

Integrating Sustainability Factors into the Public Procurement Process in Construction Industry

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Abstract

Sustainability is one of the major aspects to enhance the economy and standard of living of a country. Moreover, the essential services and infrastructure facilities of a country procured through a Public Procurement Process (PP Process) directly affect the economy and standards of living of the country. Further, the improvement of services and infrastructure facilities direct links with the construction industry of a country. However, development partners and funding agencies pointed out that sustainability is a lagging area in the construction industry when compared with other industries in developing countries. Consequently, integration of sustainability factors into the PP Process proposed as one of the effective solutions to upgrade the existing PP Process. Hence, this paper aims to identify and verify the sustainability factors to be integrated into the PP Process in construction industry. Accordingly, 72 sustainability factors identified through a comprehensive literature review were further summarised into 15 key sustainability factors through a desk study. Subsequently, 14 semi-structured interviews were conducted with subject matter experts to verify the applicability of the identified sustainability factors into the PP Process. The paper outcomes will be beneficial to the relevant authorities, funding agencies and policymakers to upgrade the existing PP Process in construction in developing countries.

Keywords

Construction Industry, Public Procurement Process (PP Process), Sustainability, Sustainability Factors.

1. Introduction

Enhancements of the Public Procurement Process (PP Process) contributes to the economic development of a country (Sönnichsen & Clement, 2020). Further, World Bank (2016) has mentioned that contemporary versions of the PP Process facilitate to upgrade the living standards of the community. Thus, the PP Process should be upgraded to achieve the desired goals of an organisation or a country by considering, not only the traditional elements of time, cost and quality but also the social, environmental, and economic elements of a country (Meehan and Bryde, 2010). The construction industry is an open system and very sensitive to change, along with the needs and requirements of the stakeholders (Sönnichsen & Clement, 2020). Interagency Procurement Working Group (2006) motivated practitioners and researchers to identify the possibilities to incorporate sustainability into the PP Process in the construction industry to ensure sustainable development of developing countries. Accordingly, Grandia and Voncken (2019) highlighted

that academic researchers and procurement practitioners in the construction industry facilitate to identify the paths to achieve sustainability. Sustainability is defined as processes and related actions that focus on the present moment and keeping things above a certain level throughout the identified period of time to fulfil the needs of future generations (United Nations, 1987; White, 2012).

Brammer and Walker (2011) highlighted that the existing PP Process should be upgraded by integrating sustainability initiatives to fulfil the requirements of stakeholders. In this context, Torres et al. (2018) emphasised that the construction industry of the developing countries will be benefitted by integrating sustainability factors into the PP Process. Grandia and Voncken (2019) and Adjei (2019) further revealed the possibilities to gain such benefits by integrating sustainability factors into the PP Process in the construction industry. Kalubanga (2012) and Laryea, Alkizim, and Ndlovu (2013) evaluated the existing frameworks of the developed countries for sustainable public procurement in the construction industry with the view of optimum combination of whole life costs and benefits to meet the stakeholder requirements with minimum damages to the environment. Moreover, incorporation of sustainability factors into the PP Process is identified as a holistic approach to upgrade the existing PP Process with compared to other alternatives of electronic procurement and green procurement to address the prevailing procurement-related problems in the construction industry (World Bank and Asian Development Bank, 2012). However, Naude (2017) identified that integration of sustainability factors into the PP Process in the construction industry in developing countries has not been much discussed within extant literature. Further, the Office of Government Commerce (OGC, 2007) pointed out that although policy level sustainable frameworks are available with integrated sustainability factors, they are not customised to the construction industry of the developing countries. Accordingly, the interest of the stakeholders continuously increases to upgrade the existing PP Process in the construction industry of developing countries by integrating sustainability factors (Ministry of Finance, 2019). Therefore, this paper aims to identify sustainability factors to be integrated into the PP process in the construction industry of developing countries.

2. Literature Review

The PP Process in construction industry has been identified as an integral part to measure government expenditure and has a direct link with the infrastructure and economic development of a country (Construction Industry Development Authority, 2015). Further, Preuss (2009) proposed that integration of sustainability factors into the PP Process is one of the effective solutions to upgrade the existing PP Process in the construction industry of the developing countries. However, a limited number of studies has investigated the role of the public sector in implementing sustainability initiatives in PP Process in the construction industry (Gelderman et al., 2015). Accordingly, a comprehensive literature review was carried out with a desk study on existing well-established sustainability frameworks to identify the sustainability factors to be integrated into the PP Process in the construction industry of the developing countries.

