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Political ecology perspective for a new way of understanding stakeholders and value in infrastructure projects

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ABSTRACT

The long-term goals and objectives that infrastructure projects aim to deliver are contextualised by complex grand challenges, which involve an entanglement of economic, social, and ecological issues. However, there have been criticisms that infrastructure projects fall short of delivering equitable value to effectively address grand challenges. These criticisms underpinned the recent calls for rethinking the purpose and definition of infrastructure projects. This essay argues that adopting a political ecology perspective can be useful to start identifying the limitations of the current understandings of external stakeholders and value in infrastructure projects, which lead to the criticised shortcomings. Political ecology considers social, ecological, and economic issues as an assemblage that manifests through power relations. Thus, for project studies, it implies a reconceptualization of external stakeholders and project value around the notions of agency, vulnerability, and empowerment. This reconceptualization provides new theoretical and practical directions for project formation, stakeholder management and project leadership in the pursuit of rethinking the purpose and definition of infrastructure projects for effectively tackling the grand challenges of our times.

1. Introduction

Infrastructure projects, such as construction of water, sanitation, transport, and energy infrastructure, are strategic endeavours that aim to enable long-term goals and objectives (Paquin *et al.* 2016). Such projects can be vehicles for defining, creating, and delivering value (Martinsuo *et al.* 2019) with long-term implications on nature and society (Whyte & Mottee 2022). Despite their major impact on value creation and distribution for nature and society, traditionally, infrastructure projects' appraisal, organisation, and performance evaluation have mainly revolved around economic arguments, where ecological and social considerations are neglected (Svejvig & Andersen 2015, Ika & Pinto 2022). The famous iron triangle of cost, time, and quality in project management (Pollack *et al.* 2018), through which project success has traditionally been understood, simply refers to delivering a technologically efficient product within budgetary and time constraints (Winter & Szczepanek 2008). Hence, until recently, the term 'value management' has been understood as delivering to the same technical

specification for cheaper, with little consideration of ecological and social value of infrastructure projects (Martinsuo & Killen 2014).

In today's world, the long-term goals and objectives that infrastructure projects are aiming to deliver are contextualised by complex grand challenges, which involve an entanglement of economic, social, and ecological issues, such as climate change, biodiversity loss, income inequality, mass migration, and reduced social mobility (United Nations 2015). In line with this, there has been a growing recognition of the need to better understand and account for social and ecological impacts of infrastructure projects, leading to new legislation and conceptual frameworks as well as an expanded literature on environmental sustainability and social value (e.g., Behar & Sykes 2022, Chan *et al.* 2022, Çıdık 2023). However, there have been criticisms that the extant work on environmental sustainability and social value of infrastructure projects do not adequately deal with the plurality of stakeholder values and their uneven social and ecological impacts (Çıdık 2020, Diep *et al.* 2022, Raiden & King 2022); thus, failing to enable a much-needed novel understanding of the purpose and value of infrastructure projects (Gil

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2021, 2023, Whyte & Mottee 2022). As a result, a major shift is required in how human and non-human external stakeholders and value are understood in infrastructure projects to achieve just socio-ecological transitions and address grand challenges through infrastructure projects.

This essay argues that what is needed for better outcomes are fresh perspectives that treat social, economic, and ecological value creation and distribution processes of infrastructure projects as interrelated and mediated by power and politics. Political ecology is proposed as a promising lens to start identifying the limitations of the current understandings of external stakeholders and project value, and to start articulating more holistic conceptions which consider social, ecological, and economic issues as an assemblage that manifests through power relations. Such a perspective suggests a reconceptualization of external stakeholders and project value around the notions of agency, vulnerability, and empowerment. This reconceptualization provides new theoretical and practical directions for project formation, stakeholder management and project leadership in the pursuit of rethinking the purpose and definition of infrastructure projects for effectively addressing grand challenges of our times.

2. Infrastructure, project value, and grand challenges

In the last two decades, as part of the 'rethinking project management' movement (Cicmil et al. 2006), the understanding of projects shifted away from being about creating products/services to achieving strategic goals and innovation (Svejvig & Andersen 2015). Accordingly, the value of projects started to be seen not merely as the economic worth of the immediate 'outputs' of the project, but rather as the consequent 'outcomes' and 'impact', which represent the value generated across the lifecycle of projects (Martinsuo et al. 2019; Institution of Civil Engineers 2020; Zerjav 2021). This extended understanding of project value has also become central to practitioner guidelines, such as Axelos' (formerly OGC) Managing Successful Programmes guidelines (Axelos 2020), and has therefore become the standard language in public procurement in several countries.

These shifts exposed project scholars to a multiplicity of, and often competing and/or conflicting, perspectives of value, with empirical and conceptual challenges. Among the empirical works, for example, Zerjav et al. (2021) explored how project teams consider project value based on the impact of the project for different time and organizational scales. Riis et al. (2019) studied how permanent organisations (i.e., project owners) generate value through (temporary) projects. Fuentes et al. (2019) examined how the client's value perspective can be effectively integrated and addressed in projects. Çıdık and Bowler (2022) explored how project actors' different value perspectives become reconciled and enact the project value through everyday negotiations of project decisions. On the other hand, there has also been some conceptual work to accommodate such plurality and subjectivity of value(s) in projects. Some recent contributions to the conceptualisation of project value includes, for example, understanding project value as narratives (Green & Sergeeva 2019), ideals and beliefs (Martinsuo 2020), and practice (Çıdık & Bowler 2022).

