Thounaojam, N., Devkar, G. and Laishram, B., 2022. A review of drivers of sustainability in mega infrastructure projects: An institutional approach. In: Sandanayake, Y.G., Gunatilake, S. and Waidyasekara, K.G.A.S. (eds). *Proceedings of the 10th World Construction Symposium*, 24-26 June 2022, Sri Lanka. [Online]. pp. 27-38. DOI: https://doi.org/10.31705/WCS.2022.3. Available from: https://ciobwcs.com/2022-papers/

A REVIEW OF DRIVERS OF SUSTAINABILITY IN MEGA INFRASTRUCTURE PROJECTS: AN INSTITUTIONAL APPROACH

Nicola Thounaojam[1], Ganesh Devkar[2] and Boeing Laishram[3]

ABSTRACT

The need for sustainable practices in megaproject implementation is becoming acute. With the ongoing progress and expansion of mega infrastructure projects (MIPs), a lot of attention has been attracted among policymakers and researchers due to their enormous impacts on the economy, society, and the environment. Given the complexity of MIPs and the sustainability-related challenges it faces; the successful management of sustainability-related targets requires influence from the institutional forces (regulative, normative and cultural-cognitive). However, existing research on the institutional drivers that can effectively promote the sustainability of megaprojects has been largely unexplored and calls for attention. Therefore, this study aims to present a review of what drives the adoption of sustainable practices in MIPs. A systematic literature review was conducted based on a combination of keyword search in the Scopus database. Using the lens of institutional theory and deductive approach, 11 drivers for sustainability in MIPs were identified from reviewing 33 selected peer-reviewed articles. This study would enhance project stakeholders' and policymakers' understanding of drivers for sustainability and help further improve policies, strategies, norms and culture to support MIPs in contributing to sustainable development goals.

Keywords: *Drivers; Infrastructure Projects; Institutional Theory; Megaproject; Sustainability.*

1. INTRODUCTION

The rapid pace of urbanisation has led to an increase in the construction of mega infrastructure projects (MIPs) across the world. In addition to the time and cost overrun of these projects, many policymakers and researchers have criticised the implementation of megaprojects given their enormous economic, social and environmental impacts. Megaprojects generate significant impact across all three "bottom-line" sustainability indicators: economic, financial, and social (Hosseini, et al., 2018). Consequently, they exhibit and trigger far-reaching, long-term effects, thus, creating an environment unable

[1] Research Scholar, Department of Civil Engineering, Indian Institute of Technology Guwahati, Guwahati, India, nicola@iitg.ac.in
[2] Associate Professor, Faculty of Technology, CEPT University, Ahmedabad, India, ganesh.devkar@cept.ac.in
[3] Professor, Department of Civil Engineering, Indian Institute of Technology Guwahati, Guwahati, India, boeing@iitg.ac.in

to foster sustainability (Brookes and Locatelli, 2015). They are widely denounced for lack of public participation, forced displacement, flaws in CBA (Cost-Benefit analysis), procedural loopholes in EIA (Environmental Impact Assessment) and environmental destruction (Thounaojam and Laishram, 2021). The scale of such projects is so huge that the project activities consume large amount of resources and cause sustainability issues due to carbon emissions. In addition, these projects expend immense budgets, draw serious economic and political attention, and often lead to conflicts between project stakeholders over white elephant projects. Therefore, it is necessary to look beyond the "iron triangle" of fulfilled schedule, budget, and specifications in analysing megaprojects (del Cerro Santamaría, 2021). The need for sustainable practices in megaproject implementation is becoming acute. However, integrating these principles to project processes depend immensely on many triggering factors or drivers that lead a project organisation to promulgate sustainable development in their projects.

Many scholars have recognised the importance of acquiring knowledge of institutional driver for sustainability and have been examining them in the manufacturing sector (Wijethilake, et al., 2017; Misopoulos, et al., 2018), supply chain (Kauppi and Hannibal, 2017) and mining industry (Famiyeh, et al., 2021). Studies have also analysed institutional factors related to sustainability reporting (Rosati and Faria, 2019). However, existing research on the institutional drivers that can effectively promote the sustainability of megaprojects has been largely unexplored and calls for attention. To better understand how megaprojects' decision-makers and policymakers can accelerate and direct sustainable practices, insight is needed into the drivers for sustainability in the practices of megaprojects. Drawing upon institutional theory, this study aims to identify various forms of institutional pressures (regulative, normative and cultural-cognitive) that are potentially related to the sustainability of MIPs. With the research question in mind, the study reviews the existing literature on drivers for sustainability in megaprojects through the lens of institutional theory. The study can be helpful for project actors and policy-makers to develop and improve policies, strategies, norms and culture to support MIPs in contributing to the sustainable development goals.

