordinate them. This can help to steer and coordinate 'collective action through (a combination of) different forms of governance' (Monkelbaan 2019, p.31). Meuleman (2008) has illustrated the use of meta-governance through case studies that can inform improved coordination between SDGs.

Polycentric governance systems try to understand the complexities of governance of decision-making at multiple levels and scales that can have a cumulative effect on a situation (Monkelbaan, p.33) such as an SDG devoted to climate change. Frameworks developed to support polycentric governance can help by analysing policies that can lead to improved governance through processes of learning and adaptation.

Network governance reflects the reality of how the world has increasingly started to work across networks based on mutually dependent relationships between actors sharing a common purpose but acting autonomously. Klijn and Koppenjan's (2012) work on governance network theory (GNT) suggests that hybrid practices in public administration will emerge as networks develop and grow. The application of NGT could assist to alleviate the 'complex, interconnected and adaptive challenges faced by SDGs' (Monkelbaan 2019, p.33)

Experimentalist governance allows 'open participation of relevant stakeholders in a non-hierarchical process of decision making' (Sabel & Zeitlin 2012 cited by Monkelbaan 2019,

p.39). It uses a pragmatic governance cycle that allows for continuous questioning of assumptions and practices through a cyclic process of broad goal setting based on an identified problem, allowing local implementation, reflecting on reports from interventions through a peer review process and finally revising goals by revisiting the problem. Sabel and Zeitlin (2012) report on the use of the experimentalist governance process by the EU Water Framework Directive and its common implementation strategy.

A comparison of key properties of the governance frameworks mentioned so far is summarized in Figure 1 (Adapted from Monkelbaan 2019, p.43).

Figure 1: Integrating Various Models (Monkelbaan 2019, p.43)

Transition Management	Metagovernance
<ul style="list-style-type: none"> - Long-term, iterative structural change - Top-down management can enable niches - Interaction between niches, regimes and landscape <p>Gaps: lacks global perspective and metagovernance</p>	<ul style="list-style-type: none"> - Coordination of markets-hierarchies-networks - systemic interdependency and complexity - Innovative, legitimate and equitable approaches <p>Gaps: lack policy dimensions and multilevel and dynamic aspects</p>
Integrative Sustainability Governance	
Experimentalist Governance	Networked governance/Polycentricity
<ul style="list-style-type: none"> - Bottom-up, iterative - Complex, diffused, diverse - Foster deliberation, coherence and participation <p>Gaps: lacks context, regime and multilevel dimensions</p>	<ul style="list-style-type: none"> - Distributed, pluriform/diverse - Requires coherence and oversight - Process management enabling-participation <p>Gaps: lacks metagovernance and dynamic aspects</p>

In conclusion, Monkelbaan (2019, p.202) suggests that SDGs require an integrated or coherent governance model that encompasses *good, effective* and *equitable* governance:

1. *Good governance* focuses on processes of decision-making and their institutional foundations and encompasses values such as enhanced participation and inclusion, transparency, accountability and access to information and respect for human rights and the rule of the law.
2. *Effective governance* is linked to institutional problem-solving capacity, technology, expertise and financial resource and the ability to engage in long-term planning in the face of interconnected problems.
3. *Equitable governance* focuses on distributional outcomes and equitable treatment, especially of the very poor and marginalized

As part of the framework for integrative governance, he suggests the formation of SDG Hubs as ‘neutral, non-partisan institutions that create opportunities for collective actions across all 17 SDGs by facilitating cooperation and taking governance coherence at heart’

(p.202). Monkelbaan (2019) has also suggested a structure and processes for SDGs to work effectively through an Integrated Sustainability Governance cycle that 'contains elements of action research, transition management, experimentalist governance, integrated risk management and systems thinking cycles' (p.203). In the next section, the application of Monkelbaan's (2019) work will be considered to propose a governance model for megaprojects.

A Proposed Viable Governance Model

Based on the discussions in previous sections on the lack of integration between SDGs and proposed models to improve this integration through appropriate governance models, Stafford Beer's Viable Systems Model (VSM) is used now to propose a model for the governance of megaprojects that could support the achievement of SDGs. The model the author proposes builds on a Viable Governance Model developed for megaprojects by Müller et al. (2021) based on VSM.

Keating (2014), proposed the development of Systems of the Systems Engineering (SoSE) framework to deal with systemic-coercive problems as 'large complex meta systems' (that is relevant to projects developed to support SDGs) suggests that a confluence of systems theory, complex systems governance and SoSE could help in governance of complex systems and projects. He advocates the use of Stafford Beer's (2003) work on VSM to integrate operational control, coordination, development and policy. These are essential aspects of a governance framework for projects that help deliver the SDGs.