Despite the recognition that project value is subjective and multifaceted, and different value perspectives are in tension, there has been limited debate on the implications of power and politics in project value research and practice. Although in recent years, Green and Sergeeva (2019), Sergeeva and Winch (2021), and Çıdık and Bowler (2022) highlighted the determining role of power and politics in project value phenomenon, there has been a lack of empirical and theoretical work studying power and politics as a central issue for project value creation and distribution.

So far, places and people affected from infrastructure projects have mainly been seen simplistically as 'external' entities which create 'threats' and/or 'opportunities' that need to be 'managed' for the realisation of the project. As a result, despite substantial amount of research

on sustainability and social value of infrastructure projects, existing frameworks for evaluating and managing ecological and social value of infrastructure projects have predominantly adopted a rhetoric around 'minimisation' or 'offsetting' of negative impacts by employing reductionist (e.g., using quantification and/or monetisation) approaches (Winch 2017, Çıdık 2020). Such a rhetoric has created a situation where projects are still mainly understood in economic terms with other dimensions of value (i.e., social and ecological) inadequately considered as add-ons.

At the same time, a critical body of infrastructure studies has emerged outside project scholarship which call for moving away from the idea that any kind of infrastructure development is inherently a public good. This work sheds light on the political economy of infrastructure and provides critical insights on the issues of power and politics in the macro- and micro-economics of infrastructure planning, investment, and delivery. Thus, it advocates for a more nuanced understanding of the value outcomes of infrastructure projects for various stakeholders. Coelho et al. (2014) explain that infrastructure related decisions are based on value-laden assumptions about an uncertain future to forecast i) the future demand for infrastructure services, and ii) how different infrastructure configurations might be able to meet that demand. This means that the assumptions and methodologies for infrastructure planning and delivery are performative as they determine the future to come, creating opportunity costs for alternative futures by locking into certain future trajectories. At the same time, such assumptions and methodologies to evaluate policy options are almost invariably highly contestable and contested, and so, "the goals that [infrastructure] projects seek to achieve and the interests they serve involve clear trade-offs, and as a result, are often subject to dispute" (Coelho et al. 2014, p. 5).

Following this line of thought, an emerging strand of critical work advocates for a reconceptualization of infrastructure away from 'infrastructure as a technological artefact' to 'infrastructure as heterogenous socio-technological configurations', which might involve many different kinds of technologies, relations, capacities, and operations, entailing different risks and power relationships (e.g., Lawhon et al. 2018, Lawhon et al. 2023). Such a reconceptualization enables a situated view of infrastructure projects considering the impact of infrastructure projects on everyday lives of the affected places and people, and contrasts this with the benefits the projects deliver to the stakeholders in positions of power (e.g., politicians, investors, landowners etc.). Thereby, it challenges the historically-culturally produced normative ideal of universal, uniform infrastructure, and draws the attention to "the conditions under which particular socio-technical artefacts work, for whom they work, and what it means for infrastructure to work" (Lawhon et al., 2018, p.730).

In this context, questions have been raised regarding whose wider interests are served by certain infrastructure project decisions, which create uneven value for various stakeholders that are unevenly affected by infrastructure projects. For example, the roles of private funding and international funding have been problematised for the requirements that they explicitly or implicitly impose on infrastructure projects, influencing the value outcomes for the affected people and places. In terms of the influence of private funding, Bowles et al.'s (2021) study on London's Thames Tideway Tunnel, a megaproject in the UK, argues that the growing move towards private infrastructure finance creates a new understanding of 'public good' which normalises private provision. According to Bayliss et al. (2022), this is a major problem because it represents financialised value extraction with increased costs and risks for utilities which raise concerns for social equity. Bayliss et al. (2021) further suggest that privatisation of infrastructure finance, as a trend, has impact beyond individual projects as it drives a re-framing of infrastructure policy landscapes in terms of what might suit potential investors, and thus, marginalising comprehensive infrastructure plans in favour of pipelines of 'bankable' projects.

In the case of international funding, there has been a similar growing body of research suggesting that international funding for infrastructure

projects is a geopolitical instrument to create and protect strategic advantages (i.e., financial, military, resource supply) of the funding countries/organisations (Chaisse and Górski, 2018, Guirado 2022). Different ideologies represented by competing infrastructure funding agencies/countries often emphasize different issues for infrastructure development and delivery, bringing about different value that might be more or less aligned with the needs and interests of the affected people and places (Gil et al. 2019).

Ultimately, the conflicting and complex sets of interests, opinions, and values around infrastructure projects make them particularly relevant for a serious consideration of power and politics, especially for the ambition of tackling grand challenges through infrastructure projects. Clegg et al. (2017) cite Flyvberg (1998) and state that, in such projects, power clearly dominates rationality to define a particular reality that serves the interests of those who configure power. Thus, the question raises: how project scholarship could think about infrastructure stakeholders and project value to recognize and adequately account for such issues of power and politics. The current discontent with infrastructure projects in addressing grand challenges, and the resulting recent calls from Gil (2021, 2023) and Whyte and Mottee (2022) for rethinking the purpose and definition of projects need to be read against this background.