2. THEORETICAL APPROACH

Institutional theory sets the foundation for analysing factors that drive survival and legitimacy of organisational practices. The three forms of drivers, regulative, normative and cultural-cognitive structures and activities, provide stability and meaning to social behaviour (Scott, 1995). These structures become the 'social facts' that describe the organisation's reality: "explanation of what is and what is not, what can be acted and what cannot" (Hoffman, 2001). Institutional theory is useful in this study to provide more understanding of the connection between institutional drivers and sustainability in megaprojects.

Organisations are likely to develop structures and policies that align with the institutional pressures they face. For instance, organisations in supply chain often adopt information technology due to institutional isomorphism, namely coercion, mimesis, and norms (Lai, et al., 2006). Likewise, institutional characteristics, such as political and legal systems, regulatory frameworks and socio-cultural norms, can influence the integration of sustainability in megaproject management. The institutional supports, including government aid, green incentives and training programmes, play a crucial role in promoting sustainability in MIPs (Thounaojam and Laishram, 2021). According to a

study conducted among megaproject experts, it was found that different incentive policies from the government can positively influence sustainable construction in megaprojects (Wu, et al., 2018). Given the complexity of megaprojects and the sustainability-related challenges, the successful management of sustainability-related targets requires influence from three institutions- regulative, normative and cultural-cognitive. These projects must be regarded as "socio-technical endeavours" set in complex institutional systems (Biesenthal, et al., 2018), and theoretical frameworks incorporating institutional theory can be a promising domain for future megaprojects research (Hu, et al., 2015). Understanding these projects from the lens of institutional theory may explain how some institutional systems may drive megaproject sustainability. The institutional-environmental elements play a crucial role in promoting the sustainability of megaprojects (Xie, et al., 2021).

Regulative elements use explicit rules and surveillance activities originating from government departments, state agencies or the judiciary. Normative elements look at prescriptive and obligatory dimensions, originating from professional bodies and industry or trade standards bodies, suppliers and consulting organisations; and cultural-cognitive elements rely on shared beliefs (culture) and are dependent on individual cognition (Butler, 2011; Biesenthal, et al., 2018). Each element differs in the degree to which it is visible and ranges from the directly coercive to the "taken-for-granted" (Hoffman, 2001).

3. RESEARCH METHODOLOGY

A systematic literature review was carried out for reviewing the existing literature on drivers for sustainability of megaprojects. Unlike traditional reviews, systematic literature reviews are explicit, rigorous and transparent, and researchers in the area of built environment research have been employing to establish an evidence-based practice (Parida and Brown, 2018). This study followed three phases of review methodology modified from Chelliah, et al. (2021).

The Scopus database was employed for literature search under the first phase of review (planning the review). The search was conducted based on building blocks, further divided into facets (variants/synonyms of each facet). Booth (2008) recommended adopting a "building blocks" strategy in conducting a search query. According to this strategy, the topic of study is broken into facets/blocks. Then, variants and synonyms for each facet are added together using Boolean operators to form a final search query. Likewise, the keywords used for the literature search are shown in Table 1. These keywords were identified using trial-and-error and snowballing techniques.

In the second phase (*conducting the review*), publications were first filtered that are English, peer-reviewed and journal articles. In the next step, papers pertinent to the research question are selected based on title, abstract, and full manuscript analysis (refer Figure 1). These papers were critically assessed based on the inclusion criteria defined in Table 1. In total, 33 papers were selected for literature review to identify critical institutional drivers for sustainability in megaprojects.

In the third phase (*analysing and reporting review*), content analysis was carried out using a deductive approach with categories informed by the institutional theory (regulative, normative and cultural-cognitive). Deductive analysis that explicitly draws from existing theory or frameworks, as opposed to inductive analysis, can be especially useful in attempts to contextualise and complicate existing knowledge (Love and Corr, 2022).

Table 1: Search strings and filtering criteria

	Building Block 1/ Facets	Building Block 2/ Facets	Inclusion criteria	Filter
Search string 1	"Regulative", "normative", "cultural cognitive", "institutional theory", "mimetic", "coercive"	Sustainab*	Articles that use words analogous to sustainability-institutional elements in project management or construction projects.	Language: English Peer reviewed Type: Journal papers
Search string 2	"megaproject", "large infrastructure", "large construction", "large project", "mega-infrastructure"	Sustainab*	Articles that has critiqued institutional drivers, motivation or pressure for sustainability in large infrastructure projects.	

Full-text of the manuscripts was taken as the unit of analysis and necessary data was extracted using QSR NVivo. All the 45 papers were reviewed for content and coded for aspects that fit the categorisation frame or are exemplification of the categories (Polit and Beck, 2004). Some example text coded for each category are provided in Table 2.

After a categorization matrix has been developed, all the data are reviewed for content and coded for correspondence with or exemplification of the identified categories (Polit and Beck, 2004).

