Evaluating the Sustainable Performance of Select Infrastructure Projects of Jammu & Kashmir

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Abstract

This research paper has attempted to evaluate the sustainable performance of select infrastructure projects of Jammu & Kashmir using survey methodology. Importance of sustainable development is crucial to understand the effectiveness and impact of infrastructure projects. This paper examines the current state of sustainable infrastructure, identifies key strengths and weaknesses, and explores potential areas for improvement in construction projects of Jammu & Kashmir. The study adopts survey approach, through data collected from stakeholders affected by these projects. The survey instrument has been designed to capture perceptions, attitudes, and experiences related to sustainability criteria, including Environmental Impacts, Social Equity and Economic Viability. Google forms was used for getting information through an adapted questionnaire. Snowball sampling has been used and the data was analysed by IBM SPSS27 and SmartPls 3. The findings shed light on the alignment between stakeholder perspectives and the overall sustainability goals of infrastructure projects.

Keywords: *Sustainable infrastructure; Triple bottom line; Environmental impact; social equity; Economic viability; Stakeholder perspectives; Sustainability criteria.*

Introduction

Sustainable infrastructure is very important in the modern world as the construction and operation of infrastructure such as roads, buildings, and bridges have substantial influence across environmental, social, and economic dimensions. Therefore, it is imperious to establish infrastructure that complements development requirements with responsible resource usage and social well-being. The attainment of triple bottom line sustainability, which encapsulates environmental, social, and economic considerations, has emerged to be crucial in modern society. It was first proposed by John Elkington in his book "*Enter the Triple Bottom Line"* in 1994. The triple bottom line is a business concept that states firms should commit to measuring their social and environmental impact—in addition to their financial performance—rather than solely focusing on generating profit, or the standard "bottom line." (Elkington,1994)

This research is based on the concept of triple bottom line sustainability in the context of infrastructure development, with focus on social and environmental aspects with the economic aspect as the bottom line This paper investigates the evaluation of sustainable infrastructure within chosen projects located in the region of Jammu and Kashmir from 2013 like the Rambagh-Jahangir Chowk flyover, Lasjan Bye Pass Flyover, the Smart city project of Srinagar, various new bridges, and numerous buildings etc. Following a comprehensive review of the literature on sustainability, it was determined that "Triple Bottom Line" approach is one of the most commonly utilized tools for assessing the sustainable performance of various industries.

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A noticeable research gap exists concerning the formulation of standardized and universally applicable measurement frameworks adept at comprehensively summarizing the multifaceted facets of sustainable infrastructure, encompassing environmental impact, social equity, and economic viability in our state. Very little research has been endorsed on the topic of sustainable development in infrastructure. These gaps in research allow for potential avenues for further exploration, thereby contributing to the advancement of comprehension and implementation pertaining to triple bottom line sustainability within infrastructure development. Researchers may elect to concentrate on one or multiple research gaps contingent on their inclinations and areas of expertise.

There is a dearth of literature considering the social and environmental impact of infrastructure in Jammu & Kashmir.

Review of Literature

This literature review followed the methodology proposed by Silvius and Schipper (2014) and Marcelino-Sadaba et al. (2015), utilizing search engines like Google Scholar, Scopus, Web of Science, Emerald, and others to identify relevant publications. The initial stage involved conducting a robust literature review and developing a conceptual framework to formulate and test hypotheses. It is widely acknowledged that a comprehensive literature review is vital for synthesizing knowledge based on existing theories and can yield a diverse array of information and insights from previously published works (Martens and Carvalho, 2014; Silvius and Schipper, 2016).

The author performed a systematic bibliographic search (Marcelino-Sadaba et al., 2015; Carvalho and Rabechini, 2017) to identify and categorize pertinent variables relating to the concepts of project sustainability through social inclusion, environmental impacts. The principal sources of these publications encompassed academic journals, books, official websites of relevant organizations, and conference proceedings (Shannon, 2002; Tranfield et al., 2003; Silvius and Schipper, 2014; Carvalho and Rabechini, 2017; Aarseth et al., 2017).