Essentially, both Gil (2021, 2023) and Whyte and Mottee (2022) highlight the issues with inadequate conceptualisations of external stakeholders (i.e., people and places affected by infrastructure projects) as the main barrier in delivering better social and ecological value for addressing grand challenges through infrastructure projects. These resonate strongly with Winch's (2017) argument that the current understanding of project stakeholders fails to address the stakes of the natural environment and future generations, and therefore, the cost-benefit analyses used in project appraisals are inadequate to capture a holistic understanding of project value. Importantly, both Gil (2021,2023) and Whyte and Mottee (2022) refer to conflicts and tensions involved with project value creation and distribution, implying the need for a deeper consideration of power and politics in reconceptualising stakeholders and project value. Gil (2023) claims that capital projects deal with two conflicting sets of evaluation criteria pre- and post-appraisal, where the external stakeholder value becomes a major priority only after the initial project appraisal (causing time delays, budget overruns etc.). From here, the author argues for a new stakeholder theory which acknowledges a more comprehensive understanding of external stakeholder value. Similarly, Whyte and Mottee (2022) argue for a wider ontology in conceptualising infrastructure projects where natural environment, built environment and society are part of a metabolism, and infrastructure investments are interventions that create tensions in the metabolism.

What is required for rethinking the purpose and definition of projects to generate better value for the affected places and people (Gil 2021, 2023, Whyte & Mottee 2022) is a deeper consideration of the external stakeholders with a better understanding of their past, present, and future, together with the micro and macro politics that surround them (as will be demonstrated through an illustrative case in Section 4). Overall, this represents a Copernican shift, where the purpose of the inquiry moves away from 'how to effectively deliver the project' towards 'how to effectively deliver value for affected places and people'. From this point of view, an infrastructure project is a manifestation of the wider social, economic, ecological, and political issues and challenges around the places and people that will be impacted by the project. Thereby, the value of a project is as much about the positive and negative impact that it makes towards alleviation of such wider issues and struggles of those external stakeholders (e.g., reducing social injustice) as it is about the core purpose of the project (e.g., building a highway for better mobility).

Political ecology is a useful theoretical approach to start developing this point of view given its rich and long tradition of studying the entangled relationships between political, economic, and social factors

with environmental issues, trade-offs, and changes. Hence, in the following section the key tenets of political ecology as a theoretical lens are briefly introduced, followed by an illustration of its relevance to project research and practice. It is argued that the adoption of such a theoretical approach will advance the conceptualisation of stakeholders and project value, supporting the rethinking of the purpose and definition of infrastructure projects as suggested by Gil (2021, 2023) and Whyte and Mottee (2022).

3. Political ecology perspective

Ecology is the study of the relationship between living organisms, including humans, and their physical environment (The Ecological Society of America, 2023). Political ecology is a field of critical research that adopts a contextual approach to exploring ecological issues with an interest in the political economy that underpins such issues. "Political ecology combines a broadly defined political economy of resource development and change centering upon the role of social relations and processes to environmental change and degradation, resource distribution, access, and control and the social constructions of nature" (Jarosz 2001, p. 5474). Political ecologists see ecological systems as power-laden rather than politically inert, and explore the relationships between economics, politics, and nature (Robbins 2019). A central premise of the field is that ecological change, comprising interventions through infrastructure projects, must be understood with a consideration of the political and economic structures and institutions that surround it (Neumann 2014).

Political ecology is a broad field which involves studies from a wide range of disciplines including anthropology, geography, and sociology, and it has become well known for its analyses of how and why structural forces, such as capitalist economic processes and power relations, drive environmental change in an increasingly interconnected world (Roberts 2020). The field of political ecology has delivered important critical analyses of the social and ecological impact of economic development and conservation initiatives, problematising issues such as material and discursive aspects of property rights, and the social construction of nature as an empty space within which social processes play out (McMahan & Nichter 2011, Neumann 2014). Political ecology researchers question and uncover relations of power and the status of powerful actors (e.g., governments, businesses, development agencies, financial institutions, conservation organizations). It explores what is taken for granted in dominant discourses (Benjaminsen & Svarstad 2020) in environmental decision-making and ecological change, where costs and benefits are redistributed, and these impacts may be shaped by gender, race, class, etc. (Bryant & Bailey 1997, Schroeder 1999, Swyngedouw & Heynen 2003, Carr, 2015). Overall, a political ecology perspective enables a new space for the conceptualisation and analysis of stakeholders and value of infrastructure projects. It shifts the focus to a more bottom-up understanding of project value where social and ecological implications of projects are at the centre, and they are understood as a result of political and economic relationships between project stakeholders.

4. Illustration of political ecology perspective using the 4E framework

In this section, the 4E (-economic- Enclosure, -political- Exclusion, -ecological- Encroachment, and -social- Entrenchment) framework (Sovacool et al. 2018, Sovacool 2021) is used to illustrate how a political ecology perspective can enable novel insights on project stakeholders and value, supporting the rethinking of the purpose and definition of infrastructure projects. The framework proposes a set of sub-processes for each of the 4Es, which manifest in most infrastructure projects in different ways, determining what value is created, how it is created, for whom it is created, and the trade-offs involved. We use this framework as a hermeneutic tool to interpret and summarise the literature on a highly contested infrastructure project in Kenya, the Nairobi Expressway, to illustrate the novel insights that could be enabled

through a political ecology perspective.