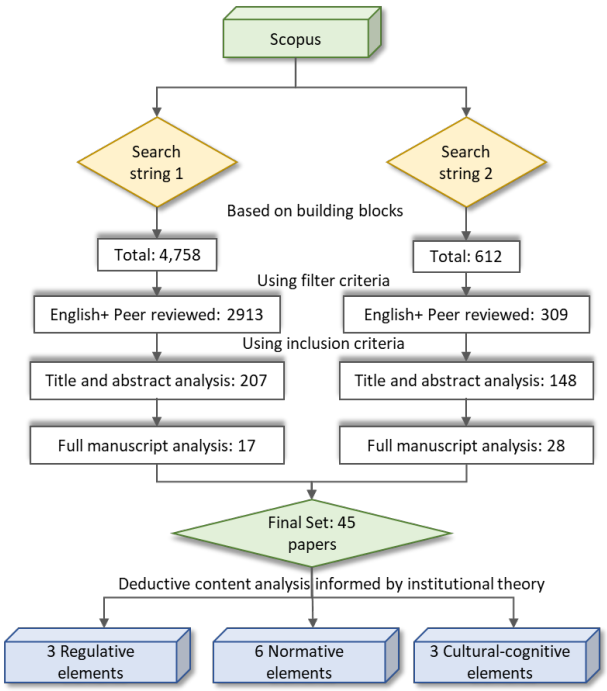

Figure 1: Literature search and selection process

4. RESULTS AND DISCUSSIONS

The findings of the analysis showed three regulative, five normative and three cultural-cognitive elements (as shown in Table 2) that can drive sustainability in mega

infrastructure projects. Therefore, the following section discusses the findings from the content analysis.

Table 1: Sustainability-institutional drivers in megaprojects

	Sustainability institutional drivers	Description	Example text	Sources
Regulative	Environmental and Social Legislative and Regulatory mechanisms (R1)	Drives through compliance with various environmental and social laws and regulations and monitoring by their respective institution (s)/organisation (s).	"The new regulations for having sustainable production processes place more emphasis on the environmental aspect of TBL."	[1] [2] [3] [4] [6] [9] [10] [13] [14] [18] [20] [21] [22] [23] [24] [27] [28] [29] [33]
	Incentives and penalties (R2)	Incentives from the government as a tool to promote sustainable activities.	"Project managers could be rewarded incentives mechanisms for implementing social and environmental improvement [..]."	[4] [18] [20] [21] [22]
	Contractual contents (R3)	Contractual contents regarding impact assessment; economic, social and environmental obligations; grievances and dispute resolution mechanisms; stabilisation clause; transparency, reporting and public engagement; and penalties and termination.	"Contract documents contain clear requirements for project quality and safety, handling public social events, and ecological environmental protection."	[2] [12] [18] [27] [28] [30] [33]
Normative	Standards and certifications (N1)	Worksites certifications such as ISO 9001, 45001 and 14001, and project green awards such as LEED certification.	"[…] pointed out about self-regulation, […] obtained Environmental Management System certification (ISO 14001) release an environmental balance and policy report annually […]."	[3] [4] [7] [8] [10] [13] [14] [16] [17] [21] [23] [28] [29]
	Vocational training and meetings (N2)	Training programs and meetings for sustainability-related activities.	"Introduce training programs associated with sustainable construction and project management practices."	[5] [8] [10] [11] [17] [19] [20] [23] [30]
	Standardised templates and norms (N3)	Standardised templates and norms for green practices and performance monitoring mechanism.	"The Project Design Documents [….] provide management plans and explanations on how projects will reduce emissions and provide SD benefits."	[13] [17] [20] [25] [31]
	Influence from consultants/ professional bodies (N4)	Participation and support from multiple consultants and professional bodies in the project with a good	"Industry professional bodies play a crucial role in disseminating information on innovative	[2] [4] [9] [11] [20] [26] [31]

Sustainability institutional drivers		Description	Example text	Sources
		history of implementing sustainable infrastructures.	environmental measures and in advocating cutting-edge green technologies."	
	Influence of multilateral/ international agencies (N5)	Presence of multiple multilateral/ international agencies with a solid environmental and social safeguard framework.	"PFIs [public funding institutions] under consideration here are not only catalysts for private finance but also trendsetters on the sustainability front."	[1] [19] [29] [30]
Cultural-cognitive	Sustainability knowledge and competence among employees (C1)	Knowledge and competence among the employees understand the need to rethink the project activities by incorporating sustainability practices.	"[…] firms' sustainable capabilities and competence as important commitments towards reducing impacts on the environment."	[14] [15] [27] [28] [29] [32]
	Project company's goals and commitments towards sustainability (C2)	The existence of energy, environmental and social sustainability policies in the company positively impacts their commitment and involvement in the sustainable transformation of the projects.	"Project management plan without sustainable principles will fundamentally result in a lack of safeguards to achieve the sustainable development of the MIP."	[6] [9] [14] [15] [17] [23] [27] [28]
	Established sustainable practices/ Peer project participants (C3)	The exchange of knowledge and experiences from peer projects brings positive reinforcement for the project to implement sustainable practices and models. Participation and support from information exchanges on successful models through industrial and government section events.	"Top managers influence the final green innovation choices by learning and comparing the decisions of peers regarding green innovation."	[6] [9] [11] [13] [19] [20] [24] [26] [28] [31] [32]

