

# The Power of Context: Addressing Risk & Uncertainty in Mega Infrastructure Decision-making

What changes in globalisation, climate change and COVID-19 have taught us?

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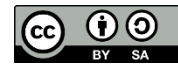
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## Abstract

The Power of Context is a phrase coined by Malcolm Gladwell in his book entitled *The Tipping Point* (2003). It refers to the idea that the environment in which a message or an idea is delivered can have a huge impact on whether enough people adopt and/or spread this to create an epidemic of thought, narrative and/or action. The phrase is used here in three ways:

- As a basis for reflecting on ‘business as usual’ (BaU) planning and appraisal practices in mega infrastructure development and the contagious global influential narratives these employ in academia, the international consultancy world, governments and multi-national development agencies alike regarding what is considered a ‘successful’ megaproject.
- To understand better how these judgements have been moulded by past contexts, values, challenges, and premises, many of which no longer remain relevant to the contexts of our contemporary turbulent times, or if so, do so in a different way/scale.
- To highlight the importance of historical perspectives for lesson-learning for reflections on the future which in turn raise the following three important questions:
  - What of our past narratives and praxis in megaproject infrastructure planning and appraisal remain valid in these new uncertain times, impacted as they are by faltering globalisation and climate change and pandemic challenges?
  - What is path-dependent and increasingly dangerous which pose consequences that reflect imbedded interests that prevent us from learning from history and engaging in needed innovative thinking and action?
  - What of this knowledge should we embrace, develop and discard?

While no alternative templated approach is offered in the paper’s conclusions to replace BaU practices, it is contended that the reflections offered here do give some useful strategic guidance of how we should/could do things differently. It commences with an urgent need to develop a framework for the systematic scrutiny of lessons from the past that we should embrace, develop and discard when addressing the multiple critical global challenges, we confront and for different scenarios ahead. This

would assist choosing which technological innovations and investments should be targeted that are consistent with UN's sustainable development goals (SDGs) (UN, 2015) as they translate both locally and globally.

## Introduction

'The Power of Context' is a phrase coined by Malcolm (2003) which refers to the idea that the environment in which a message (narrative) or idea is delivered can have a huge impact on whether enough people adopt and spread it to create an epidemic of thought, belief and possibly actions.

The phrase is used here regarding judgements about narratives concerning the 'success' (or otherwise) of megaprojects and how these judgements are moulded by the contexts and values at the times in which they were planned, appraised and (especially) delivered. It is also used to highlight the important value of historical perspectives of these judgements as a basis for lesson-learning for the future for megaprojects as identified by Peter Hall in *Great Planning Disasters* (1980), *The OMEGA 2 Project* (OMEGA Centre, 2012) and by Knut Samset in his book entitled *Beforehand and Long Thereafter* (2012).

Megaprojects here refer to large-scale, complex infrastructure investments found in all sectors costing more than US\$ 1 billion and up to US\$ 20 billion (see Figure 1), with projects costing more than this (in terms of US\$ trillions) referred to as gigaprojects (see Figure 2). Megaprojects often share common features (see SMEC, 2001) and typically involve multiple stakeholders from the public and private sectors, taking many decades and more to complete. Like gigaprojects, they frequently have transformational impacts on the territories, economies and environments they traverse and serve.

Mega infrastructure projects exist in a variety of sectors: transport; energy (power plants, pipelines, refineries, wind farms); information technology and communications (ITC) networks (for telecoms both fibre and wireless); defence (military installations and bases, equipment programmes); water and wastewater (dams, reservoirs and pipelines); and in the social sector (infrastructure and systems for health, housing and education). They are often in the form of multi-sector infrastructure investments. In many instances, megaprojects are a colloquial term given to programmes of projects or (more misleadingly) as a strategy of programmes of megaprojects as in the case of China's One Belt One Road Initiative (see Figure 3).