Table 1 shows brief definitions of 4Es together with a set of example sub-processes from Sovacool et al. (2018) and Sovacool (2021). The argument being made is that such sub-processes are hardly acknowledged as part of project value considerations and analyses. The framework ultimately presents an alternative perspective for studying value creation and distribution in infrastructure projects exposing the benefit of using a political ecology perspective in studying external stakeholders and value of infrastructure projects.

Although individually the 4Es may be known in project scholarship, collectively they have not been considered as interrelated and interdependent. Hence, this framework, originally developed to explain how injustice happens in climate change mitigation and disaster relief, is being used here in project research context mainly due to its multidimensional structure where social, economic, political, and ecological processes that are instrumental to value creation and distribution are jointly considered.

4.1. Illustrative case: the Nairobi expressway

The Nairobi Expressway is an elevated highway project that was developed in Public Private Partnership (PPP) between the Kenya National Highways Authority (KeNHA), an autonomous road agency, and the China Road and Bridge Corporation (CRBC), a state-owned engineering contracting company, with a 30-year concession period¹ (Centric Africa, 2020; Eickhoff, 2022). The road was conceived in 1997, cabinet-approved in 2009, and built in 2020, more than two decades since its conception (Guma et al., 2023). The delay was blamed on the World Bank, who had committed USD 380 million to the project but

Table 1
An overview of 4E framework for project value research (adapted from Sovacool et al. 2018, Sovacool 2021)

4Es	Brief definition	Example sub-processes
(Economic) Enclosure	Refers to when public assets are transferred into private hands, the roles of a private actor are expanded into a formerly public sphere.	Territorial accumulation, privatization, market stretching, parallel bureaucratization, land grabbing.
(Political) Exclusion	Often occurs in tandem with enclosure and it refers to when a [...] project excludes or displaces a particular group of stakeholders or limits access to resources related to due process, fairness, and procedural justice.	Dispossession, accumulation by dispossession, tyranny.
(Ecological) Encroachment	Refers to when [...] projects degrade the environment, interfere with ecosystem services provision, or intrude upon biodiversity conservation zones such as protected areas and national parks. [...] hegemonic [...] projects can encroach upon ecosystems or create their own type of environmental degradation.	Commodification, subordination, forum shopping.
(Social) Entrenchment	Refers to when projects result in uneven patterns of development, or are not affordable or accessible to all affected groups.	Comparative advantage, elite capture, sexism, racism, ethnic discrimination.

¹ Broken down into two periods: three years for construction and 27 years for operation.

then declined to fund the project in 2011 due to the contractor’s failure to comply with social and environmental provisions as well as Kenya’s legal and land acquisition provisions (Mulwa, 2019; Centric Africa, 2020). In October 2019, the then President, Uhuru Kenyatta officially launched the Expressway with its financing, design, and construction left to CRBC and the company’s parent firm, China Communications Construction Company, who kicked off actual construction in June 2020 (Centric Africa, 2020). The Nairobi Expressway officially opened to the public in July 2022 (Guma et al., 2023). On the one hand, the project was cited by government officials as a key solution and technological fix to Nairobi’s real and perceived mobility and transport challenges, and for improving efficiency. On the other hand, it has faced heavy criticism for failure to achieve its goals and, instead, leading to further aggravating the problems it aimed to tackle (Cap, 2022; Guma et al., 2023).

Table 2 below summarises the literature reviewed on Nairobi Expressway to exemplify how a top-down understanding of project stakeholders and value materialised through processes of (economic) enclosure, (ecological) encroachment, (social) entrenchment and (political) exclusion, resulting in highly criticised project outcomes for the affected people and places.

5. Towards a re-conceptualisation of external stakeholders and project value

Looking at the Nairobi Expressway project from a political ecology perspective, highlights some of the complex interrelationships between political, economic, social, and ecological considerations in infrastructure projects. A political ecology perspective also emphasises how such considerations are balanced and aligned via subtle and taken for granted structures, discourses, and power relationships. Thus, it reveals how a prevailing top-down understanding of value fails to create and distribute equitable value to the affected places and people. The illustrative case demonstrates how the initial framing of the project’s value, which was shaped by top-down processes and dominant financial and institutional structures, leads to an inequitable distribution of value where social, economic, and ecological injustices are replicated and deepened.

Bringing together the four dimensions of the 4E framework (economic, political, social, ecological) helps trace a thread between macro-level political economy of infrastructure projects (e.g., who has the power to initiate and shape infrastructure projects, or to arrange credit agreements for project investment) and the micro-level place-based ecological outcomes (e.g., reduced mobility of local residents who need to walk a long distance to cross the highway) as well as social outcomes (e.g., re-production of social classes by reinforcing the rich outskirts neighbourhoods versus poor central neighbourhoods distinction). Importantly, here power does not only manifest as bureaucratic authority or project sponsorship, but also in other complementary forms, such as universalised professional institutions, professionalisation and institutionalisation of ‘development’ (Escobar 1988), and de-contextualised visions of what is a good city or a good transport project (Pinder 2013), which legitimise subpar value outcomes. Hence, for infrastructure projects to effectively address the grand challenges, there needs to be a better understanding of how the pervasive and multifaceted nature of power and politics shapes the framing, creation, and distribution of various forms of project value.