[1] Caspary (2009); **[2]** Javernick-Will and Levitt (2010); **[3]** Butler (2011); **[4]** Caprar and Neville (2012); **[5]** (Othman, 2013); **[6]** Glover, et al. (2014); **[7]** Brookes and Locatelli (2015); **[8]** Zeng, et al. (2015); **[9]** Dubey, et al. (2017); **[10]** Lin, et al. (2017); **[11]** Hosseini, et al. (2018); **[12]** Li, et al. (2018); **[13]** Misopoulos, et al. (2018); **[14]** Zhang, et al. (2018); **[15]** Alotaibi, et al. (2019); **[16]** Dushenko, et al. (2019); **[17]** Qin, et al. (2019); **[18]** Xie, et al. (2019); **[19]** Yang, et al. (2019); **[20]** Ajibike, et al. (2020); **[21]** He, et al. (2020); **[22]** Jaber and Oftedal (2020); **[23]** Khan, et al. (2020); **[24]** Ma, et al. (2020); **[25]** Mensah, et al. (2020); **[26]** Ullah, et al. (2020); **[27]** Li, et al. (2021); **[28]** Lingegård, et al. (2021); **[29]** Qi, et al. (2021); **[30]** Sidhu and Gibbon (2021); **[31]** Xie, et al. (2021); **[32]** Bamgbade, et al. (2022); **[33]** Ma and Fu (2022).

4.1 REGULATIVE ELEMENTS

Studies have emphasised that regulatory pressure is a significant driver of environmental commitment (Huang and Yang, 2014). Regulative drivers mainly come from formal pressures exerted on organisations by other organisations upon which they are dependent.

They are evident and primarily coercive. For instance, project organisations are under pressure from stakeholders, such as the government, to incorporate social, environmental and economic considerations into their projects through *environmental and social legislative and regulatory mechanisms* (R1) (Xie, et al., 2021). As a result, stimulating project organisations to devote to environmental and social causes (He, et al., 2020). Therefore, it is important that the project organisations and governments make effective and efficient policies and regulation and take appropriate consequent actions to improve sustainability of megaprojects (Ma, et al., 2020). Some of these regulatory mechanisms in the context of India applicable to megaprojects are compiled and shown in Table 3.

Table 2: Environmental and social legislation to address impacts of infrastructure projects in India - compiled from Planning Commission (2007) and Centre for Policy Research (2016)

	Act	Rules and notifications	Organization/ Institution
1	Environment Protection Act, 1986	EIA notification 2006	MoEFCC/ SEIAA/ DEIAA
		CRZ Notification 2011	State CZMA to MoEFCC/ SEIAA
		Hazardous and other waste rules, 2016	SPCB
		Solid waste management rules, 2016	SPCB/ Local Body
2	Water (Prevention and Control of Pollution) Act, 1974		CPCB/SPCB
3	Air (Prevention and Control of Pollution) Act, 1981		CPCB/SPCB
4	Ground water guidelines, 2015		Authorised officers of notified areas
5	Wildlife Protection Act, 1972		Chief Wildlife Warden/ Wildlife advisory boards
6	Forest Conservation Act, 1980		Regional Office of MoEFCC
7	Land Acquisition Act, 1894		Ministry of Rural Development
8	National Rehabilitation and Resettlement Policy 2007		Ministry of Rural Development
9	Various Labour Laws		Central and State Government.

MoEFCC- *Ministry of Environmental, Forest and Climate Change*; **SEIAA**- *State Environment Impact Assessment Authority*; **DEIAA**- *District Environment Impact Assessment Authority*; **CZMA**- *Coastal Zone Management Authority*; **SPCB**- *State Pollution Control Board*; **CPCB**- *Central Pollution Control Board.*

Furthermore, *legal penalties and incentives* (R2) also serve as drivers for promoting sustainability in megaprojects (He, et al., 2020). For instance, in India, the Ministry of Environment & Forest (2011) has issued a memorandum highlighting that the projects that obtained green building rating under GRIHA, IGBC, including LEED India, shall prioritise environmental clearance. On the other hand, penalty is often used as a routine regulatory strategy to govern poor environmental performance, imposing coercive pressures on organizations (He, et al., 2020).

In addition, Ma and Fu (2022) highlighted that sustainability of megaprojects is mainly dependent on the implementation of contracts. Therefore, *contractual contents* (R3) that highlight environmental protection, occupational health, green construction and other related clauses serve as crucial drivers for sustainability in megaprojects (Sidhu and Gibbon, 2021). Brauch (2017) emphasised the importance of integration of sustainability in infrastructure contracts and highlighted eight approaches to incentivise investment in sustainable infrastructure.