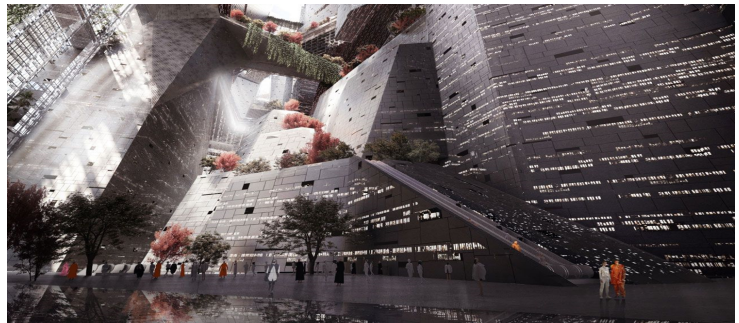
**Figure 1: Michigan State Highway, USA**



Source:

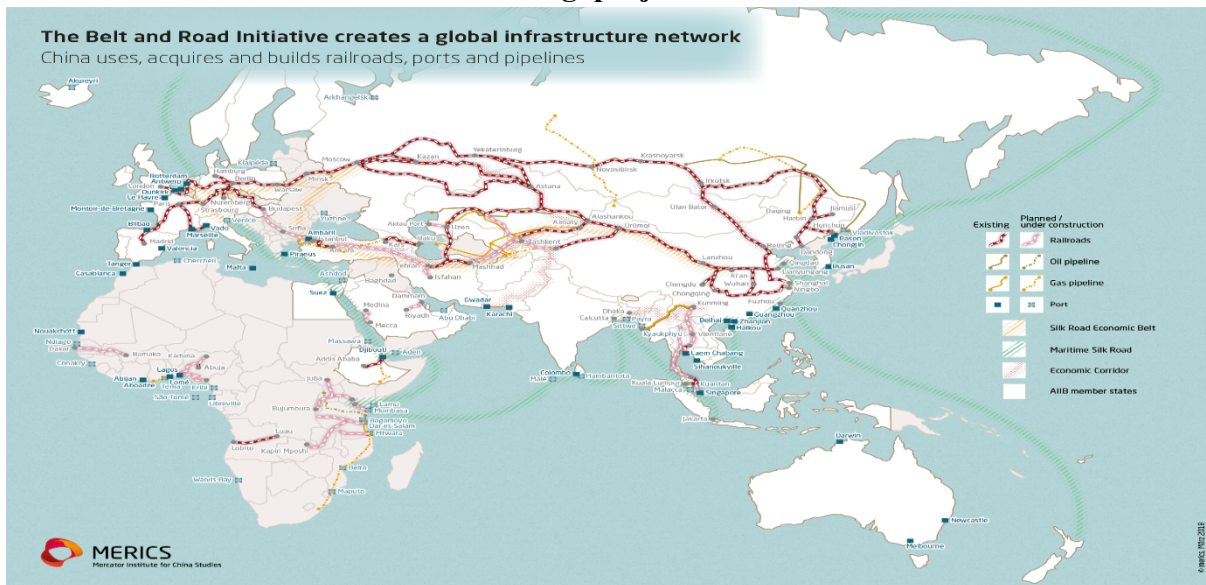
<https://www.nytimes.com/2020/07/08/opinion/us-infrastructure-plan.html>

**Figure 2: The Line - a Vertical Garden City in Desert of Saudi Arabia**



Source: <https://www.neom.com/en-us/regions/theline>

**Figure 3: The Belt and Road Initiative: The World’s Most Ambitious and Complex 21st Century Megaprojects**



Source: [https://merics.org/sites/default/files/2020-06/Silkroad-Projekt\\_EN\\_2020\\_150dpi.pn](https://merics.org/sites/default/files/2020-06/Silkroad-Projekt_EN_2020_150dpi.pn)

**Recent Developments**

There is a growing phenomenon whereby such projects are turned into a financial investment asset class by commercial interests and international financial institutions, including multi-lateral development banks (MDBs), international investment banks and Sovereign Wealth Funds (SWFs) which in certain/many cases deter such parties from fully taking on board broader environmental, social and environmental (ESG) perspectives in judging their success as agents of sustainable development, despite the rhetoric.