The desk study serves an important function in providing a foundation for the existing PP Process to build the next step of systematic approach (Management Study Guide, 2012). Accordingly, the desk study was conducted by analysing well-established sustainable procurement frameworks developed by 04 institutions, i.e., World Bank (2016), Asian Development Bank (2010), National University of Singapore (2018), and Office of Government Commerce (2007). Accordingly, this paper explores sustainability factors relevant to the PP Process in the construction industry through the 04 frameworks as discussed below.

Procurement Regulations for Sustainable Procurement of the World Bank

In this framework, the World Bank (2016) has highlighted that sustainability is an approach, which takes into account the sustainability factors to fulfil the requirements of the stakeholders, in addition to the environmental, social, and economic influencing areas. Further, the World Bank (2016) added that the approach to sustainability shall be in line with the core procurement principles of value for money, economy, integrity, fit for purpose, efficiency, transparency and fairness. Accordingly, the World Bank (2016) pointed out **26 sustainability factors** apply to all the industries.

Post Completion Sustainability Evaluation Report of the Asian Development Bank

The post-completion sustainability evaluation report of the Asian Development Bank (2010) has assessed sustainability at the global level and over several future generations, with a focus on the resources used for human life. Further, Asian Development Bank has added that sustainability has been assessed for the assistance of the program with a focus on broader economic and institutional changes, extending well beyond the life of specific activities. Accordingly, the Asian Development Bank has identified **09 sustainability factors**, which affect project

sustainability. Further, the Asian Development Bank has identified opportunities for collaboration, improve effectiveness and promote innovation as features of sustainability.

Sustainability Reporting in Singapore Developed by National University of Singapore (NUS)

National University of Singapore (NUS, 2018) has reported on factors to improve the adoption and quality of sustainability in line with the guidance of Sustainable Singapore Blueprint (SSB), which encompasses 05 pillars to drive the nation as an active and gracious community, "Eco-smart" enduring towns, a zero-waste nation, a leading green economy, and a "car-lite" Singapore. Singapore has made good progress in the sustainability journey and tracks records to achieve 2020 and 2030 targets laid out in its 2009 Blueprint. NUS (2018) has noted that the voluntary guidelines for sustainability reporting are an attempt to encourage listed institutions to disclose the extent to which their businesses are conducted sustainably. Further, sustainability reporting has evolved from the traditional corporate social responsibility (CSR) paradigm to incorporate environmental, social and governance (ESG) practices in the business practices and strategy. Accordingly, the NUS (2018) explored **sustainability factors under the 27 topics** of sustainability criteria beyond the triple bottom line indicators.

The Framework of the Office of Government Commerce (OGC), United Kingdom

The OGC of the United Kingdom (UK) (2007) has identified Sustainable Construction Procurement as an achievement of a better quality of life through the efficient use of resources, which realises the continued social progress while maintaining stable economic growth and caring for the environment. Further, the OGC has identified 04 main aims to establish a strategy to achieve sustainability; social progress which recognises the needs of everyone, effective protection of the environment, the prudent use of natural resources, and maintenance of high and stable levels of economic growth and employment. Furthermore, the OGC of the UK has established its strategy for more sustainable construction. OGC has suggested **10 sustainability factors** that would encourage the development of sustainable construction within the construction industry. Hence, OGC (2007) has identified the sustainability factors, without categorisation under the triple-bottom-line indicators, by allocating weightage to the efficient use of resources together with waste management.

3. Methods

The study used a qualitative research approach to identify the sustainability factors to be integrated into the PP Process in the construction industry of developing countries. At the outset, a comprehensive literature synthesis was carried out to identify the sustainability factors by scrutinising journal articles, conference proceedings, books, news bulletins, reports, and records. Accordingly, the literature review identified 72 sustainability factors. Literature review further extended through the desk study summarised 72 sustainability factors into the 15 key sustainability factors by reviewing 04 well-established sustainable procurement frameworks of World Bank (2016), Asian Development Bank (2010), National University of Singapore (2018), and the Office of Government Commerce (2007).