This argument highlights issues of agency, vulnerability, and empowerment as central concerns for conceptualising human and non-human external stakeholders and the value infrastructure project could deliver for them. Agency is an under-explored concept in project research, and it refers to an entity’s ability to enact behaviour or make things happen (Murtagh & Sergeeva 2021). As demonstrated through the illustrative case, in the context of value creation and distribution in infrastructure projects, agency is an outcome of various explicit and tacit circuits of power and politics that span through time and multiple levels of organisation, from institutions (e.g., financial institutions) to practices (e.g., consultation practices). Developing a deeper understanding

Table 2

An interpretation of Nairobi Expressway Project from the lens of 4E framework.

4Es	Brief definition
(Economic) Enclosure	The foreign credit provided for the project is closely related to global geopolitics and local politics, which should be accounted in understanding the project (Fontein & Smith 2023). While those holding bureaucratic and economic power frame the foreign credit arrangement as 'international cooperation', this suppresses alternative framings such as the project being a 'debt trap' (Eickhoff 2022) with effects that are not easily contained or gauged through evaluative frameworks that measure impact or success (Fontein & Smith 2023). With a project budget increase of 35% (due to design variation and cost of materials), toll charge increases, and the allocation of an extra contingent liability of £135M (Musyoka 2021, Eickhoff 2022, Guma et al. 2023, Omondi 2023), Kenyans will be paying for a long time to come for this road representing a foreign idea of a 'modern' transport project (Guma 2023, Fontein & Smith 2023).
(Political) Exclusion	It is argued that the final approval of the project was rushed as it was not part of the landmark projects detailed in the 2014 masterplan for Nairobi, and the environmental impact assessment was done after the approval by a company with no prior experience (Kimari 2021). Despite a wide range of public discontent about the project, the public consultation took place early in the morning on a workday in a police training college, which can be argued played a part in reducing the numbers of the meeting to around only 30 participants (Kimari 2021). There were signs that the internal working and the public relations of the project were kept separate with, for example, Centric Africa attending public consultation without CRBC (Kimari 2021), and the use of only Mandarin language on signboards by the Chinese contractor initially during the operative testing phase (Eickhoff 2022).
(Ecological) Encroachment	In relation to economic enclosure, adopting 'foreign standards' for the design and delivery of the project generated ecological encroachment through questionable design decisions, which required a large amount of natural resource extraction and the exploitation of the locations where these were sourced (Musyoka 2021). Additionally, deterioration of the existing pedestrian infrastructure (Cap 2022) and demolition of a part of a public green space (Kimari 2021) have direct influence on mobility, wellbeing, and social aspects of local life, revealing the link between ecological encroachment and social entrenchment.
(Social) Entrenchment	Social entrenchment was generated through the use of 'traditional' transport mega-infrastructure projects, rather than identifying transport needs of local residents and designing transport systems that can support different levels and forms of mobility (Cap 2022). This has been criticised for being socially and environmentally detrimental, servicing those at the higher levels of the socioeconomic spectrum – who have access to private transportation means (i.e., cars) but who are also able to pay the tolls fees to use the road (Kimari 2021). The Nairobi Expressway and other mega road projects have also led to displacement, the severance of social networks, and increased risks for non-Expressway users (Sameer et al. 2023). The project has been further criticised for reproducing and materialising social inequalities between different social classes in Nairobi by primarily serving better off communities living in the outskirts of the city and travelling by car.

of 'agency' (i.e., how agency is acquired, negotiated, prioritized etc.) in project value creation and distribution is crucial for improving theory and practices around stakeholders and value in infrastructure projects. A relational view of agency (Burkitt, 2016), which suggests that agency is not a fixed attribute, but emerges out of situational configuration, seems particularly relevant for the recognition and analysis of the unfolding, multi-level and multi-faceted nature of power and politics in project value creation and distribution. A political ecology perspective presents a good opportunity for relational analyses of different forms of agency, as it reveals connections between power and politics on the one hand,

and multiple facets of project value on the other.

A focus on agency brings attention to those who are bypassed, or paid lip services, by formal project processes, and therefore lack 'formal agency' and voice. The alternative perspectives representing the needs and interests of external human and non-human stakeholders (e.g., people in low-income or informal settings and places) need to be incorporated to create equitable value, which can be suitably captured by the notions of vulnerability and empowerment. Adger (2006) defines vulnerability as "the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt". The notion of 'vulnerability' provides a new angle on the conceptualisation and analysis of external stakeholders which can help better articulate what social and ecological value infrastructure projects should deliver to effectively address grand challenges. A focus on 'vulnerability' also enables a more appropriate consideration of intersectionality of external stakeholders for an improved understanding of project value. In this formulation, the notion of 'empowerment' appears as complementary to the notions of 'agency' and 'vulnerability', as it can capture various ways in which stakeholders with different vulnerabilities could be given agency as part of creating and realising project value.