First a brief overview of VSM is provided:

The Viable Systems Model (VSM) was developed by Sir Stafford Beer based on cybernetics and social science to show how a viable system can be built. His original explanation of VSM used the neurophysiological systems of a human being and were titled *Brain of the Firm* (Beer 1972) and *The Heart of the Enterprise* (Beer 1979). Williams & Hummelbrunner (2010, p. 200) offer a simple explanation of VSM as 'the minimum requirements that must be placed on social systems if they are to prove enduring and capable of development'.

VSM has three interacting elements and five subsystems. These are now explained with respect to projects that can contribute to achieve SDGs.

1. The *operation system* carries out the work that is required. These are projects that are undertaken to reach the goals of SDGs. The operation system consists of System 1 or S1 where megaprojects are carried out and System 2 or S2 that coordinates work being carried out at S1 by 'providing information, communication and processes' (p. 201) to address issues common to all S1 activities.
2. A *meta system* helps to bring all the work carried out at the operation system together. System 5 or S5 is the level where policies at an organizational level are made. This would be situated at the UN Headquarters where policies regarding the SDGs are formulated and adjusted. System 4 or S4 is an intelligence system that senses the environment and adjusts the plans for the UN SDGs in the future. This responsibility would also rest with the UN where a specific unit can be dedicated to

- scan and make sense of the environment and feed it back to the S5 level to adjust policies. For example, the adjustment of policies due to COVID-19 could be one of the triggers for adjustment of project timelines and even initiate new projects. System 3 or S3 acts as an interface between S1 and S5 to ensure that the activities carried out at S1 are working towards delivering the policies. It has a stabilizing role and can direct the projects if they are not delivering the required outcomes. To enable S3 to work well, S3* is an auditing function, associated with S3, whose role is to validate ‘the information flowing between and among systems.’ (Williams 2009, p. 202). S3* provides feedback to S1 on its own progress and feeds it back to S3 and S5. The reviews and annual reports produced by the UN could support the S3* function.
3. The *environment* includes the external environment within which the systems remain viable and include the immediate environment that directly affects the work that is carried out at S1. The operation and meta systems interact with the environment at two levels. S4 interacts with the environment to anticipate future events that could affect the systems to help S5 to adapt policies. S1 interacts with the immediate environment that can affect operational issues. An example of this could be activities dealing with changing stakeholder expectations that may affect the projects at S1.

Figure 2 shows a proposed governance model that could be adopted to govern the megaprojects supporting the SDGs. It will use, as far as possible, existing structures within the UN but which will have some additional responsibilities in overseeing the megaprojects.

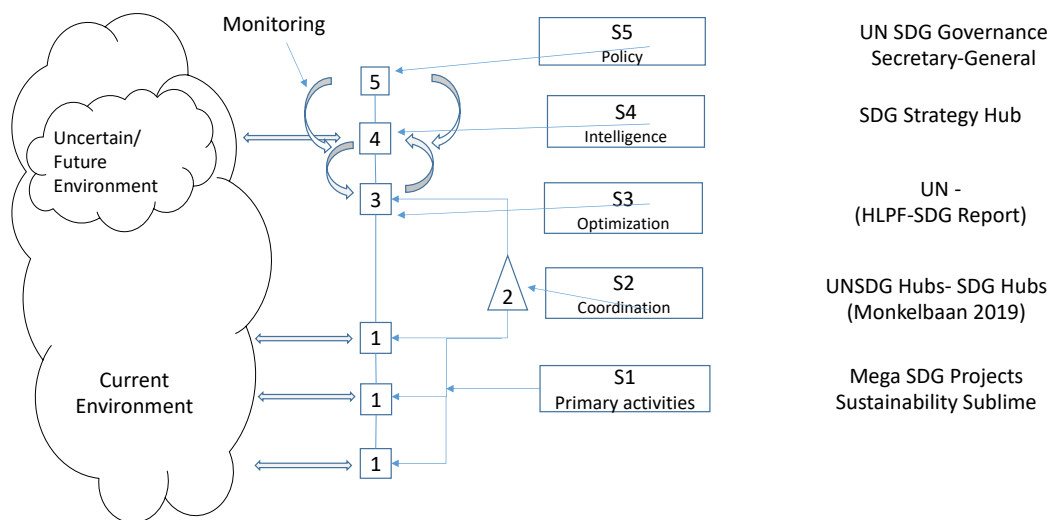


Figure 2 – Proposed Viable Governance Model to Manage Megaprojects Initiate to Deliver UN SDGs (adapted from Müller et al. 2020)

System 5 (S5): This will be the role of the nominated body within the UN that sets the policy for SDGs reporting to the UN Secretary General (<https://www.un.org/en/about-un/>). This body would review the policy adoption. It probably performs this function anyway. The only additional activity would be an overview of the megaprojects, which could be enhanced through the creation of a purpose-built project dashboard (Eckerson 2010; Barns 2018).