Subsequently, semi-structured face-to-face interviews were conducted with 14 industry experts to verify the applicability of sustainability factors to be integrated into PP Process in the Sri Lankan construction industry as a developing country. The 14 experts were selected from 03 foreign-funded projects of World Bank (02 projects) and Asian Development Bank (01 project) in Sri Lanka based on the purposive sampling method. The experts were identified based on their professional experience and seniority of the organisation with more than 15 years of experience in the industry. Further, the selected industry experts directly involve and guide the decision and policymaking, resource allocation, prioritise the activities and budget allocation of the PP Process in the construction industry. A majority of the experts are in the professions of Engineering, Project Management and Contract Administration. The profile of the industry experts is given in Table 1.

Table 1: Profile of the Experts in Preliminary Survey

Entity	Profile	Designation of Expertise	Experience
World Bank (WB) Funded Project 1	R1	Project Director	36 years
	R2	Deputy Project Director	32 years
	R3	Procurement Specialist	15 years
World Bank (WB) Funded Project 2	R4	Project Director	37 years
	R5	Deputy Project Director	24 years
	R6	Procurement Specialist	16 years

Entity	Profile	Designation of Expertise	Experience
Asian Development Bank Funded (ADB) Project	R7	Project Director	40 years
	R8	Deputy Project Director	31 years
	R9	Procurement Specialist	18 years
Industry Experts	R10	Procurement Specialist (WB)	40 years
	R11	Procurement Consultant (WB)	37 years
	R12	Procurement Consultant (ADB)	42 years
	R13	Representative of Contractor	15 years
	R14	Representative of Consultant	15 years

4. Research Findings and Discussion

Findings of the desk study and expert interviews are discussed below.

4.1 Sustainability Factors Identified from the Desk Study

The paper extended a comprehensive literature review through the desk study by analysing well-established 04 sustainable procurement frameworks. Accordingly, the desk study outcome categorised, proposed the similar sustainability factors together, and synthesised them into 15 major factors as presented in the last column in Table 2.

Table 2: Sustainability Factors identified from the Desk study

	Procurement Regulations for Sustainable Procurement of the World Bank	Post Completion Sustainability Evaluation Report of the Asian Development Bank	The Framework of the Office of Government Commerce (OGC), United Kingdom	Sustainability Reporting in Singapore by National University of Singapore	Sustainability Factors Proposed by Desk Study
1	<ul style="list-style-type: none"> ▪ Economic regeneration ▪ Value for money ▪ Emerging markets ▪ The total cost of ownership and life cycle costing ▪ Sustainable economic development ▪ Development of Small to Medium Enterprises (SMEs) ▪ Poverty reduction 	<ul style="list-style-type: none"> ▪ Pricing of outputs ▪ Availability of adequate and effective demand for the project's services or products 		<ul style="list-style-type: none"> ▪ Economic value generated ▪ Indirect economic impact ▪ Value and supply chain ▪ Anti-competitive behaviour ▪ The economic impact of climate change 	<ul style="list-style-type: none"> ▪ Sustainable economic value generated by the project
2	<ul style="list-style-type: none"> ▪ Anti-child labour and forced labour laws ▪ Human rights ▪ Fair pay and labour law protections 	<ul style="list-style-type: none"> ▪ Adequacy of policies, institutions, markets, and regulatory conditions and the risks of change ▪ The political will to ensure government ownership of and commitment to the project 		<ul style="list-style-type: none"> ▪ Human rights 	<ul style="list-style-type: none"> ▪ Government policies, laws and regulations for sustainability