6. Conclusions

Value has been increasingly understood as a multifaceted concept in the context of infrastructure projects, both in research and practice, due to the strategic importance of infrastructure projects in addressing the colossal social, economic, and ecological challenges that the world is facing (i.e., the grand challenges). The political ecology perspective proposed in this essay acknowledges how economic, ecological, and social value of infrastructure projects, and the politics and power relationships surrounding such projects, are inextricably entangled. The political ecology approach promises a re-conceptualization of external stakeholders and project value highlighting the notions of agency, vulnerability, and empowerment, through which social and ecological value could be better understood and delivered to address the grand challenges.

Such a re-conceptualization does not constitute merely an abstract theoretical advance, but it also has implications for research and practice on infrastructure project formation, stakeholder engagement, and leadership. First, there is a need for rethinking project formation and leadership around the issues of agency, vulnerability, and empowerment. This would enable governmental agencies to conceive and deliver infrastructure projects based on social, environmental, and economic value creation rather than being primarily driven by the narrow framing of outputs based on costs, timelines, and quality. Second, a focus on agency, vulnerability and empowerment is essential for technical experts and project professionals to recognise their own roles in the re-production of existing imbalances in value creation and distribution in infrastructure projects. Such a focus would help to address imbalances by identifying and supporting those who lack 'formal and 'institutionalised' agency, thus equipping technical experts and project professionals with the right concepts and tools for project leadership towards sustainable development (Pielke Jr. 2007, Bell et al. 2011). Finally, despite some critical attempts to re-theorize stakeholder engagement and its practices from the perspective of agency (Chow & Leiringer 2020, Collinge 2020), there is still much academic and practical work to be done in this area. With a reconceptualization of stakeholders (and their engagement) rooted in power and politics, original frameworks can be developed to help discern the legitimacy of nonmarket stakeholder claims, as well as for balancing public and private interests in infrastructure projects defined by purpose and grand challenges.