The initial phase aimed to establish the uniqueness of this research by pinpointing related studies that focus the interplay between project sustainability and social inclusion & project sustainability and environmental considerations within infrastructure firms. The subsequent phase sought to locate publications addressing sustainability in projects to explore the most commonly utilized criteria and models for assessing the relationship between the three components of Triple Bottom Line. Infrastructure can yield cross-sectorial benefits and provides a basis for improvements within three dimensions: an economic dimension, a social dimension, and an environmental dimension which form the three independent variables of this study with sustainable infrastructure being the dependent variable.

Objectives of the study:

1. To evaluate the impact of social inclusion on sustainable infrastructure.
2. To examine the association between environmental compliance and sustainable infrastructure.
3. To determine the relationship between economic viability and sustainable infrastructure.

Hypothesis:

H1: There is a positive and significant impact of Social Inclusion on Infrastructure Sustainability.

H2: There is a positive and significant relationship between Environmental Compliance and Sustainable Infrastructure.

H3: These is a positive and significant relationship between Economic Viability and Sustainable Infrastructure.

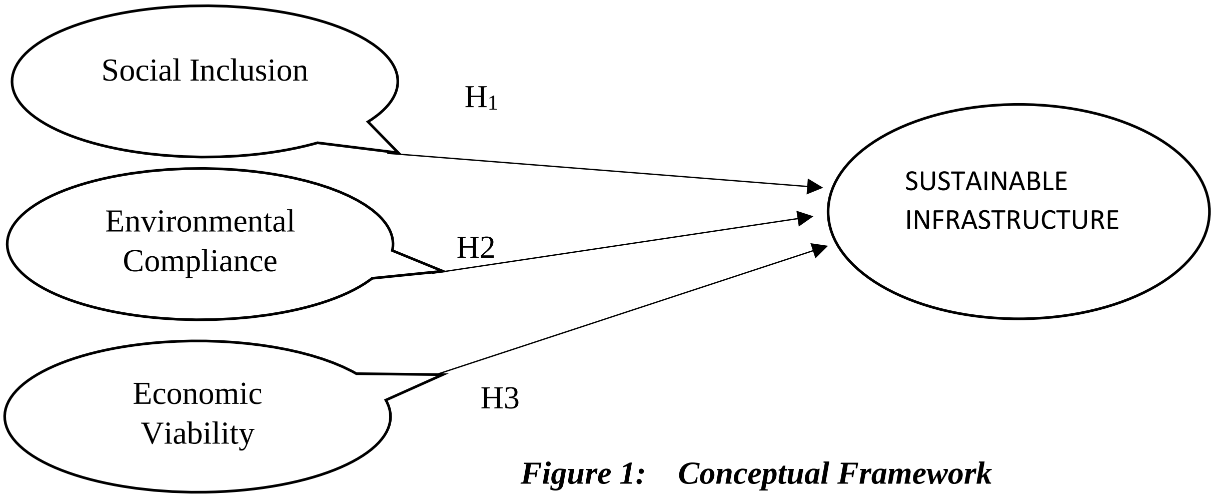

Figure 1: Conceptual Framework

Research Methodology

Instrument Development

Data collection was accomplished by administering a structured questionnaire designed specifically to capture their perspectives on various facets of sustainable infrastructure, encompassing environmental, social and economic impacts, on sustainability of infrastructure projects. A structured questionnaire adapted from Gericke et al. (2019, Karlstad University) was employed which was modified in line with the present research. A 5-point Likert scale was used for response evaluation. Social inclusion has 6 variables, Environmental Compliance 6 items and Economic Viability has 5 variables. Also, Sustainable Infrastructure has 6 variables to gauge it.

Sampling and Data Collection

This study employed a survey approach to collect data for the assessment of sustainable infrastructure from common people who are directly or indirectly influenced due to the infrastructure projects of Jammu & Kahmir. Google forms was used to generate the questionnaire and was distributed online using various online platforms like WhatsApp, Instagram, email, etc. The survey responses were subjected to rigorous statistical analysis to yield meaningful insights. More than 1000 questionnaires were distributed coming up with 358 complete responses. Snowball sampling technique was used to get the responses as the study is focused on studying people who are involved and affected by construction projects.