	Procurement Regulations for Sustainable Procurement of the World Bank	Post Completion Sustainability Evaluation Report of the Asian Development Bank	The Framework of the Office of Government Commerce (OGC), United Kingdom	Sustainability Reporting in Singapore by National University of Singapore	Sustainability Factors Proposed by Desk Study
3	▪ Fairtrade			<ul style="list-style-type: none"> ▪ Strategy and analysis regarding sustainability ▪ Labour and industrial relations ▪ Anti-corruption and code of ethics ▪ Sustainability-centric corporate governance ▪ Diversity and equal opportunity ▪ Compliance ▪ Product and service stewardship 	<ul style="list-style-type: none"> ▪ Sustainability centred good governance
4			<ul style="list-style-type: none"> ▪ Respect people and the local environment 	<ul style="list-style-type: none"> ▪ Corporate responsibility for sustainability ▪ Philanthropy 	<ul style="list-style-type: none"> ▪ Corporate social responsibility for sustainability
5	<ul style="list-style-type: none"> ▪ Environmental resource management ▪ Protection of ecosystems 	<ul style="list-style-type: none"> ▪ Environmental, social, technological, and natural resource risks 			<ul style="list-style-type: none"> ▪ Sustainable natural resource management
6	<ul style="list-style-type: none"> ▪ Water management 		<ul style="list-style-type: none"> ▪ Conserve water resources 	<ul style="list-style-type: none"> ▪ Water 	<ul style="list-style-type: none"> ▪ Sustainable water management system
7	<ul style="list-style-type: none"> ▪ Pollution and waste management ▪ CO₂ reduction 		<ul style="list-style-type: none"> ▪ Design for minimum waste ▪ Aim for lean construction ▪ Do not pollute ▪ Re-use existing built assets 	<ul style="list-style-type: none"> ▪ Waste management ▪ Emissions 	<ul style="list-style-type: none"> ▪ Efficient waste management and emission control mechanisms
8			<ul style="list-style-type: none"> ▪ Preserve and enhance biodiversity 	<ul style="list-style-type: none"> ▪ Biodiversity 	<ul style="list-style-type: none"> ▪ Biodiversity
9			<ul style="list-style-type: none"> ▪ Minimise energy in construction ▪ Minimise energy in use 	<ul style="list-style-type: none"> ▪ Energy 	<ul style="list-style-type: none"> ▪ Energy management

	Procurement Regulations for Sustainable Procurement of the World Bank	Post Completion Sustainability Evaluation Report of the Asian Development Bank	The Framework of the Office of Government Commerce (OGC), United Kingdom	Sustainability Reporting in Singapore by National University of Singapore	Sustainability Factors Proposed by Desk Study
10	▪ Alternative energies: e.g.: solar, wind				▪ Alternative energy
11	▪ Health and safety ▪ Healthy lives and well-being for all			▪ Occupational health and safety	▪ Occupational health and safety ensured the project
12	▪ Gender equality including universal education			▪ Training and education	▪ Sustainable lifelong learning
13	▪ Urban planning	▪ Presence of appropriate policies and procedures to ensure continued funding for operation and maintenance of both public and private enterprises ▪ Application of appropriate policies to ensure the maintenance of required human resources	▪ Set targets - i.e. monitor and report, to benchmark performance	▪ Materiality and boundaries	▪ Sustainability centric project planning, execution and performance evaluation system
14		▪ Adequacy of incentives for continued stakeholder participation		▪ Stakeholder engagement and inclusiveness ▪ Community involvement	▪ Continued engagement of the community and other stakeholders
15		▪ Financial viability of operating entities		▪ Product responsibility ▪ Organisational profile	▪ Organisational capacity and financial viability
16	▪ Sustainable agriculture ▪ Clean drinking water ▪ Marine resources management ▪ Child mortality and maternal health ▪ Food security				These factors were not considered as they are not directly relevant to the projects in the construction industry

Sustainability factors developed by the World Bank (2016) apply not only to the construction industry but also to all other industries as well. Therefore, 05 sustainability factors were identified as not relevant to the PP Process in the

construction industry. The sustainability factors to be integrated into the PP Process in the construction industry, which proposed through the desk study, are discussed hereafter.

'Sustainable Economic Value Generated by the Project' proposed by the desk study as one sustainability factor covers several significant areas such as economic regeneration, value for money, emerging markets, life cycle costing, sustainable economic development, poverty reduction, the economic value generated, indirect economic impact and anti-competitive behaviour as shown. However, OGC of the UK framework has not provided evidence for the area of sustainable economic value generation due to the reason that this framework has given more weightage to lean concept with resources and waste management.