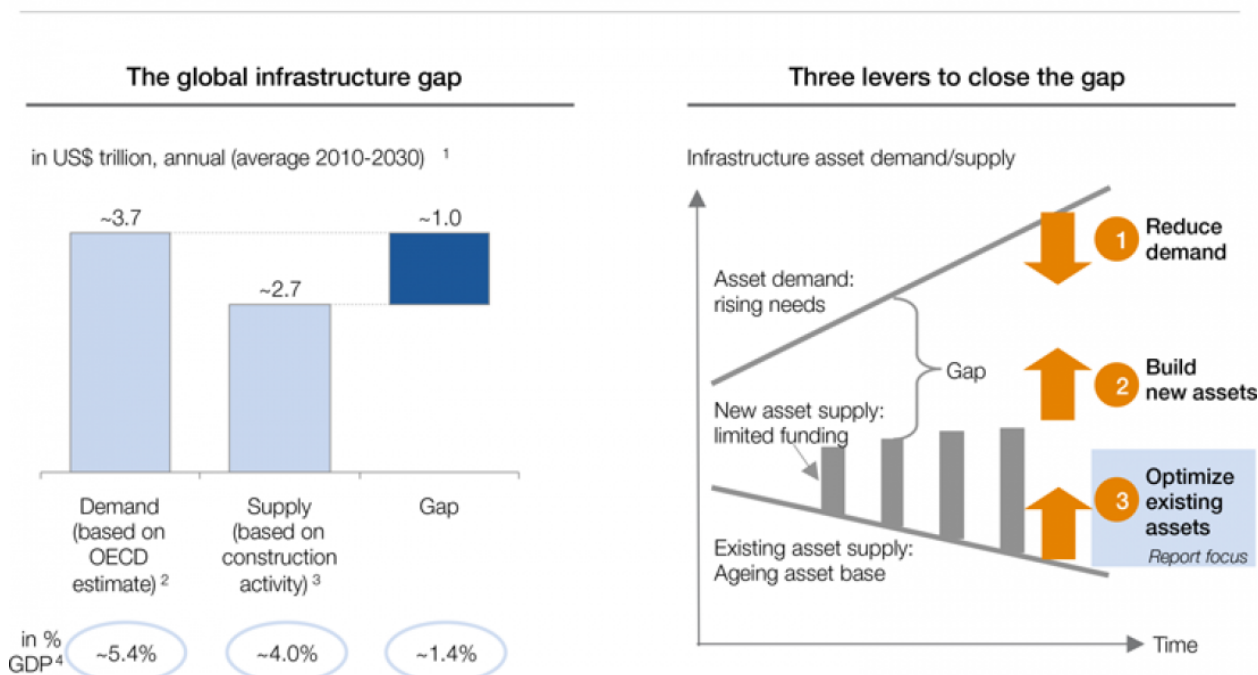
This conversion of public infrastructure assets into commercial class assets is especially important given infrastructure investments for megaprojects are currently experiencing the largest construction boom the world has ever seen. This is in part due to studies undertaken by international development agencies,

global private sector investment interests, and some non-government agencies making predictions of significant shortfalls in infrastructure provision worldwide based on current trends, unless kept in pace with forecasts of population growth, urbanization, and economic development on a sustainable basis.

These infrastructure shortfalls are frequently alluded to as part of an identified set of ‘global infrastructure gaps’ - broadly defined globally by the McKinsey Global Institute (MGI) as the difference between estimated future world-wide infrastructure needs and current global investment levels in infrastructure (see Figure 4). In 2015 the MGI estimated between 2013-2030 the world needs to spend \$57 trillion on infrastructure to fulfil global needs. The same source estimated a global infrastructure investment shortfall of \$2.5 trillion per annum (in transportation, power, water, and telecommunications systems) and a need for this to be increased to \$3.3 trillion per year in economic infrastructure alone, to keep pace with prevailing expected rates of growth; this is outside of any cost estimates pertaining to post-conflict reconstruction or post-disaster costs or climate change mitigation needs.

This narrative has had considerable international influence since the closing decades of the twentieth century, even though there are growing criticisms of this presentation of global infrastructure development ‘needs’, highlighted most recently by consequences of the COVID-19 pandemic (see Dimitriou, 2013; Castello, 2023; Ekins, 2023). Underlying such criticisms is the argument that forecasts of the kind employed in support of the ‘global infrastructure gaps’ thesis is largely based on ‘predict and provide’ assumptions, frequently employed by BaU infrastructure development practices, erroneously premised on the belief that such investment will enhance economic growth and development via trickle-down benefits - at least in the long-run (Dimitriou and Field, 2019).