The demographic information is given in Table 1 which shows 68.4% of respondents fall in 18-30 age group, 26.8% fall in 31-50 and 4% fall in 51-65 age group, 0.8% fall in 65+. Females account for 29% and males account for 71% respectively.

Table 1: Demographic Profile

Age	**Frequency**	**Percent**
18-30	245	68.4
31 – 50	96	26.8
51 – 65	14	4.0
65+	3	0.8

Gender	**Frequency**	**Percent**
Female	104	29
Male	254	71

Educational Background	**Frequency**	**Percent**
Graduate	83	23.2
Higher Secondary Level	85	23.7
Ph.D	58	16.2
Post Graduate	130	36.3
Secondary Level	2	4
Total	**358**	**100**

Hypothesis of the study were tested by using IBM SPSS 27 and SmartPls 3. Descriptive statistics were computed to summarize the survey data, including measures such as means, standard deviations, and percentages. These statistical measures offered an overview of the participants' perceptions, attitudes, and experiences concerning the different dimensions of sustainable infrastructure. Moreover, inferential statistics were applied to explore relationships and associations within the survey data. Correlation analysis was carried out to ascertain the strength and direction of connections between various variables. Regression analysis was employed to identify significant predictors of sustainable infrastructure performance, encompassing social, environmental and economic aspects.

Measurement Model Evaluation

The measurement model was checked for internal consistency, composite reliability, and discriminant validity. Table 2 shows KMO and Bartletts Test with results confirming the data is suitable for conducting Exploratory Factor Analysis. Table 3 shows that all 3 constructs met the required thresholds because the Composite Reliability was above 0.7, and Cronbach's Alpha, which is used to measure internal consistency, was also higher than 0.7. For composite reliability higher than 0.6, the convergent validity of the construct is adequate (Fornell & Larcker, 1981) So, the constructs were shown to have convergent validity. To check the discriminant validity Heterotrait-Monotrait criteria were all looked at. Discriminant validity shows "how well the measure can be distinguished from similar concepts within the nomological net" (Dinev & Hart, 2004,). Table 4 shows the Heterotrait-Monotrait criterion which confirm discriminant validity. Tables 5.1, 5.2 and 5.3, 5.4 show mean, standard deviation, and loadings for all of the constructs in the study.

Table 2: KMO and Bartlett's Test

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) is calculated at 0.85, which exceeds the recommended threshold of 0.60. This value indicates that the sample used is adequate for conducting Exploratory Factor Analysis. Additionally, Bartlett's Test of Sphericity yields a significant result ($p < 0.05$), affirming the suitability of the data for factor analysis. Therefore, based on these results, it is appropriate to proceed with the Exploratory Factor Analysis.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy:		0.850
Bartlett's Test of Sphericity---------->	Approx. Chi-Square	4088.63
	Df	325
	Sig.	.000

Table 3 Cronbach's Alpha and Composite Reliability

The four constructs, Social Utility (6 items), Environmental Compliance (7 items), Economic Viability (6 items) and Infrastructure Sustainability (6 items), were assessed for internal consistency using Cronbach's alpha and composite reliability. Social Utility exhibits a strong internal consistency with a Cronbach's alpha of 0.81 and a high composite reliability of 0.86. Environmental Compliance demonstrates acceptable internal consistency with a Cronbach's alpha of 0.79 and a solid composite reliability of 0.85. Economic viability with Cronbach's alpha of 0.82 and composite reliability of 0.87. Similarly, Infrastructure Sustainability shows satisfactory internal consistency, reflected in a Cronbach's alpha of 0.76 and a reliable composite reliability of 0.83. *Also, total Cronbach Alpha=0.91*

Construct	**Items**	**Cronbach Alpha**	**Composite Reliability**
SOCIAL UTILITY	6	0.81	0.86
ENV COMPLIANCE	7	0.79	0.85
ECONOMIC VIABILITY	6	0.82	0.87
INFRA SUST	6	0.76	0.83

Table 4 Hetero-trait Mono-trait ratio

	INFRASTRUCTURE SUSTAINABILITY
SOCIAL INCLUSION	0.64
ENVIRONMENTAL COMPLIANCE	0.73
ECONOMIC VIABILITY	0.64

HTMT criterion measures the average correlations of the indicators across constructs. The acceptable levels of discriminant validity (< 0.90) as suggested by Henseler et al. (2015).