'Government Policies, Laws and Regulations for Sustainability' derived as another factor covering the areas such as labour law protection, anti-child labour laws and forced labour laws, human rights, fair pay, adequacy of policies, institutions, markets, and regulatory conditions and the risks of change and political will to ensure government ownership of and commitment to the project. Similar to the previously identified sustainability factor, OGC of the UK has not identified any government policies, laws and regulations for sustainability, since their focus was more towards lean concept and resources & waste management.

'Sustainability Centred Good Governance' is another factor revealed through the desk study which covers sustainability-related good governance factors such as fair trade, strategy and analysis regarding sustainability, labour and industrial relations, anti-corruption and code of ethics, sustainability-centric corporate governance, diversity and equal opportunity, compliance and product and service stewardship.

'Corporate Social Responsibility for Sustainability' is proposed by the desk study as another sustainability factor by considering relevant areas of the established frameworks such as respect people and local environment, corporate responsibility for sustainability and philanthropy.

'Sustainable Natural Resource Management' derived through the desk study by considering similar nature areas of the established sustainability frameworks such as environmental resource management, protection of ecosystems, and environmental, social, technological & natural resource risks.

'Sustainable Water Management System' is another important sustainability factor revealed through the desk study by focusing on water, water management and water resource conservation.

'Efficient Waste Management and Emission Control Mechanisms' is another factor proposed through the desk study by giving weightage to waste management and emission control, which considered sub-factors of pollution and waste management, CO₂ and other emissions reduction, design for minimum waste, lean implementation in construction, do not pollute and re-use existing built assets.

'Biodiversity' is derived by considering the biodiversity and importance of preserving and enhancing the biodiversity.

'Energy Management' is another key sustainability factor covering energy related aspects such as minimise energy in construction and minimise energy in use, which has a major impact on the implementation of procurement activities in the construction industry.

'Alternative Energy' proposed as another sustainability factor through the desk study by giving weightage to the alternative energies of solar and wind.

'Occupational Health and Safety Ensured the Project' covers the sustainability factors of health and safety, healthy lives and well-being for all, and occupational health and safety.

'Sustainable Lifelong Learning' was established through the desk study by considering gender equality including universal education and training and education.

'Sustainability Centric Project, Planning, Execution and Performance Evaluation System' proposed factors of urban planning, presence of appropriate policies and procedures to ensure continued funding for operation and

maintenance of both public and private enterprises, application of appropriate policies to ensure the maintenance of required human resources, set targets, and materiality and boundaries.

'Continued Engagement of the Community and Other Stakeholders' is another sustainability factor to be considered, which covers the adequacy of incentives for continued stakeholder participation, stakeholder engagement and inclusiveness, and community involvement.

'Organisational Capacity and Financial Viability' proposed sub-factors such as financial viability of operating entities, product responsibility, and organisational profile.

Accordingly, the desk study derived 15 sustainability factors relevant to the PP Process in the construction industry by considering similar areas and relevance to the industry. Further, the sustainability framework proposed by World Bank (2016) is limited only to the construction industry. Hence, the factors not related to the construction industry from the World Bank framework also were determined through the desk study. The applicability of derived sustainability factors to the PP Process in the construction industry of developing countries was subsequently verified through the experts' interviews.

4.2 Sustainability Factors Verified by Industry Experts

Industry experts verified the 15 sustainability factors proposed through the desk study by considering the importance and relevance to the construction industry. However, the experts suggested to refine the 03 sustainability factors as appropriate to developing countries. Accordingly, the following sustainability factors were refined to suit the developing countries with special attention to the Sri Lankan context;