**Figure 4: The Global Infrastructure Gap, and Levers to Close it**  
The infrastructure gap can be narrowed via three levers



Source: WEF (2014, p. 15)

There is rising opinion that this rationale is no longer fit-for-purpose given the current highly uncertain times we live in, highlighting a need for the radical re-framing of how international infrastructure



investments should be identified, planned, appraised and delivered. An advocated response with growing support is that this should involve a movement away from estimates of infrastructure deficits which over-emphasize quantitative metrics of economic supply and demand that look to the financialization of infrastructure assets and the monetization of costs and benefits above all else. This would entail adopting a more holistic qualitative approach that is sensitive to project context, more resilient to prevailing uncertainties, and conscious of new risks and opportunities.

An approach of this kind (see for example Dimitriou *et al*, forthcoming 2024) looks to focus more on strategic and smarter mega infrastructure investment and spending, drawing crucially on lessons of history feeding back into scenario planning and informed by UN's SDGs, including concerns about climate change, equity considerations, emissions and health, plus geopolitical developments. With the required investment in R&D, it is anticipated that the analysis and modelling of these highly complex and dynamic interrelated considerations can potentially be significantly aided by quantum computer developments and advances in artificial intelligence (AI) plus fast developing ICT measures that will greatly enhance the application of environmental, social and governance (ESG) compliance procedures for mega infrastructure investment assuming the appropriate governance, regulation and enforcements are in place. This expectation, it should be stressed, rests on the premise that the software employed reflects pre-agreed values and metrics of sustainable development, including those related to the UN's SDGs at both the global and local level.

### **Reflecting on the Past and Looking Ahead**

The starting point of how-to re-frame future decision-making for megaproject planning and appraisal is to acknowledge the obvious; namely: that we are living in highly uncertain times where much has changed (even in the last ten years), much is changing, and much change has yet to take place. Some argue that resultant level of uncertainty on so many fronts is unprecedented, especially if we look at:

- Climate change challenges and rising pollution problems.
- Energy cost hikes, particularly of oil and gas, as we move to greenhouse gas emissions as close to zero as possible.
- Dramatic increases in wealth disparities, poverty and health inequities.
- Fast changing technological innovations in multiple sectors including, information systems, transport, health and financial systems.
- Much greater movements of populations and changing identities of place and communities.
- Changes in geopolitics and rising security and governance concerns challenging globalization as we knew it.

The next step is to recognise that these identified changes offer both threats and opportunities and need to be identified to be harnessed or protected against. The only thing we can be sure of is that we cannot manage this change on a BaU basis.

Returning to our focus on mega infrastructure projects, the World Economic Forum (WEF) has suggested the most notable of all these uncertainties and risks, aside from climate change, are political risks. These have featured significantly in OMEGA Centre case study research on megaproject decision-making (OMEGA Centre, 2012) (see Figure 5) and are cited in WEF's annual Global Risks Report (WEF, 2020), particularly in terms of global governance concerns.



live in a very (and increasingly) politically fragmented world does not bode well for the immediate future, suggesting lesson learning from history is in short supply.

*The Third Industrial Revolution* by Jeremy Rifkind (2013) which adopts a premise that fundamental economic change occurs when new communication technologies converge with new energy regimes also offers some invaluable perspectives of what we should do differently regarding future infrastructure development. In this publication he looks at the scale-up of the ‘internet of things’, the ‘rising sharing economy’ and a ‘zero marginal cost society’. Rifkind declares here that the world is in crisis because fossil fuels (the engine of the Second Industrial Revolution) has created not only an unsustainable dependency on this source of energy but that it threatens our livelihoods and exacerbates unprecedented climate change challenges at a time when the global economy is on the brink of collapse. Together with geopolitical changes and global governance challenges, these developments make long term infrastructure investment planning and appraisal for projects of all kinds and scales almost impossible to undertake outside of a high-risk scenario.

Reflecting some of the concerns raised by Rifkind, in a recent OMEGA Centre Seminar at UCL, Ekins (2023) advocated the development of more nature-based solutions to infrastructure development when prioritising responses to decision-making that new megaprojects should look to:

- New infrastructure needs to be delivered with consideration for a net zero world.
- Facilitating green innovation in some of the highest emitting sectors, particularly for transport.
- Experimentation and learning around new, low-carbon technologies and the infrastructure and institutions to deliver them.
- Infrastructure policy that go beyond hard infrastructure and supply side solutions which consider consumer behaviour and the institutions that govern infrastructure and consumer responses to technical change.
- Natural assets providing effective alternatives to build infrastructure.
- Making infrastructure responses more locally appropriate, requiring regionally specific solutions and more local participation.