System 4 (S4): As this is related to strategy it is recommended that the existing SDG Strategy Hub is guided by the SDG advocates who have strong external connections (<https://www.unsdgadvocates.org/about>). The SDG Strategy Hub is a network of offices of the UN, NGOs, businesses and cities working towards the implementation of the 2030 Agenda. SDG Advocates are eminent persons nominated to assist in the campaign to achieve the SDGs appointed by the UN. An intelligence function to scan the external environment to inform policy could be added to the hub and advocates. The double arrow leading to the environment on the left indicates that the intelligence function is scanning the future to forecast any changes in the environment that may have a major implication to change direction at the policy level. The post-COVID-19 situation is an example where projects may have to be delayed, prioritised or carried out differently.

System 3 (S3): This subsystem is an interface with S2 and carries out audit functions. Some of these are already being done by the UN High Level Political Platform (HLPF) and SDG annual Reporting Systems. The reports and discussions on the performance of megaprojects could be added to their responsibilities.

System 2 (S2) : The UN has set up structures called SDG Business and Knowledge Hubs that have the potential to provide information required at this layer. However, it is proposed that this is where the valuable work carried out by Monkelbaan (2019) could be used to set up a governance mechanism specifically for megaprojects. The SDG Hubs could coordinate collective actions across all 17 SDGs by facilitating cooperation and establishing coherent governance. This will ensure that any megaproject that has been initiated caters to more than one SDG, considering interrelationships with related SDGs. For example, based on Constanza's (2014) work, the SDG Hub could ensure that if a megaproject is set up for achieving SDG 11 (sustainable cities and communities), it also considers other SDGs linked to 'building a living economy'. Table 4 shows all the SDGs that contribute to Constanza's, combining interrelated SDGs into a cluster. So, a megaproject that was initiated based on SDG 11 (sustainable cities and communities) would also be expected to consider other SDGs in the 'building a living economy cluster' if the agreed scope of the megaproject is formulated in a systemic way in consultation with the SDG Hubs.

Table 4 SDGs contributing to building a living economy

Goal	Theme	Aim
7	Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable and modern energy for all
8	Decent Work and Economic Growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9	Industry, Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10	Reduces Inequalities	Reduce inequality among countries
11	Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient and sustainable
12	Responsible Consumption and Production	Ensure sustainable consumption and production patterns

In Figure 2, Systems 1 (S1) refer to the megaprojects that are expected to be developed from the sustainability sublime. The three boxes represent individual projects and the double arrow on the left connected to the current environment indicates adjustments made to the projects being currently implemented due to changes in the environment. An example could be changes made when it is noticed that the stakeholder expectations are changing.

Limitations

The proposal in this article is based on secondary data obtained from the UN's websites and the literature reviewed related to the topics covered by this article. Therefore, the article does not represent the views of the officers of the UN who are responsible to work towards delivery of these targets. It would be important to interview a sample of officers on the board to understand the current difficulties they are facing in achieving the SDGs and current actions being undertaken to move forward. At that time, the validity of this proposal can also be checked, and adjustments made so that it can be implemented in practice.

As pointed out by one of the reviewers the failure of SDG implementation can also be due to lack of political will contrasting values, different normative frameworks, economic incentives, lobbies and systems lock-in. While these issues have been discussed in the review of the literature on governance strategies of SDGs by sustainability scholars further consideration is necessary when implementing the proposed model.