- Factor 3 - 'Sustainability centred good governance' was refined as 'sustainability centred good governance and transparency'. Experts pointed out that it is difficult to maintain fair trade among the bidders in construction industry. Further, industry experts noted that government policies, laws and regulations shall continue and combine with national agenda. However, some experts specified that 'transparency' is an important key area to achieve sustainability, hence, sustainability centred good governance shall combine with transparency.
- Factor 4 - 'Corporate social responsibility for sustainability' was refined as 'social responsibility for sustainability'. Industry experts specified, as 'Procurement Guideline (PG) and Financial Regulations (FR) may not bind corporate sector. However, if the corporate sector organisations enter into the PP Process, the corporate social responsibility practises consider as a code of evaluation, hence, as much as public funds use consideration of social aspects will be the practical implication to the PP Process in the construction industry. Further, experts pointed out that private sector organisation allocate more weightage to the profit, hence, as a bidder; all the actions shall be taken towards maximising the profit. However, based on the opinions of the experts, it was decided to refine the findings of the desk study by removing the term 'corporate'.
- Factor 13 - 'Sustainability centric project planning, execution and performance evaluation system' refined as 'sustainability centric project initiation, planning, execution and performance evaluation system'. Industry experts added that attention to the preparation stage of the PP Process positively affects the planning activities and result of the Project. Accordingly based on the opinions of the experts decided to refine the sustainability factor by adding sustainability centric project 'initiation'.

5. Conclusions

The paper aimed to identify the sustainability factors to be integrated into the Public Procurement Process (PP Process) in the construction industry, as a holistic approach to enhance economic development and standard of living of the developing countries. Through the literature review and desk study 15 sustainability factors were identified to be integrated into the PP Process. Identified sustainability factors were refined and verified through experts' interviews to ensure the applicability for the PP Process in the construction industry of developing countries, with special attention to the Sri Lankan context. Results of the experts' interview confirmed the applicability of 15 sustainability factors to the PP Process in the construction industry of developing countries as; 12 sustainability factors in line with the findings of the desk study and 03 sustainability factors in line with the findings of the desk study and refined results as per the opinions of the industry experts.

In summary, this study has identified (1) sustainable economic value generated by the project, (2) government policies, laws and regulations for sustainability, (3) sustainability centred good governance and transparency, (4) social responsibility for sustainability, (5) sustainable natural resource management, (6) sustainable water management system, (7) efficient waste management and emission control mechanisms, (8) biodiversity, (9) energy management, (10) alternative energy, (11) occupational health and safety ensured the project, (12) sustainable lifelong learning, (13) sustainability centric project initiation, planning, execution and performance evaluation system, (14) continued engagement of the community and other stakeholders, and (15) organisational capacity and financial viability as the factors to be integrated into the PP Process in the construction industry in developing countries.

The paper outcomes will be benefited to the relevant authorities of developing countries, funding agencies, development partners, and policy and decision-makers in taking necessary steps to update the existing guidelines, bidding documents, procedures and protocols to achieve sustainability.