Descriptive Analysis

Social Inclusion includes six variables (SOC01 to SOC06) measuring different social organizational perceptions. Overall, the variables indicate moderately positive average perceptions with varying degrees of variability. The factor loadings suggest associations with underlying factors, reflecting the multidimensional nature of the survey items.

Table 5.1: Descriptive Statistics for Social Inclusion:

Item Code	Item	Mean	Std. Deviation	Loadings
SOC01	Adopting SPs enhances the image	4.02	.729	0.748
SOC02	Companies need to respect common people	4.42	.655	0.705
SOC03	Earthquake complaint measures	4.37	.752	0.655
SOC04	Improving people's opportunities for employment	4.18	.672	0.667
SOC05	Implementing SPs in construction benefits the society	4.03	.770	0.751
SOC06	Sustainable Infrastructure improves quality of life	4.11	.827	0.768

Environmental Compliance has 7 variables (ENV01 to ENV07). Respondents express consistently positive perceptions, as indicated by high mean scores (ranging from 3.95 to 4.46) across seven environmental assessment items.

Table 5.2: Descriptive Statistics for Environmental Compliance:

Item code	Item	Mean	Std. Deviation	Loadings
ENV01	Trees are cut down frequently	3.95	.929	0.520
ENV02	Curb Harmful emissions	4.41	.682	0.701
ENV03	Safe disposal of toxic waste	4.46	.731	0.766
ENV04	Using efficient energy resources	4.17	.684	0.705
ENV05	Employees environmental Knowledge	4.38	.657	0.753
ENV06	Use of less hazardous processes	4.25	.797	0.702
ENV07	Recycling is prominent in sustainable companies	4.14	.813	0.506

Economic Viability has 6 items (ECON01 to ECON06) with higher means from 4.08 to 4.39 All loadings are having good values.

Table 5.3: Descriptive Statistics for Economic Viability:

Item Code	Item	Mean	Std. Deviation	Loadings
ECON01	Overuse of nature's resources is harmful	4.29	.826	0.545
ECON02	Renewable resources of energy are cheaper in the long run	4.39	.716	0.774
ECON03	Not caring about environment leads to economic losses	4.23	.932	0.752
ECON04	Generally sustainable organizations have more customers	4.21	.926	0.769
ECON05	Sustainable Practices help in reducing costs	4.08	.883	0.788
ECON06	Sustainable Infrastructure leads to Economic Dev.	4.25	.819	0.710

Sustainable Infrastructure has 6 variables. Respondents express positive attitudes toward sustainable practices within their organization, with high mean scores ranging from 3.87 to 4.41 across 6 items. The low standard deviations suggest a degree of consensus among respondents.

Table 5.4: Descriptive Statistics for Sustainable Infrastructure

Item Code	Item	Mean	Std. Deviation	Loadings
IS01	The construction of various flyovers has positively impacted our daily life	4.20	.753	0.705
IS02	The development of vast network of new metalled roads has improved the connectivity	4.23	.650	0.722
IS03	Common people enjoy due to construction of public parks, recreation spots	3.87	.794	0.603
IS04	People have benefitted a lot due to modern healthcare buildings, facilities	4.11	.784	0.610
IS05	Preserving nature is necessary for sustainable develop.	4.41	.735	0.701
IS06	Sustainable development should be a primary consideration in all strategies	4.21	.762	0.732

Stevens (2002) suggested that the value of a factor loading should be greater than 0.4 for interpretation purposes, whereas Hair et al. (2009) argued that all standardized factor loadings should be at least 0.5 and, ideally, at least 0.7. It's worth noting that acceptable values for skewness fall between -3 and +3, and kurtosis is considered appropriate within a range of -10 to +10 when using Structural Equation Modelling (SEM) (Brown, 2006). The data meets these criteria, suggesting that it exhibits a relatively normal distribution, which is typically desirable for statistical analysis. Also, three items were removed from the analysis due to low score, which improved the overall internal consistency of the scale. (DATA from SMARTPLS3)

Structural Model Evaluation:

The Variance Inflation Factor (VIF) values for both SOC, ENV and ECON are 1.667, 1.786 and 1.418 respectively, (Table 6) which is acceptable range, indicating no issues with multicollinearity so there is no high correlation of independent variables. The smallest possible value of VIF is one (absence of multicollinearity). As a rule of thumb, a VIF value that exceeds 5 or 10 indicates a problematic amount of collinearity (James et al. 2014).