Declaration of competing interest

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References

- Axelos. (2020). *Managing successful programmes* (5th edition). Cyprus: Peopleceart International Ltd.
- Adger, W. N. (2006). Vulnerability. *Global Environmental Change*, 16(3), 268–281.
- Bayliss, K., Romero, M. J., & Waeyenberge, E. V. (2021). Uneven outcomes from private infrastructure finance: Evidence from two case studies. *Development in Practice*, 31(7), 934–945.
- Bayliss, K., Van Waeyenberge, E., & Bowles, B. O. (2022). Private equity and the regulation of financialised infrastructure: The case of Macquarie in Britain's water and energy networks. *New Political Economy*, 28(2), 155–172.
- Behar, C., & Sykes, J. (2022). Social value in infrastructure. In , 175. *Proceedings of the Institution of Civil Engineers-Engineering Sustainability* (pp. 165–166). Thomas Telford Ltd.
- Bell, S., Chilvers, A., & Hillier, J. (2011). The socio-technology of engineering sustainability. In , 164. *Proceedings of the Institution of Civil Engineers-Engineering Sustainability* (pp. 177–184). Thomas Telford Ltd.
- Bowles, B. O., Bayliss, K., & Van Waeyenberge, E. (2021). London's 'super sewer': A case study for the interdisciplinary possibilities of anthropologists and economists investigating infrastructure together. In C. Wood Donald (Ed.), 41. *Infrastructure, morality, food and clothing, and new developments in Latin America* (pp. 5–30). Bingley: UK: Emerald Publishing Limited.
- Bryant, R. L., & Bailey, S. (1997). *Third world political ecology*. Psychology Press.
- Burkitt, I. (2016). Relational agency: Relational sociology, agency and interaction. *European Journal of Social Theory*, 19(3), 322–339.
- Cap, C. (2022). *Nairobi: Did The Expressway forget about 'people?' African City Planner: Urban Planning and Design in Africa*, November 2022. <http://africacityplanner.com/nairobi-did-the-expressway-forget-about-people/>.
- Carr, E. R. (2015). Political ecology and livelihoods. *The Routledge Handbook of Political Ecology* (pp. 332–342). Routledge.
- Centric Africa. (2020). *Environmental and Social Impact Assessment for the Proposed Nairobi Expressway Project*, 1.
- Chaisse, J., & Górski, J. (Eds.). (2018). *The Belt and Road initiative: Law, economics, and politics*. Boston: Brill.
- Chan, M., Jin, H., van Kan, D., & Vrcelj, Z. (2022). Developing an innovative assessment framework for sustainable infrastructure development. *Journal of Cleaner Production*, 368, Article 133185.
- Chow, V., & Leiringer, R. (2020). The practice of public engagement on projects: From managing external stakeholders to facilitating active contributors. *Project Management Journal*, 51(1), 24–37.
- Cicmil, S., Williams, T., Thomas, J., & Hodgson, D. (2006). Rethinking project management: researching the actuality of projects. *International Journal of Project Management*, 24(8), 675–686.
- Clegg, S., Sankaran, S., Biesenthal, C., & Pollack, J. (2017). Power and sensemaking in megaprojects. In B. Flyvbjerg (Ed.), *The Oxford handbook of megaproject management* (pp. 238–258). Oxford, UK: Oxford University Press.
- Coelho, M. C., Ratnoo, V., & Dellepiane, S. (2014). *The political economy of infrastructure in the UK*. London: Institute for Government.
- Collinge, W. (2020). Stakeholder engagement in construction: Exploring corporate social responsibility, ethical behaviors, and practices. *Journal of Construction Engineering and Management*, 146(3), Article 04020003.
- Çıdık, M. S. (2020). Project-managing the social value of built assets: a call for a focus on value manifestation. In , 36. *Proceedings of the 36th Annual ARCOM Conference* (pp. 35–44). Association of Researchers in Construction Management (ARCOM).
- Çıdık, M. S., & Bowler, V. (2022). Project value as practice: Interactive valuation practices in architectural design projects. *International Journal of Project Management*, 40(4), 362–371.
- Çıdık, M. S. (2023). Politics of social value in the built environment. *Buildings & Cities*, 4(1), 475–487.
- Diep, L., Parikh, P., Dodman, D., Alencar, J., & Martins, J. R. S. (2022). Problematizing infrastructural "fixes": critical perspectives on technocratic approaches to Green Infrastructure. *Urban Geography*, 1–22.
- Eickhoff, K. (2022). Chinese Mega Projects in Kenya: Public Controversies around Infrastructure and Debt in East Africa's Regional Hub. *Policy Brief*, May.
- Escobar, A. (1988). Power and visibility: Development and the invention and management of the Third World. *Cultural Anthropology*, 3(4), 428–443.
- Flyvbjerg, B. (1998). *Rationality and power: democracy in practice*. Chicago: The University of Chicago Press.
- Fontein, J., & Smith, C. (2023). Introduction: the stuff of African cities. *Africa*, 93(1), 1–19. <https://doi.org/10.1017/S000197202300013X>
- Fuentes, M., Smyth, H., & Davies, A. (2019). Co-creation of value outcomes: A client perspective on service provision in projects. *International journal of project management*, 37(5), 696–715.
- Gil, N., Stafford, A., & Musonda, I. (Eds.). (2019). *Duality by design: the global race to build Africa's infrastructure*. Cambridge: Cambridge University Press.
- Gil, N. (2021). Megaprojects: a meandering journey towards a theory of purpose, value creation and value distribution. *Construction Management and Economics*, 40(7-8), 562–584.
- Gil, N. A. (2023). Cracking the megaproject puzzle: A stakeholder perspective? *International Journal of Project Management*, 41(3), Article 102455.
- Green, S. D., & Sergeeva, N. (2019). Value creation in projects: Towards a narrative perspective. *International Journal of Project Management*, 37(5), 636–651.
- Guirado, J. (2022). *Political economy of infrastructure in the Middle East and North Africa*. SEPAD (the Sectarianism, Proxies and De-Sectarianization project). [Online] Available at https://www.sepad.org.uk/files/documents/infrastructure_sepad-compressed.pdf.
- Guma, P. K., Akallah, J. A., & Odeo, J. O. (2023). Plug-in urbanism: City building and the parodic guise of new infrastructure in Africa. *Urban Studies*. <https://doi.org/10.1177/00420980231158013>
- Institution of Civil Engineers (2020). *Maximising Social Value from Infrastructure Projects*. https://usefulprojects.co.uk/wp-content/uploads/2020/01/Maximising_social_value_from_infrastructure_projects_v1.1.pdf.
- Ika, L. A., & Pinto, J. K. (2022). The "re-meaning" of project success: Updating and recalibrating for a modern project management. *International Journal of Project Management*, 40(7), 835–848.
- Jarosz, L. (2001). Feminist political ecology. In N. J. Smelser, & P. B. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (pp. 5472–5475). Pergamon.
- Kimari, W. (2021). Under construction': Everyday anxieties and the proliferating social meanings of China in Kenya. *Africa*, 91(1), 135–152. <https://doi.org/10.1017/S0001972020000996>
- Lawhon, M., Nilsson, D., Silver, J., Ernstson, H., & Lwasa, S. (2018). Thinking through heterogeneous infrastructure configurations. *Urban Studies*, 55(4), 720–732.
- Lawhon, M., Makina, A., & Nakyagaba, G. N. (2023). Infrastructure beyond the modern ideal: Thinking through heterogeneity, serendipity, and autonomy in African cities. *Turning up the heat* (pp. 186–204). Manchester University Press.
- Martinsuo, M., & Killen, C. P. (2014). Value management in project portfolios: Identifying and assessing strategic value. *Project Management Journal*, 45(5), 56–70.
- Martinsuo, M., Klakegg, O. J., & van Marrewijk, A. (2019). Delivering value in projects and project-based business. *International Journal of Project Management*, 37(5), 631–635.
- Martinsuo, M. (2020). The management of values in project business: Adjusting beliefs to transform project practices and outcomes. *Project Management Journal*, 51(4), 389–399.
- McMahan, B. & Nichter, M. (2011). Medical Anthropology. In *Encyclopedia of Environmental Health*, 2nd ed.; Nriagu, J.O., Ed.; Elsevier: Burlington, VT, USA, Volume 4, pp. 274–281.
- Mulwa, R. (2019). When urban green spaces meet infrastructure development in Kenya: A case of the Nairobi Expressway. *East African Law Journal*, 2019(Special Issue), 66–81.
- Murtagh, N., & Sergeeva, N. (2021). Agency and sustainability in the construction industry. *Research Handbook of Sustainability Agency* (pp. 277–292).
- Musyoku, M. (2021). Silent Beneficiaries Already Minting Millions from Nairobi Expressway. *Kenya's Co.Ke*. <https://www.kenyas.co.ke/news/62160-silent-beneficiaries-already-minting-millions-nairobi-expressway>.
- Neumann, R. (2014). *Making political ecology*. Routledge.
- Omondi, D. (2023). Taxpayers to spend sh24.8bn on Nairobi expressway. *Business Daily*. <https://ikesra.kra.go.ke/handle/123456789/2492>.
- Paquin, J. P., Gauthier, C., & Morin, P. P. (2016). The downside risk of project portfolios: The impact of capital investment projects and the value of project efficiency and project risk management programmes. *International Journal of Project Management*, 34(8), 1460–1470.
- Pielke, R. A., Jr (2007). *The honest broker: Making sense of science in policy and politics*. Cambridge University Press.
- Pinder, D. (2013). *Visions of the city: Utopianism, power and politics in twentieth century urbanism*. Routledge.
- Pollack, J., Helm, J., & Adler, D. (2018). What is the Iron Triangle, and how has it changed? *International Journal of Managing Projects in Business*, 11(2), 527–547.
- Raidén, A., & King, A. (2022). Considering, creating and delivering social value: Problematic polarisations. In A. Tutesigensi, & C. J. Neilson (Eds.), *Proceedings of the 38th Annual ARCOM Conference, 5-7 September 2022, Glasgow, UK* (pp. 701–710). Association of Researchers in Construction Management.
- Riis, E., Hellström, M. M., & Wikström, K. (2019). Governance of Projects: Generating value by linking projects with their permanent organisation. *International Journal of Project Management*, 37(5), 652–667.
- edited by Roberts, J. (2020). Political ecology. In Felix Stein (Ed.), *The Open Encyclopedia of Anthropology*. Facsimile of the first edition in The Cambridge Encyclopedia of Anthropology. edited by Online: <http://doi.org/10.29164/20polieco>.
- Robbins, P. (2019). *Political ecology: A critical introduction*. John Wiley & Sons.
- Sameer, D., Barake, B., & Saleem, A. (2023). Exploring urban risk, climate change and the emancipatory possibilities of climate repair infrastructures in Karachi and Nairobi. *Geography Directions*. <https://doi.org/10.55203/ISSE5621>
- Schroeder, R. A. (1999). Geographies of environmental intervention in Africa. *Progress in Human Geography*, 23(3), 359–378.
- Sergeeva, N., & Winch, G. M. (2021). Project narratives that potentially perform and change the future. *Project Management Journal*, 52(3), 264–277.
- Sovacool, B. K. (2021). Who are the victims of low-carbon transitions? Towards a political ecology of climate change mitigation. *Energy Research and Social Science*, 73 (November 2020), Article 101916. <https://doi.org/10.1016/j.erss.2021.101916>
- Sovacool, B. K., Tan-Mullins, M., & Abrahamse, W. (2018). Bloated bodies and broken bricks: Power, ecology, and inequality in the political economy of natural disaster