References

- Adjei, A. B., Sustainable Public Procurement: A New Approach to Good Governance, *Dama Academic Scholarly Journal of Researchers*, vol. 4, no. 7, pp. 01-05, 2019.
- Albano, G. L., Snider, K.F., & Thai, K.V., *Charting a Course in Public Procurement Innovation and Knowledge Sharing*. In G. L. Albano, K. F. Snider, and K. V. Thai (Eds.), Charting a Course in Public Procurement Innovation and Knowledge Sharing (pp. 1-27). Boca Raton, FL: PrAcademics Press, 2013.
- Ameyaw, C., Mensah, S. & Osei-Tutu, E., Public procurement in Ghana: The implementation challenges to the Public Procurement Law 2003 (Act 663), *International Journal of Construction Supply Chain Management*, vol. 2, no. 2, pp. 55-65, 2012.
- Asian Development Bank (ADB), *Post completion sustainability evaluation report*, Department of Independent Evaluation, Asian Development Bank, Philippines, (2010).
- Ayopo, O. O., Ohis, A.C., Wellington, T.D., Challenges of Construction Procurement: A Developing Nation's Perspective, *International Conference of Socio-economic Researchers 2016*, Serbia, Retrieved from <http://www.socioeconomica.info/xmlui/bitstream/handle/11171/238/18.pdf?sequence=1>, 2016.
- Brammer, S., & Walker, H. Sustainable procurement in the public sector: an international comparative study. *International Journal of Operations & Production Management*. vol. 31, no. 4, pp. 452-476, 2011.
- Central Bank of Sri Lanka, *Annual Report 2019*. Colombo, Sri Lanka: Central Bank of Sri Lanka (ISBN 978-955-575-169-4), 2019.
- Chimwani, B.I., Iravo, M.A. & Tirimba, O.I., Factors influencing procurement performance in the Kenyan public sector: Case study of the state law office. *International Journal of Innovation and Applied Studies*, vol. 9, no. 4, p.1626. 2014.
- Construction Industry Development Authority (CIDA), *Construction Review*. The Chamber of Construction Industry, Sri Lanka, vol. 15, no. 05, 2015.
- Construction Industry Development Authority (CIDA). *Standard Bidding Documents Major Contracts (Procurement of Works, suitable for project above LKR 50 Mn)*, Publication number: CIDA/SBD/101 (Major). Construction Industry Development Authority, Sri Lanka, 2018.
- Daneshpour, H., Integrating Sustainability into Management of Project, *International Journal of Environmental Science and Development*, vol. 6, no. 4, p. 321, 2012.
- Diniz, J. D. A. S., & Fabbe, C. N., Supply Chain Management and Supply Chain Orientation: key factors for sustainable development projects in developing countries? *International Journal of Logistics: Research and Applications*, vol. 10, no. 3, pp. 235-250, (2007).
- EURODAD, Procurement and development effectiveness; A literature review, p1-30., 2009.
- Grandia, J., & Voncken, D., Sustainable public procurement: The impact of ability, motivation, and opportunity on the implementation of different types of sustainable public procurement. *Sustainability*, vol. 11, no. 19, 5215, 2019.
- Hillebrandt, P. M., *Analysis of British Construction Industry*, Macmillan, London. 1984.
- International Federation of Consulting Engineers (FIDIC). *FIDIC® Conditions of Contract for Construction, For Building and Engineering Works Designed by the Employer*, Geneva, Switzerland. 2017.
- Korosec, L. R. & Bartle, R. J., A review of state procurement and contracting, *Journal of Public Procurement*, vol. 3 no. 2, pp.83-5. 2003.
- Kumaraswamy M, Dulaimi M., Empowering innovative improvements through creative construction procurement, *Engineering, Construction and Architectural Management*, vol. 8, no. 5/6, pp. 325-334, 2001.