Table 6: Multicollinearity

	Infra_sustainability
SOCIAL INCLUSION	1.667
ENVIRONMENTAL COMPLIANCE	1.786
ECONOMIC VIABILITY	1.418

Table 7: Regression Analysis

R	R Square	F Change	Sig. F Change	Durbin Watson
.759	**.58**	**160.31**	**.000**	**1.896**

The correlation coefficient or the multiple correlation coefficient **R (.759)** suggests that there is a correlation between the dependent variable and the independent variables. **R Square (.58)** indicates that 58% of the variation in the dependent variable can be explained by the independent variables.

F Change (160.31): A high value suggests that the regression model is a good fit for the data.

Durbin Watson (1.896): Suggests that there is little to no autocorrelation in the residuals of the regression analysis. A value around 2 indicates no significant correlation.

RESULTS

Bootstrapping

The structural model was tested with 5,000 resamples at 95% confidence intervals from the bootstrapping method to test the hypothesis of the study (P values <0.05 showing significance.)

Hypothesis	Path	R^2	F^2	(STDEV)	T Statistics	P Values	Decision
H1	SOC_INC -> INFRA_SUST	0.144	0.448	0.068	2.108	0.035	Supported
H2	ENV-COM -> INFRA-SUST	0.412	0.749	0.075	5.513	0.000	Supported
H3	ECON-VIAB- >INFRA SUST	0.245	0.382	0.054	4.574	0.000	Supported

Path Coefficients (R^2): R^2 should be greater than 0 and for H1, the path coefficient from Social Inclusion to Sustainable Infrastructure is 0.144 and for H2, the path coefficient from

Environmental Compliance to Sustainable Infrastructure is 0.412. From economic viability to Sustainable Infrastructure is 0.245.

Fit Indices (F^2): For H1, the fit index is 0.448. For H2, the fit index is 0.749. For H3 it is 0.382 These values suggest a relatively high level of goodness of fit for both models. A value close to 1 indicates a strong fit, while lower values may suggest a less satisfactory fit.

T-statistics need to be greater than 1.96, and are 2.1, 5.5 and 4.57 for H1, H2 and H3 respectively.

Therefore H1, H2 and H3 are supported.

Findings:

The study employed the Triple Bottom Line (TBL) approach to assess sustainable infrastructure, considering environmental, social, and economic dimensions as Sustainable infrastructure is crucial for addressing urbanization, climate change, and resource depletion. The study highlighted the significant impact these aspects on infrastructure projects.

The model exhibited statistical significance, indicating that the independent variables (Social Inclusion, Environmental Compliance and Economic Viability) collectively explain a substantial portion of the variance in the dependent variable (Infrastructure Sustainability).

A positive and significant relationship was found between social inclusion (Social) and infrastructure sustainability (INFRA_SUST).

A positive and significant relationship was identified between environmental compliance (ENVIRONMENT) and infrastructure sustainability (INFRA_SUST)

A positive and significant relationship was found between Economic Viability (ECON) and infrastructure sustainability (INFRA_SUST).

Social Inclusion: The data reveals a strong positive sentiment toward the adoption of Sustainable Practices (SPs) across various societal dimensions. Respondents express favourable views on SPs, indicating their belief in the positive impact on image enhancement, respect for common people, earthquake-related measures, improved employment opportunities, and societal benefits through construction and sustainable infrastructure. The low standard deviations imply a consistent agreement among participants, and the loadings underscore the robust correlation between SPs and positive societal outcomes. This suggests a promising foundation for advocating and implementing SPs to enhance overall societal well-being and sustainable development.