4.2 NORMATIVE ELEMENTS

Normative pressures stem from shared norms within the organisation that are usually informal and latent. Government regulations are not the only driver to practice sustainable management. Self-regulation through obtaining Environmental Management System (EMS) *certification* (N1), such as ISO 14001, has become a clear driver for adopting sustainable management practices. Organisations also attain sustainability compliance by acquiring some of the most tangible, visible and widely adopted approaches, such as voluntary certifications (such as IGBC certification) and eco-labelling (Zhang, et al., 2018) and by GRI or sustainability reporting (Zuo, et al., 2012). These components can also provide source or reference for governments and industry partners to use as they promote targeted industrial standards and regulations (Ma, et al., 2020). In addition, such acts are believed to promote attaining sustainability in projects and enhance the reputation of the organisation and the confidence of the client or end-users (Brooks and Rich, 2016). Having such standards and certification makes the projects more adept at supporting sustainability actions (Thounaojam, et al., 2022).

In addition, *training* (N2) received by the project employees is expected to drive the practices they adopt. Therefore, normative pressure to drive sustainable practices can also be wielded through prescribed training (Lin, et al., 2017). Through systematic training programs and regular meetings associated with sustainable construction and project management practices, project actors can accumulate professional knowledge, build a sense of responsibility toward the environment, and demonstrate their willingness to engage in pro environmental behaviours (Hosseini, et al., 2018; Wang, et al., 2018).

Furthermore, Bamgbade, et al. (2022) accentuated that organisations emphasise sustainability performance because they are obligated to observe specific stringent international- *standardised codes of practice* (N3). Dubey, et al. (2017) also emphasised that these associations can encourage organisations to become more environmentally responsible, and the leading organisations set an example for environmentally and socially responsible conduct. They create environmental standards and mechanisms to ensure environmentally responsible associations in the industry. In addition, *International and national professional associations* (N4), industry-standard bodies and consultants also play an essential role (Caspary, 2009; Butler, 2011). They drive sustainability in projects through standard-setting, awards, training, and regular workshops. In addition, *international or multilateral funding agencies* (N5) are considered "trendsetters on the sustainability front" (Caspary, 2009). They have strict environmental safeguard policies drawn from SDGs, enabling the project to attain sustainability in most aspects.

4.3 CULTURAL-COGNITIVE ELEMENTS

According to Biesenthal, et al. (2018), cultural-cognitive structures have received little attention, and there is a need for looking at megaprojects research from this perspective. Cultural-cognitive elements stem from *sustainability knowledge and competence* (C1) among the employees (Jaber and Oftedal, 2020). Li, et al. (2021) highlighted that the project team exhibits lower sustainable awareness when the professional knowledge of team personnel is not complementary and lacks experience or professional ability. Therefore, specialised sustainability units with competence of specific individuals can help better manage the integration and development of sustainability practices in the project (Lingegård, et al., 2021).

In addition, it is also essential that organisations themselves advocate the importance of sustainability practices and voluntarily measure and disclose their sustainability strategies through the company's *goals and commitments* (C2) (Butler, 2011). Project organisations' willingness to innovate in sustainable models can also drive sustainability in megaprojects (Bamgbade, et al., 2022). Shared vision and organisational culture towards sustainable development goals help promote sustainability in megaprojects (Lingegård, et al., 2021). In addition, organisations also maintain the legitimacy of sustainable practices by *imitating successful strategies of peer projects* (C3) (Li, et al., 2021). In particular, the organisation ascribes its competitor's success to their strategic choices and imitate successful sustainable practices by adopting the same practices. Furthermore, ongoing dialogue and learning between government clients and market actors related to successful and sustainable models or technologies are central for driving long-term change and the development of sustainability in the infrastructure projects (Lingegård, et al., 2021).

5. CONCLUSIONS AND THE WAY FORWARD

This study provides a systematic review of drivers for sustainability in megaprojects, which was lacking in the existing body of knowledge. Using the lens of institutional theory, a deductive analysis of 33 peer-reviewed journals was conducted to identify 11 drivers for sustainability in megaprojects. This review identified three regulative drivers, namely, *environmental and social legislative and regulatory mechanisms*, *incentives and penalties*, and *contractual contents*. Project organisations and governments need to make effective and efficient policies, regulation and contractual clauses and take appropriate consequent actions to improve sustainability of megaprojects. In addition, this study identified five normative drivers, namely, *standards and certifications*, *vocational training and meetings*, *standardised templates and codes*, and *influence from consultants, multilateral and international agencies*. Self-regulation by the project organisations through acquiring international standards and certification can drive the projects more adept at supporting sustainability actions. In addition, training programs and regular meetings associated with sustainable development can accumulate professional knowledge and build a willingness to engage in pro environmental behaviour. Presence of multiple consultants and multi-lateral funding agencies also drive sustainability in megaprojects because of their strict environmental safeguard policies. Furthermore, cultural-cognitive elements that can drive sustainability in MIPs include *sustainability knowledge and competence*, *project company's goals and commitments*, and *learning and comparing decisions of peers* regarding sustainability practices. Professional knowledge along with specialised sustainability units, sustainable goals and commitment from project companies, and mimicking of successful models from peer-projects can drive sustainability in megaprojects.