- Lacy, P., Arnott, J., Lowitt, E., The challenge of integrating sustainability into talent and organization strategies: investing in the knowledge, skills and attitudes to achieve high performance, *Corporate Governance*, vol. 9, no. 4, pp. 484-494, 2009.
- Laryea S., Alkizim A. & Ndlovu T., The increasing development of publication on sustainable procurement and issues in practice, In: Smith, S.D and Ahiaga-Dagbui, D.D (Eds), *Procs 29th Annual ARCOM Conference*, 2-4 September 2013, Reading, UK, Association of Researchers in Construction Management, pp. 1285-1294. 2013.
- Management Study Guide. *Desk research - Methodology and techniques*.
<http://www.managementstudyguide.com/desk-research.htm>, 2012.
- Meehan, J., & Bryde, D. J., *Sustainable Procurement Practice*, Wiley Online Library, DOI: 10.1002/bse.678, 2010.
- Ministry of Finance. *Guide to Project Management & Contract Management for Infrastructure Development Projects (Works)*, Government of Sri Lanka, Ministry of Finance, The Secretariat. Colombo 01. 2017.
- Ministry of Finance, *National Policy Framework (NPF) of the government, Ministry of Finance, Economic and Policy Development*, Government of Sri Lanka, Ministry of Finance, The Secretariat. available online at <http://www.treasury.gov.lk/recent-policy-measures>, 2019.
- Ministry of Finance, *Budget Estimates, Fiscal Year 2021*, The Treasury Publication, Colombo 01. 2021.
- Mohan V., Public Procurement for Sustainable Development, *Annual Transactions of IESL*, The Institute of Engineers in Sri Lanka (IESL) pp. 49-60. 2010.
- Murray, J. G., Improving the validity of public procurement research, *International Journal of Public Sector Management*, vol. 22, no.2, pp. 91-103. 2009.
- National Procurement Agency. *Procurement Guide Line 2006 Goods and Works*. Sri Lanka: National Procurement Agency. 2006.
- National University of Singapore (NUS), *Sustainability Reporting in Singapore*, Centre for governance, National University of Singapore, Singapore 119245. 2018.
- Naude M, *Problems affecting the operational procurement process: A study of the Zimbabwean public sector*, publication at: <https://www.researchgate.net/publication/314082384>, 2017.
- OECD (Organisation for Economic Co-operation and Development), *Methodology for the Benchmarking and Assessment of Public Procurement Systems*, Vol.4 – Used Guide - OECD – DAC Joint Venture for Procurement, www.oecd.org, 2007.
- OECD (Organisation for Economic Co-operation and Development), *OECD Journal on Going Green: Best Practices for Sustainable Procurement Issues and Practical Solutions*. OECD head office, France Available: <https://www.oecd.org/gov/public-procurement/publications>. 2015.
- Office of Government Commerce (OGC), Achieving Excellence in Construction Procurement Guide: Sustainability Action Plan, Available at: www.ogc.gov.uk, 2007.
- Office of Government Commerce (OGC), *An Introduction to Public Procurement*, Office of Government Commerce, London. Retrieved from http://www.ogc.gov.uk/documents/Introduction_to_Public_Procurement.pdf, 2008.
- Parliament Secretariat, *The 19th Amendment to the Constitution of the Democratic Socialist Republic of Sri Lanka* Department of Government Printing, Sri Lanka. Retrieved on the Web at <https://www.parliament.lk/en/constitution/nineteenth-amendment>. 2015.
- Preuss, L., Addressing sustainable development through public procurement: the Case of local government, *Supply Chain Management: An International Journal*, vol. 14/3, pp.213-223. 2009.
- Raymond J., Benchmarking in public procurement, *Benchmarking: An International Journal*, vol.15, no. 6, pp.782-793, 2008.
- Royal Institute of British Architectures (RIBA), *RIBA Plan of Work 2007*, RIBA, London, Retrieved from www.ribaplanofwork.com, 2007.
- Schiele, J. J. & McCue, C. P. Professional service acquisition in public sector procurement, *International Journal of Operations and Production Management*, vol. 26, no. 3, pp. 300-325, 2006.
- Silva, R.C.D., Betiol, L., Villac, T., & Nonato, R., Sustainable public procurement: the Federal Public Institution's shared system, *Revista de Gestão*, vol. 25, no. 1, pp. 9-24, 2017.
- Sönichsen, S. D. & Clement, J., Review of green and sustainable public procurement: Towards circular public procurement. *Journal of Cleaner Production*, 245, 118901, 2020.
- Thai, K. V., Global Public Procurement Theories and Practices: An Introduction, *7th International Public Procurement Conference (IPPC7)*, held in Bali, Indonesia, August 3-5, 2016.
- Torres, M. J. M., Izquierdo, M. A. F., Lirio, J.M.R., Ferrero, I. F., Olmedo, E. E., Navarro, J. V. G., & Marullo, M. C., An Assessment Tool to Integrate Sustainability Principles into the Global Supply Chain, *Sustainability*, vol. 10, 535, 2018.

- Turin, D. A., *The Construction Industry: Its Economic Significance and Its Role in Development*, 2nd Edition, University College Environmental Group, London. 1973.
- United Nations, World Commission on Environment and Development's Report, United Nations Publications, Gro Harlem Brundtland Oslo. 1987.
- White, M.A., Sustainability: I know it when I see it. *Ecological Economics*, 213-217. 2012.
- Williams, S., Chambers, T., Hills, S. & Dowson, F. *Buying a better world: sustainable public procurement*. Available: <http://eprints.uwe.ac.uk/23414/1/buying-better-world.pdf>, 2007.
- World Bank, *The World Bank Procurement Regulations for Investment Project Financing (IPF) Borrowers, Goods, Works, Non-Consulting and Consulting Services*, The World Bank Washington DC, 2016.
- World Bank. *A beginner's guide for borrowers, Procurement under World Bank Investment Project Financing*, The World Bank Washington DC, Available: www.worldbank.org/procurement. 2018.
- World Bank and Asian Development Bank, *Public Procurement Modernization and Reform Assessment Report*, South Asia Procurement Services Unit (World Bank) and Central Operations Services Department (Asian Development Bank), 75567, 2012.
- Zheng, J., Knight, L., Harland, C., Humby, S. & James, K., An analysis of research into the future of purchasing and supply management, *Journal of Purchasing & Supply Management*, vol.13, no.1, pp.69-83, 2010.

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