Environmental Compliance: The data indicates positive attitudes toward environmental practices. Respondents express concern about tree cutting and strongly endorse actions such as curbing emissions, safe waste disposal, efficient energy use, employee environmental knowledge, less hazardous processes, and recycling in sustainable companies. The findings suggest a moderate level of agreement among participants, reinforcing the importance of these environmentally responsible practices for the surveyed context.

Economic Viability: On the economic front, respondents overwhelmingly support sustainable economic principles, as evidenced by high mean scores and agreement with statements emphasizing the harmful impact of overusing natural resources and the cost-effectiveness of renewable energy. The lower variability in responses indicates a consistent positive sentiment regarding the economic viability of sustainable practices, emphasizing the perceived benefits of environmentally conscious approaches in infrastructure development.

Conclusion:

In conclusion, this research employs a holistic Triple Bottom Line approach to assess the relationships among social inclusion, environmental compliance, economic viability, and infrastructure sustainability within selected projects in Jammu & Kashmir. The outcomes underscore positive and substantial connections between these dimensions, highlighting the intricate interdependence of social, environmental, and economic factors in sustainable infrastructure development.

The study goes beyond recognizing positive relationships and delves into actionable insights by pinpointing specific areas for improvement, with a particular emphasis on enhancing social equity aspects. These identified areas serve as valuable guidance for policymakers, project planners, and stakeholders involved in infrastructure initiatives. The aim is to refine strategies and practices, fostering a more inclusive and socially impactful approach to sustainable development in the region.

Furthermore, the research extends its significance beyond the immediate context by contributing to existing gaps in the literature related to the social and environmental impact of infrastructure projects in Jammu & Kashmir. By addressing these gaps, the study not only adds depth to the understanding of sustainable infrastructure in the specific geographical context but also offers a valuable reference point for scholars, practitioners, and decision-makers interested in sustainable development paradigms.

Importantly, the research is positioned as a catalyst for future studies, providing a robust framework for subsequent investigations into sustainable infrastructure practices. The framework encapsulates the complexities of the Triple Bottom Line, encouraging a nuanced examination of the dynamic relationships between social, environmental, and economic factors. This forward-looking perspective aligns with the evolving nature of sustainability challenges and sets the stage for continual advancements and refinements in the field of sustainable infrastructure development, both in Jammu & Kashmir and beyond.

References:

Daniel, C., Daniel, P. A., & Smyth, H. (2022). The role of mindfulness in the management of projects: Potential opportunities in research and practice. International Journal of Project Management. https://doi.org/10.1016/J.IJPROMAN.2022.07.003

Ho, L.-C. J., & Taylor, M. E. (n.d.). An Empirical Analysis of Triple Bottom-Line Reporting and its Determinants: Evidence from the United States and Japan.

Shen, L., Cheng, S., Gunson, A., Cities, H. W.-, & 2005, undefined. (n.d.). Urbanization, sustainability and the utilization of energy and mineral resources in China. Elsevier. Retrieved June 28, 2022, from https://www.sciencedirect.com/science/article/pii/S0264275105000570

Okanga, B., & Groenewald, D. (2017). Leveraging effects of triple bottom lines business model on the building and construction small and medium-sized enterprises' market performance. Acta Commercii, 17(1). https://doi.org/10.4102/ac.v17i1.457

Jayashree, S., Reza, M. N. H., Malarvizhi, C. A. N., & Mohiuddin, M. (2021). Industry 4.0 implementation and Triple Bottom Line sustainability: An empirical study on small and medium manufacturing firms. Heliyon, 7(8). https://doi.org/10.1016/j.heliyon.2021.e07753

Tseng, M. L., Chang, C. H., Lin, C. W. R., Wu, K. J., Chen, Q., Xia, L., & Xue, B. (2020). Future trends and guidance for the triple bottom line and sustainability: a data driven bibliometric analysis. In

Environmental Science and Pollution Research (Vol. 27, Issue 27, pp. 33543–33567). Springer. https://doi.org/10.1007/s11356-020-09284-0

Kucukvar, M., & Tatari, O. (2013). Towards a triple bottom-line sustainability assessment of the U.S. construction industry. International Journal of Life Cycle Assessment, 18(5), 958–972. https://doi.org/10.1007/s11367-013-0545-9