This study provides valuable insights for improving the understanding of project stakeholders and policymakers' understanding of drivers for sustainability and can help further improve policies, strategies, and norms to support MIPs in contributing to sustainable development goals. This study also imparts project managers the right balance between the three institutional drivers, thus creating a path to promote sustainable culture for addressing sustainable practices in managing megaprojects. In addition, this study lays a solid foundation for researchers to further probe into why some institutional systems drive megaproject sustainability while others are not.

6. REFERENCES

Ajibike, W.A., Adeleke, A.Q., Mohamad, F., Nawi, M.N.M., Bamgbade, J.A., Riazi, S.R.M. and Ahmad, M.F., 2020. Achieving environmental sustainability in malaysian construction industry through institutional pressure. *Journal of Critical Reviews,* 7(7), pp. 1159-1167.

Alotaibi, A., Edum-Fotwe, F. and Price, A.D.F., 2019. Critical barriers to social responsibility implementation within mega-construction projects: the case of the Kingdom of Saudi Arabia. *Sustainability,* 11(6), pp. 1755.

Bamgbade, J.A., Nawi, M.N.M., Kamaruddeen, A.M., Adeleke, A.Q. and Salimon, M.G., 2022. Building sustainability in the construction industry through firm capabilities, technology and business innovativeness: empirical evidence from Malaysia. *International Journal of Construction Management,* 22 (3), pp. 473-488.

Biesenthal, C., Clegg, S., Mahalingam, A. and Sankaran, S., 2018. Applying institutional theories to managing megaprojects. *International Journal of Project Management,* 36 (1), pp. 43-54.

Booth, A., 2008. Unpacking your literature search toolbox: on search styles and tactics. *Health Information and Libraries Journal,* 25(4), pp. 313-317.

Brauch, M.D., 2017. *Contracts for sustainable infrastructure: Ensuring the economic, social and environmental co-benefits of infrastructure investment projects.* Winnipeg, Canada: IISD. [Online] Available from: https://www.iisd.org/publications/report/contracts-sustainable-infrastructure-ensuring-economic-social-and-environmental [Accessed 30 April 2020].

Brookes, N. and Locatelli, G., 2015. Power plants as megaprojects: using empirics to shape policy, planning, and construction management. *Utilities Policy,* 36, pp. 57-66.

Brooks, A. and Rich, H., 2016. Sustainable construction and socio-technical transitions in London's mega-projects. *The Geographical Journal,* 182 (4), pp. 395-405.

Butler, T., 2011. Compliance with institutional imperatives on environmental sustainability: Building theory on the role of Green IS. *The Journal of Strategic Information Systems,* 20(1), pp. 6-26.

Caprar, D.V. and Neville, B.A., 2012. "Norming" and "Conforming": Integrating cultural and institutional explanations for sustainability adoption in business. *Journal of Business Ethics,* 110 (2), pp. 231-245.

Caspary, G., 2009. Improving sustainability in the financing of large infrastructure projects: what role for leaders? *Corporate Governance: The International Journal of Business in Society,* 9(1), pp. 58-72.

Centre for Policy Research, 2016. *How effective are environmental regulations to address impacts of industrial and infrastructure projects in India.* India: CPR. [Online] Available from: http://www.indiaenvironmentportal.org.in/content/437346/how-effective-are-environmental-regulations-to-address-impacts-of-industrial-and-infrastructure-projects-in-india/ [Accessed 28 Mar 2021].

Chelliah, V., Thounaojam, N., Devkar, G. and Laishram, B., 2021. Evaluation of systematic literature reviews in built environment research: What are we doing and how can we improve? In: E. Manu & J. Akotia (eds.) *Secondary Research Methods in the Built Environment.* London: Routledge.

Del Cerro Santamaría, G., 2021. Megaprojects, ecology and the environment: Dimensions of sustainability in global cities. In: F. Trapani, N. Mohareb, F. Rosso, D. Kolokotsa, S. Maruthaveeran and M. Ghoneem (eds.) *Advanced Studies in Efficient Environmental Design and City Planning.* Cham: Springer.

Dubey, R., Gunasekaran, A., Childe, S.J., Papadopoulos, T., Hazen, B., Giannakis, M. and Roubaud, D., 2017. Examining the effect of external pressures and organizational culture on shaping performance measurement systems (PMS) for sustainability benchmarking: some empirical findings. *International Journal of Production Economics,* 193, pp. 63-76.