Conclusions

The latest UN reports on SDGs as well as the UN Secretary General's proposed Roadmap clearly show that the world is falling behind on reaching the targets set for the SDGs. This has prompted a need to accelerate efforts to meet the targets set for the SDGs by 2030. It is suggested that one way to accelerate the efforts would be to motivate politicians, engineers, scientists, business leaders and designers to conceptualize and create

manageable megaprojects that can work across SDG goals to help meet the targets. Megaproject scholars have argued that four sublimines – technological, political, business and aesthetic have resulted in an increase in the number of megaprojects being built. These sublimines, however, have mainly resulted in large infrastructure projects, monuments or buildings representing excellent architectural design. The four sublimines discussed in the literature are unlikely to initiate megaprojects that could contribute to UN SDGs. A new sublime is required to do that. As an answer to the first research question (How can we initiate megaprojects to accelerate the achievement of UN SDGs?), this article proposed that creating a sustainability sublime could be a possible solution. Evidence has been presented to show that ambitious projects have been initiated by businesses to deal with climate action. So, there is a potential for the sustainability sublime to succeed in coming up with ambitious projects if it is promoted well.

While the original four sublimines discussed in the literature have resulted in megaprojects their performance has fallen short of touted benefits. Recently it has been reported that the performance of megaprojects overall has improved due to better governance strategies. Therefore, megaprojects initiated due to the sustainability sublime need to be governed well to deliver intended benefits.

The literature review showed that the UN SDGs require an integrated effort and a suitable governance model to achieve their goals. For this, several integrated governance models presented in the literature were reviewed and a model based on Stafford Beer's Viable Systems Model has been proposed to ensure that megaprojects will deliver targets set by the UN SDGs. As an answer to the second research question a Viable Governance Model based on VSM is suggested for governing megaprojects. This model builds on the model proposed by project management scholars by considering views of scholars in the sustainability literature on ways in which UN SDG's can be governed in a more integrated way.

However, in order to translate the model proposed in this article into practice, more work would be required.

As a first step, a branding effort needs to be made to promote the sustainability sublime to politicians, engineers and scientists, business leaders and design thinkers. Branding has been used to promote branding of megaprojects (Ninan et al. 2019). Branding also requires the support of designated bodies within the UN that are responsible for marketing efforts towards the SDGs.

As a second step, it will be important to get buy-in from the officers at the UN to review how the proposed model can be applied in practice by complementing and working with the existing structures and processes established to achieve the SDGs. VSM itself has been used as a diagnostic model in increasing the awareness of sustainability (Juárez et al. 2012). So, the proposed model could be used for diagnosing current governance practices to identify gaps.

The article has taken a systemic view towards UN SDG implementation improvement and outlined two complementary approaches that support and potentially increase acceptance

and perceived importance of the UN SDG implementation through an additional sublime, as well as using a governance model based on systems theory to implement the SDGs. The conceptual groundwork and the initial implementation steps have been presented, it is now a matter of testing and proving its viability.

References

Aras, G., & Crowther G. (2010). Corporate social responsibility: a broader view of corporate governance, In G. Aras, D. Crowther. (Ed.) *A handbook of corporate governance and social responsibility*, (pp. 265-280), Farnham, UK: Gower.

Atkinson, R. (1999). Project management: cost, time, quality, two best guesses and a phenomenon, it's time to accept other success criteria, *International Journal of Project Management*, 17: 337–342.

Barns, S. (2018). Smart cities and urban data platforms: designing interfaces for smart governance. *City, Culture and Society*, 12, 5–12.

Beer S. (1972). *Brain of the firm: the managerial cybernetics of organization*. Harmondsworth: Penguin.

Beer S. (1979). *The heart of enterprise*. Chichester: John Wiley & Sons.

Beer, S. (2003). *Diagnosing the system for organizations*. Chichester, John Wiley.

Biermann, F., Kanie, N., & Kim, R.E. (2017). Global governance by goal setting: the novel approach of the UN Sustainable Development Goals. *Current Opinion in Environmental Sustainability*, 26, 26–31.

Biesenthal, C., Clegg, S., Mahalingam, A., & Sankaran, S. (2018). Applying institutional theories to managing megaprojects. *International Journal of Project Management*, 36, 43–54.

Bradley, G. (2016). *Benefits realization management* (2nd ed.). Abingdon: Routledge.

Busco, C., Fiori, G., Frigo, M. L., & Angelo, R. (2017). Sustainable Development Goals: integrating sustainability initiatives with long term value creation. *Strategic Finance*, Sep 1, 2017, Viewed July 15, 2020.

Cleland, D. I., & King, R. (1975). *Systems analysis and project management*, New York, NY: McGraw-Hill.

Corbett, J., & Mellouli, S. (2017). Winning the SDG battle in cities: how an integrated information ecosystem can contribute to the achievement of the 2030 sustainable development goals. *Information Systems Journal*, 27, 427–461.