Martens, M. L., & Carvalho, M. M. (2017). Key factors of sustainability in project management context: A survey exploring the project managers' perspective. International Journal of Project Management, 35(6), 1084–1102. https://doi.org/10.1016/j.ijproman.2016.04.004

Hoque, N., Biswas, W., Mazhar, I., & Howard, I. (2020). Life cycle sustainability assessment of alternative energy sources for the Western Australian transport sector. Sustainability (Switzerland), 12(14). https://doi.org/10.3390/su12145565

Goh, C. S., Chong, H. Y., Jack, L., & Mohd Faris, A. F. (2020). Revisiting triple bottom line within the context of sustainable construction: A systematic review. In Journal of Cleaner Production (Vol. 252). Elsevier Ltd. https://doi.org/10.1016/j.jclepro.2019.119884

Cordes, C. (2014). The rise of triple-bottom-line businesses. In State of the World 2014: Governing for Sustainability (pp. 203–214). Island Press-Center for Resource Economics. https://doi.org/10.5822/978-1-61091-542-7_19

Silvius, A. J. G., & Schipper, R. P. J. (2014). Sustainability in project management: A literature review and impact analysis. Social Business, 4(1), 63–96. https://doi.org/10.1362/204440814x13948909253866

Silvius, G. (2017). Sustainability as a new school of thought in project management. Journal of Cleaner Production, 166, 1479–1493. https://doi.org/10.1016/J.JCLEPRO.2017.08.121

Breesam, H. K., & Kadhim Jawad, Z. A. (2021). Application of the Triple Bottom Line (TBL) concept to measure the maintenance performance of buildings. IOP Conference Series: Materials Science and Engineering, 1090(1), 012079. https://doi.org/10.1088/1757-899x/1090/1/012079

Hourneaux, F., Gabriel, M. L. da S., & Gallardo-Vázquez, D. A. (2018). Triple bottom line and sustainable performance measurement in industrial companies. Revista de Gestao, 25(4), 413–429. https://doi.org/10.1108/REGE-04-2018-0065

Blair, J. M., Phd, D. P., & Zehner phd, R. (n.d.). TRIPLE BOTTOM LINE ASESSMENT AND SUSTAINABILITY: A METHOD OF PERFORMANCE EVALUATION.

Xue, B., Liu, B., & Sun, T. (2018). What matters in achieving infrastructure sustainability through project management practices: A preliminary study of critical factors. Sustainability (Switzerland), 10(12). https://doi.org/10.3390/su10124421

Ho, L. C. J., & Taylor, M. E. (2007). An empirical analysis of triple bottom-line reporting and its determinants: Evidence from the United States and Japan. Journal of International Financial Management and Accounting, 18(2), 123–150. https://doi.org/10.1111/J.1467-646X.2007.01010.X

Magano, J., Silvius, G., Silva, C. S. e, & Leite, Â. (2021). The contribution of project management to a more sustainable society: Exploring the perception of project managers. Project Leadership and Society, 2, 100020. https://doi.org/10.1016/j.plas.2021.100020

Gericke N, Boeve-de Pauw J, Berglund T, Olsson D. The ***Sustainability Consciousness Questionnaire****: The theoretical development and empirical validation of an evaluation instrument for stakeholders working with sustainable development. Sustainable Development. 2019; 27:35–49. https://doi.org/10.1002/sd.1859*

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. https://doi:10.1371/journal.pmed1000097

Hall, Anika R., "Scaling Sustainable Infrastructure: District Design for the Triple Bottom Line" (2018). University Honors Theses. Paper 621. https://doi.org/10.15760/honors.633

Schweikert, A., Espinet, X. & Chinowsky, P. The triple bottom line: bringing a sustainability framework to prioritize climate change investments for infrastructure planning. Sustain Sci ***13****, 377–391 (2018). https://doi.org/10.1007/s11625-017-0431-7*

Aguiñaga E, Henriques I, Scheel C, Scheel A, Building resilience: A selfsustainable community approach to the triple bottom line, Journal of Cleaner Production (2017), doi: 10.1016/j.jclepro.2017.01.094.