Dushenko, M., Thærie Bjorbæk, C. and Steger-Jensen, K., 2019. Application of a sustainability model for assessing the relocation of a container terminal: A case study of Kristiansand port. *Sustainability,* 11(1), pp. 1-87.

Famiyeh, S., Opoku, R.A., Kwarteng, A. and Asante-Darko, D., 2021. Driving forces of sustainability in the mining industry: evidence from a developing country. *Resources Policy,* 70, p. 101910.

Glover, J.L., Champion, D., Daniels, K.J. and Dainty, A.J.D., 2014. An Institutional Theory perspective on sustainable practices across the dairy supply chain. *International Journal of Production Economics,* 152, pp. 102-111.

He, Q., Wang, Z., Wang, G., Zuo, J., Wu, G. and Liu, B., 2020. To be green or not to be: how environmental regulations shape contractor greenwashing behaviors in construction projects. *Sustainable Cities and Society,* 63, p. 102462.

Hoffman, A.J., 2001. Linking organizational and field-level analyses:the diffusion of corporate environmental practice. *Organization & Environment,* 14(2), pp. 133-156.

Hosseini, M.R., Banihashemi, S., Martek, I., Golizadeh, H. and Ghodoosi, F., 2018. Sustainable delivery of megaprojects in Iran: integrated model of contextual factors. *Journal of Management in Engineering,* 34 (2), p. 05017011.

Hu, Y., Chan Albert, P.C., Le, Y. and Jin, R.-Z., 2015. From construction megaproject management to complex project management: bibliographic analysis. *Journal of Management in Engineering,* 31(4), p. 04014052.

Huang, Y.-C. and Yang, M.-L., 2014. Reverse logistics innovation, institutional pressures and performance. *Management Research Review,* 37(7), pp. 615-641.

Jaber, T. and Oftedal, E.M., 2020. Legitimacy for sustainability: a case of a strategy change for an oil and gas company. *Sustainability,* 12(2), pp. 525.

Javernick-Will, A. and Levitt, R.E., 2010. Mobilizing institutional knowledge for international projects. *Journal of Construction Engineering and Management,* 136(4), pp. 430-441.

Kauppi, K. and Hannibal, C., 2017. Institutional pressures and sustainability assessment in supply chains. *Supply Chain Management,* 22(5), pp. 458-472.

Khan, M., Lockhart, J. and Bathurst, R., 2020. A multi-level institutional perspective of corporate social responsibility reporting: a mixed-method study. *Journal of Cleaner Production,* 265, pp. 121739.

Lai, K.-H., Wong, C.W.Y. and Cheng, T.C.E., 2006. Institutional isomorphism and the adoption of information technology for supply chain management. *Computers in Industry,* 57(1), pp. 93-98.

Li, H., Zhang, X., Ng, S.T., Skitmore, M. and Dong, Y.H., 2018. Social sustainability indicators of public construction megaprojects in China. *Journal of Urban Planning and Development,* 144(4), p. 04018034.

Li, Y., Xiang, P., You, K., Guo, J., Liu, Z. and Ren, H., 2021. Identifying the key risk factors of mega infrastructure projects from an extended sustainable development perspective. *International Journal of Environmental Research and Public Health,* 18(14), p. 7515.

Lin, H., Zeng, S., Ma, H., Zeng, R. and Tam, V.W.Y., 2017. An indicator system for evaluating megaproject social responsibility. *International Journal of Project Management,* 35(7), pp. 1415-1426.

Lingegård, S., Olsson, J.A., Kadefors, A. and Uppenberg, S., 2021. Sustainable public procurement in large infrastructure projects- policy implementation for carbon emission reductions. *Sustainability,* 13(20), p. 11182.

Love, H.R. and Corr, C., 2022. Integrating without quantitizing: two examples of deductive analysis strategies within qualitatively driven mixed methods research. *Journal of Mixed Methods Research,* 16(1), pp. 64-87.

Ma, H., Liu, Z., Zeng, S., Lin, H. and Tam, V.W.Y., 2020. Does megaproject social responsibility improve the sustainability of the construction industry? *Engineering, Construction and Architectural Management,* 27(4), pp. 975-996.

Ma, L. and Fu, H., 2022. A governance framework for the sustainable delivery of megaprojects: the interaction of megaproject citizenship behavior and contracts. *Journal of Construction Engineering and Management,* 148(4), p. 04022004.

Mensah, S., Ayarkwa, J. and Nani, G., 2020. A theoretical framework for conceptualizing contractors' adaptation to environmentally sustainable construction. *International Journal of Construction Management,* 20 (7), pp. 801-811.