Costanza, R., McGlade J., Lovins H., & Kubiszewski I. (2014). An overarching goal for the UN sustainable development goals. *Solutions*, 5, 13–16.

Davis M. (2019). 7 climate change projects that are changing the game. *Big Think* March 27, 2019, Viewed July 15, 2020

- Denicol, J., Davies, A., & Krystallis, I. (2020). What Are the Causes and Cures of Poor Megaproject Performance? A Systematic Literature Review and Research Agenda. *Project Management Journal*, 51(3), 328–345.
- Devi, T. R., & Reddy, V. S. (2012). Work breakdown structure of the project. *International Journal of Engineering Research and Applications*, 2, 683–686.
- Eckerson, W. W. (2010). *Performance dashboards: measuring, monitoring, and managing your business*. Chichester: John Wiley & Sons.
- Er, M., Pollack, J., & Sankaran, S. (2013). Actor-network theory, activity theory and action research and their application in project management research in N. Drouin., R. Müller. & S. Sankaran (Ed.) in *Novel approaches to organizational project management research: Translational and Transformational*. CBS Press: Copenhagen.
- Flyvbjerg, B. (2014). What you should know about megaprojects and why: an overview. *Project Management Journal*, 45, 6–19.
- Flyvbjerg, B. (2017). *The Oxford handbook of megaproject management*. Oxford: Oxford University Press.
- Flyvbjerg, B., Bruzelius, N., & Rothengatter, W. (2003). *Megaprojects and risk: an anatomy of ambition*. Cambridge: Cambridge University Press.
- Frick, K. T. (2008). The cost of the technological sublime: daring ingenuity of the new San Francisco-Oakland Bay Bridge, in H. Priemus, B. Flyvbjerg, B. van Wee. (Ed.) *Decision-making on mega-projects*, Cheltenham: Edward Elgar.
- Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy*, 1257–1274.
- Gellert, P. K., & Lynch, B. D. (2003). Mega-projects as displacements. *International Social Science Journal*, 55, 15–25.
- Griggs, D., Stafford-Smith, M., Gaffney, O., Rockström, J., Öhman M. C., Shyamsundar, P., Noble, I. (2013). Sustainable development goals for people and planet. *Nature*, 495, 305–307.
- Hu, Y., Chan, A. P. C., Le, Y., & Jin, R. Z. (2015). From construction megaproject management to complex megaproject management; Bibliographic analysis, *Journal of Management in Engineering*, 31, 4014052.
- Joslin, R. (2017). Governance and project success. in Muller R, (Ed.) *Governance and Governmentality of Projects*; (pp. 159-172). New York: Routledge.
- Juárez, A.B., Padilla, R.J. & Piña, I.B. (2012). Using viable systems model as a diagnostic tool of the sustainable tourism, (pp. 397-409), *Proceedings 56th Annual Meeting to the International Society of the Systems Sciences*, 15-20 July, San Jose, California.
- Jugdev, K., & Müller, R. (2012). Critical success factors in projects: Pinto, Slevin and Prescott-the elucidation of project success, *International Journal of Managing Projects in Business*, 5, 757–775.