- recovery. *World Development*, 110, 243–255. <https://doi.org/10.1016/j.worlddev.2018.05.028>
- Svarstad, H., & Benjaminsen, T. A. (2020). Reading radical environmental justice through a political ecology lens. *Geoforum*, 108, 1–11.
- Svejvig, P., & Andersen, P. (2015). Rethinking project management: A structured literature review with a critical look at the brave new world. *International Journal of Project Management*, 33(2), 278–290.
- Swyngedouw, E., & Heynen, N. C. (2003). Urban political ecology, justice and the politics of scale. *Antipode*, 35(5), 898–918.
- United Nations (2015). *Transforming our world: The 2030 Agenda for sustainable development* [online]. Available at <https://sdgs.un.org/2030agenda>. Last accessed on 16 May 2023.
- Whyte, J., & Mottee, L. (2022). Projects as interventions. *International Journal of Project Management*, 40(8), 934–940.
- Winch, G. (2017). Megaproject stakeholder management. In B. Flyvbjerg (Ed.), *Oxford Handbook of Megaproject Management* (pp. 339–361). Oxford: Oxford University Press.
- Winter, M., & Szczepanek, T. (2008). Projects and programmes as value creation processes: A new perspective and some practical implications. *International Journal of Project Management*, 26(1), 95–103.
- Zerjav, V. (2021). Why do business organizations participate in projects? Toward a typology of project value domains. *Project Management Journal*, 52(3), 287–297. <https://doi.org/10.1177/875697282110>
- Zerjav, V., McArthur, J., & Edkins, A. (2021). The multiplicity of value in the front-end of projects: The case of London transportation infrastructure. *International Journal of Project Management*, 39(5), 507–519.
- The Ecological Society of America (2023). What is ecology? Available at: <https://www.esa.org/about/what-does-ecology-have-to-do-with-me/> (Accessed 15 February 2024).