Ministry of Environment & Forest, 2011. *Office Memorandum.* Ministry of Environment & Forest, Government of India. [Online] Available from: http://environmentclearance.nic.in/writereaddata/OMs-2004-2021/80_OM_10_05_2011.pdf [Accessed 31 Nov 2021].

Misopoulos, F., Michaelides, R., Salehuddin, M.A., Manthou, V. and Michaelides, Z., 2018. Addressing organisational pressures as drivers towards sustainability in manufacturing projects and project management methodologies. *Sustainability,* 10(6), pp. 2098.

Othman, A., 2013. Challenges of mega construction projects in developing countries. *Organisation, Technology and Management in Construction,* 5(1), pp. 730-746.

Parida, S. and Brown, K., 2018. Investigating systematic review for multi-disciplinary research in the built environment. *Built Environment Project and Asset Management,* 8(1), pp. 78-90.

Planning Commission, 2007. Report of the working group on environment & environmental regulatory mechanisms: In*: Environment & Forests for the Eleventh Five Year Plan.* New Delhi: Government of India.

Polit, D.F. and Beck, C.T., 2004. *Nursing research : principles and methods* Philadelphia: Lippincott Williams & Wilkins

Qi, G., Jia, Y. and Zou, H., 2021. Is institutional pressure the mother of green innovation? examining the moderating effect of absorptive capacity. *Journal of Cleaner Production,* 278, p. 123957.

Qin, Y., Harrison, J. and Chen, L., 2019. A framework for the practice of corporate environmental responsibility in China. *Journal of Cleaner Production,* 235, pp. 426-452.

Rosati, F. and Faria, L.G.D., 2019. Addressing the SDGs in sustainability reports: the relationship with institutional factors. *Journal of Cleaner Production,* 215, pp. 1312-1326.

Scott, W.R., 1995. *Institutions and organizations* Thousand Oaks: SAGE Publications

Sidhu, A.M. and Gibbon, J., 2021. Institutionalisation of weak conceptions of sustainability in the United Nations clean development mechanism: empirical evidence from Malaysian organisations. *Accounting, Auditing & Accountability Journal,* 34(5), pp. 1220-1245.

Thounaojam, N., Devkar, G. and Laishram, B., 2022. Institutionalisation of sustainability in Indian megaprojects: an organisational field-based approach. *International Journal of Managing Projects in Business,* 15(4), pp. 676-700.

Thounaojam, N. and Laishram, B., 2021. Issues in promoting sustainability in mega infrastructure projects: a systematic review. *Journal of Environmental Planning and Management,* 65(8), pp. 1349-1372.

Ullah, M., Khan, M.W.A., Kuang, L.C., Hussain, A., Rana, F., Khan, A. and Sajid, M.R., 2020. A structural model for the antecedents of sustainable project management in Pakistan. *Sustainability,* 12(19), pp. 8013.

Wang, G., He, Q.H., Xia, B., Meng, X.H. and Wu, P., 2018. Impact of institutional pressures on organizational citizenship behaviors for the environment: evidence from megaprojects. *Journal of Management in Engineering,* 34(5), pp. 04018028.

Wijethilake, C., Munir, R. and Appuhami, R., 2017. Strategic responses to institutional pressures for sustainability: the role of management control systems. *Accounting, Auditing and Accountability Journal,* 30(8), pp. 1677-1710.

Wu, G., Qiang, G., Zuo, J., Zhao, X. and Chang, R.-D., 2018. What are the key indicators of mega sustainable construction projects? - Stakeholder-network perspective. *Sustainability,* 10(8), pp. 2939.

Xie, L., Ju, T. and Xia, B., 2021. Institutional pressures and megaproject social responsibility behavior: a conditional process model. *Buildings,* 11(4), pp. 140.

Xie, L.L., Han, T., Chu, H.T. and Xia, B., 2019. Behavior selection of stakeholders toward megaproject social responsibility: perspective from social action theory. *Advances in Civil Engineering,* 2019, p. 14.

Yang, D., Wang, A.X., Zhou, K.Z. and Jiang, W., 2019. Environmental strategy, institutional force, and innovation capability: a managerial cognition perspective. *Journal of Business Ethics,* 159(4), pp. 1147-1161.

Zeng, S.X., Ma, H.Y., Lin, H., Zeng, R.C. and Tam, V.W.Y., 2015. Social responsibility of major infrastructure projects in China. *International Journal of Project Management,* 33(3), pp. 537-548.

Zhang, J., Qi, X. and Liang, C., 2018. Tackling complexity in green contractor selection for mega infrastructure projects: a hesitant fuzzy linguistic MADM approach with considering group attitudinal character and attributes' interdependency. *Complexity,* 2018, pp. 1-31.

Zuo, J., Zillante, G., Wilson, L., Davidson, K. and Pullen, S., 2012. Sustainability policy of construction contractors: a review. *Renewable and Sustainable Energy Reviews,* 16(6), pp. 3910-3916.