- Keating, C. B., (Ed.). (2014). Governance implications for meeting challenges in the system of systems engineering field. 2014 *9th International Conference on System of Systems Engineering (SOSE)*: IEEE. pp. 154-159.
- Klijn E., & Koppenjan, J. (2012). Governance network theory: past, present and future. *Policy & Politics*, 40, 587–606.
- Lieberman, A. (2018). SDGs show slow progress, not on track to reach 2030 targets, UN reports. *Devex News*, June 21, 2018, Viewed July 15, 2020.
- Locatelli, G., Mikic, M., Kovasevic, M., Brooks, N. J., & Ivanisevic, N. (2017). The successful delivery of megaprojects: A novel research method, *Project Management Journal*, 48, 78–94.
- Morris P., & Hough G. H., (1988). *The anatomy of major projects: a study of the reality of project management* (1st ed.). Chichester: Wiley.
- Menga, F. (2018). Bigger is better or how governments learned to stop worrying and love megaprojects, *Studies of Transition States and Societies*, (10), 1, 3-14.
- Merrow, E. W. (2011). *Industrial megaprojects*. Hoboken, NJ: Wiley.
- Meuleman, L. (2008). *Public management and the metagovernance of hierarchies, networks and markets: The feasibility of designing and managing governance style combinations*. Heidelberg: Springer Science & Business Media.
- Monkelbaan, J. (2019). *Governance for the sustainable development goals*. Singapore: Springer Nature.
- Müller, R., Drouin, N., & Sankaran, S. (2019a). *Organizational project management: theory and implementation*. Cheltenham: Elgar.
- Müller, R., Drouin, N., & Sankaran, S. (2019b). Modeling organizational project management, *Project Management Journal*, 50, 1–15.
- Nevell, M., & Wyke, T. (2011). *Bridgewater 250: the archaeology of the world's first industrial canal*. Salford: University of Salford.
- Nhamo, G., & Mjimba, V. (2020). Scaling up SDGs implementation: down the road to fast approaching 2030 in G. Nhamo, G. Odularu and V. Mjimba (Ed.) *Scaling up SDGs implementation* (pp. 3-19). Chalm: Springer.
- Ninan, J., Clegg, S. & Mahalingam, M. (2019). Branding and governmentality of infrastructure megaprojects: The role of social media, *International Journal of Project Management*, 37(1), 59-72
- Ninan, J., Phillips, I., Sankaran, S., & Natarajan S. (2019). Systems thinking using SSM and TRIZ for stakeholder engagement in infrastructure megaprojects, *Systems*, 7, 1–20. doi:10.3390/systems7040048
- Nunes, A. R., Lee, K., & O’Riordan, T. (2016). The importance of an integrating framework for achieving the Sustainable Development Goals: the example of health and well-being. *BMJ*

Global Health, 1, 3. e000068. doi:10.1136/bmjgh-2016-000068

Nye, D.E. (1994). *American technological sublime*. Cambridge, MA: The MIT Press.

OECD 2015. 2015. *Effective delivery of large infrastructure projects: the case of the new international airport of Mexico City*. Paris: OECD Publishing.

Oisen, R.P. (1971). Can project management be defined? *Project Management Quarterly*, 2, 12–14.

Pelham, N. (2019). An investigation into the impact of governance on megaprojects, PhD Thesis, University of Melbourne, Australia.

Pich, M.T., Loch, C.H., & DeMeyer A. (2002). On uncertainty, ambiguity and complexity in project management, *Management Science*, 48, 955–1101.

PMI. (1987). *A guide to the project management body of knowledge (PMBOK guide)* (1st ed.). Newtown Square, PA: Project Management Institute.

PMI. (2016). *PMBOK guide* (6th ed.). Newtown Square, PA: Project Management Institute:

Pitsis, A., Clegg, S., Freeder, D., Sankaran, S., and Burdon, S. (2018). Megaprojects redefined—complexity vs cost and social imperatives. *International Journal of Managing Projects in Business*, 11(1), 7-34.

PWC (2014). *Successful capital project delivery: the art and science of effective governance*. New York: PWC.

Roorda, C., Frantzeskaki, N., Loorbach, D., Van Steenbergen, F., & Wittmayer, J. (2012). Transition management in urban context. *Guidance Manual, DRIFT*, Rotterdam: Erasmus University.

Sabel, C. F., Zeitlin, J. (2012). Experimentalist governance. *The Oxford handbook of governance* 1, 2–4.

SDG Case Studies (2020). available at <https://www.sdgfund.org/case-studies>

Sheffield, J., Sankaran, S., & Haslett, T. (2015). Systems thinking: taming complexity in project management. *On the Horizon*, 20, 126–136.

Söderlund, J., Sankaran, S., & Biesenthal, C. (2017). The past and present of megaprojects. *Project Management Journal*, 48, 5–16.

Stafford-Smith, M., Griggs, D., Gaffney, O. Ullah, F., Reyers, B., Kanie, N., Connell, D. (2017). Integration: the key to implementing the Sustainable Development Goals. *Sustainability Science*, 12, 911–919.

UN SDG Report 2020. (2020). The Sustainable Development Goals Report. New York: United Nations.

UNSGR 2020 available https://www.un.org/sustainabledevelopment/wp-content/uploads/2019/07/EXEC.SUM_SG-Roadmap-Financing-SDGs-July-2019.pdf

Williams, B., & Hummelbrunner R. (2010). *Systems concepts in action: a practitioner's toolkit*. Stanford: Stanford University Press.

Williams, T., Ackermann, F., Eden, C., & Howick, S. (2005). Learning from project failure. *International Journal of Project Management*, *13*, 151–155.

Zhai, L., Zin, Y., & Cheng, C. (2009). Understanding the value of project management from a stakeholder's perspective: case study of mega-project management, *Project Management Journal*, *40*, 99–109.