*Beforehand and Long Thereafter* by Knut Samset (2012) is another invaluable publication that can usefully inform us of lessons to be learned from past megaproject developments. Samset reminds us in this book that megaprojects which are often seen as important (even spectacular) at the time of delivery, when re-examined from a historical perspective, can prove either even more impressive/groundbreaking or in other cases, downright disastrous. This sobering observation somewhat undermines the ‘iron-triangle’ criteria of BaU megaproject management appraisal and an observation also made several decades earlier by Hall (1980). Samset further contends that retrospective views of megaproject impact made in much broader terms also offers better judgements of success in terms of relevancy and sustainability. As in the case of OMEGA Centre case study findings (2012) he concludes that much can be learned by present day governments, global investors, international development agencies plus local communities from these past projects and yet this lesson-learning/sharing is limited.

Finally, another invaluable publication that would usefully inform future megaproject infrastructure planning and appraisal (from a more public health perspective) is Andrew Nikiforuk’s book entitled *Pandemonium: How Globalization and Trade are Putting the World at Risk* (2007) in which the author

investigates whether the pace and scale of global trade, facilitated by major globally infrastructure networks, is undetectably endangering our world. Well ahead of the Covid-19 pandemic, he asks how vulnerable our food is to bacterial, viral and fungal invaders; whether certain trade goods cause more biological trouble than others; and reminds us of while many enjoy our 21<sup>st</sup> century global lifestyle, it is all too easy to forget the hidden risks of pandemics enabled and spread by globalization and its supporting supply chain infrastructure.

Adding to Nikiforuk's concerns, in a contribution to an OMEGA Centre seminar in UCL by Castello (2023) regarding what lessons can be learned for future mega infrastructure planning and appraisal from the recent Covid19 pandemic, he cites an absence of devolved decision-making to local levels, a failure to put in place a strategy to balance public health concerns with national and local economies, the delayed concerns for the disadvantaged, and inadequate lesson sharing as additional lessons.

### **The Challenges, the Mantra and Rhetoric**

Notwithstanding the numerous useful international technical reports prepared by governments, international development banks, and Think Tanks that look to address future mega infrastructure developments, and how they should address future needs, fundamentally, the international infrastructure development community seems to suggest that these challenges are best responded to by an enhanced capacity of Public Private Partnerships (PPPs) used as strategic vehicles of megaproject innovation and delivery, employing what some consider to be more streamlined resilient responses, others as 'greenwashed' BaU practices that are caught up in old narratives and increased rhetoric against a backcloth of rising costs, risks and uncertainties contributing in some quarters to a pushback on ESG compliance; this being described as woke economics. This uncertainty of direction amid tensions between the mantra of PPPs and much rhetoric about sustainability, is especially important for those mega infrastructure projects promoted as transformational projects. This is so since they are often accompanied with particular attention given to the creation of a trans-national institutional architecture that looks to put in place international measures, regulations and enabling frameworks that seek to reduce risks for private sector parties without ensuring equivalent safeguards are in place to protect public welfare and our ecosystems.

Where PPPs are deemed appropriate, the evidence to date suggests the immensity of the challenge ahead deserves more innovative and more people-centric global PPP approaches to infrastructure investment - more fitting to both individual contexts but also of rising global interdependent challenges that pose risks and uncertainties at a scale never encountered before. The background conundrum to this aspired mission, however, is that while it is reported there is ample money globally looking to invest in mega infrastructure projects world-wide, and so many governments needing both the funds and upgraded infrastructure, slow progress is made in the use of such funds. These circumstances raise several important questions - which substitute for conclusions - on the basis that the answers to them will perhaps further inform us what are the pre-requisites of developing alternative more innovative approaches, drawing on past lessons as well as future technologies? The questions include:

- Why is this investment not happening, and to what extent are PPPs (as currently delivered) underperforming because of the political, environmental and regulative risks that such projects bring?
- How best to take a megaproject forward from an idea to a PPP financial close with minimum risks to all where it is seen to be the best delivery platform?



- Where PPPs are not the best vehicle to fund/deliver such projects and why, when and where is this the case?

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