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Identification of social responsibility factors within mega construction projects

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https://waset.org/publications/10009917/identification-of-social-responsibility-factors-within-mega-construction-projects-

PUBLISHER

World Academy of Science, Engineering and Technology

VERSION

VoR (Version of Record)

PUBLISHER STATEMENT

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REPOSITORY RECORD

Alotaibi, Ali, Francis Tekyi Edum-Fotwe, and Andrew D.F. Price. 2019. “Identification of Social Responsibility Factors Within Mega Construction Projects”. figshare. https://hdl.handle.net/2134/36614.

World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:13, No:1, 2019

Identification of Social Responsibility Factors within Mega Construction Projects

Ali Alotaibi, Francis Edum-Fotwe, Andrew Price

Digital Open Science Index, Economics and Management Engineering Vol:13, No:1, 2019 waset.org/Publication/10009917

***Abstract*—**Mega construction projects create buildings and major infrastructure to respond to work and life requirements while playing a vital role in promoting any nation's economy. However, the industry is often criticised for not balancing economic, environmental and social dimensions of their projects, with emphasis typically on one aspect to the detriment of the others. This has resulted in many negative impacts including environmental pollution, waste throughout the project lifecycle, low productivity, and avoidable accidents. The identification of comprehensive Social Responsibility (SR) indicators, which combine social, environmental and economic aspects, is urgently needed. This is particularly the case in the context of the Kingdom of Saudi Arabia (KSA), which often has mega public construction projects. The aim of this paper is to develop a set of wide-ranging SR indicators which encompass social, economic and environmental aspects unique to the KSA. A qualitative approach was applied to explore relevant indicators through a review of the existing literature, international standards and reports. A list of appropriate indicators was developed, and its comprehensiveness was corroborated by interviews with experts on mega construction projects working with SR concepts in the KSA. The findings present 39 indicators and their metrics, covering 10 economic, 12 environmental and 17 social aspects of SR mapped against their references. These indicators are a valuable reference for decision-makers and academics in the KSA to understand factors related to SR in mega construction projects. The indicators are related to mega construction projects within the KSA and require validation in a real case scenario or within a different industry to demonstrate their generalisability.

***Keywords*—**Social responsibility, construction projects, economic, social, environmental, indicators.

I. Introduction

THE construction industry plays a major role at all levels of development of the built environment through sustainable practices in planning, designing and execution of infrastructure projects to meet population growth, work and social demands [45], [97], [63]. However, construction also has a negative impact on society, manifested in the form of traffic congestion, disruption of economic activities, pollution, loss of biodiversity and damage to existing social and physical infrastructure [44]. Therefore, a balanced approach must be maintained to meet the requirements of modernising societies and the need for sustainable development. In other words, buildings and large-scale projects are not an end, but a developmental means towards a sustainable and modern society. This position is supported by [2], who stated that construction is a social process and, therefore, its social aspects of sustainability, such as health and safety amongst others, are important. Similarly, [95] asserted that any ignorance of societal demands could result in loss or misuse of resources—either natural resources or the utilisation of resources, such as buildings or infrastructure projects, in an unsustainable way.

The construction industry is considered the second largest industry, after the petrochemical industry, in the KSA and one of the fastest growing in the Gulf region with current expenditure rising to more than US $120 million a year [3], [60]. There is a significant number of mega construction projects being implemented, in both the public and private sectors, despite the industry having poor SR performance levels [6], [4]. The literature alludes that the KSA construction industry is underperforming with a prevalent complacent attitude, as indicated by accidents, waste production and the consumption of large amounts of resources [11], [9]. Projects in the KSA have experienced significant challenges and set-backs due to political, social, environmental and community problems, therefore failing to meet statutory criteria such as high performance and completion within specified timeframes and budgets [5], [39], [60]. According to [107], the KSA 2030 Vision aims to resolve all these issues.

The understanding and implementation of SR in developing countries, including the KSA, is considered to be inadequate, with research still at an early stage [61], [46], [121], [103]. As such, SR is an underexplored and poorly studied area in these countries. Furthermore, findings from SR studies show that in developing countries, organisational SR initiatives are primarily focused on capturing philanthropic activities [61], [46], [84] and are not seen as part of mainstream business activities. In addition, due to intense competition in local and global markets within developing countries, SR is often not high on a company's list of objectives or priorities and might be relegated to charitable activities carried out to gain media attention [58]. Meanwhile, global best practices, such as ISO 26000, ISO 9001, AA1000, GRI, ISO 14001, SA 8000, OHSMS 18001 and the United National Global Compact, indicate the need to better integrate SR and sustainable development objectives to obtain a competitive advantage. Therefore, there is a need for further studies on the concept of SR, including an exploration of its nature within the local contexts, to enable the introduction of appropriate strategies and agenda for organisations to adopt and practice SR principles [46], [128], particularly in developing countries.

There are few studies focusing on social issues in the context of construction [129], [26]. The traditional approach

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of the construction industry fails to identify and respond to the concerns of the stakeholders during the project planning process [35]. It is noteworthy that economic, environmental and social impacts of a construction project may differ at different stages of the construction process [122]. Today, the key challenge faced by the construction industry globally is how to integrate SR practices within different stages of construction projects, as a continuous process.

The KSA requires a comprehensive guiding framework to strengthen the position and potential of construction industry players in this globally competitive environment [106], [8]. Meanwhile, the challenges of modern society also demand that the KSA construction industry stays ahead in an increasingly challenging environment, through a dedicated focus on maintaining and developing performance and productivity quality and ensuring that it is a profitable and increasingly lucrative industry. Essentially, the KSA construction industry needs to completely shift its focus to improve its competitiveness and optimise resources while using advanced techniques, but also acknowledge their failings [5], [60].

II. Objective of This Study

The main aim of this paper is to develop a set of wide-ranging SR indictors relevant to mega construction projects in the KSA which encompass economic, environmental and social aspects unique to the KSA. These indicators are assumed to be critical which will shed light on important SR factors within the context of the KSA mega construction projects. The paper begins with a review of SR as a concept and its development; followed by SR within mega construction projects and the existing gaps. The research methodology adopted is then presented before a discussion of the SR indicators' development, and their validation with experts within the KSA construction industry. The paper concludes with recommendations for the delivery of sustainable mega construction projects in the KSA.

III. Literature Review

A. SR: Concept and Significance

The concept of SR has grown in importance since its inception in the 1950s [42], [41]. SR has been a topic of considerable debate within academic and practitioner communities around the world due to the underlying different perspectives [24], [91]. Reference [23] defines SR as *"the economic, legal, ethical and discretionary expectations that society has of organisations at a given point in time"*. This model is useful but is limited by its static and general nature, alongside its inability to reflect how companies operate within the construction sector [81], [80]. Reference [32] conducted content analysis of 37 different SR definitions and identified five SR dimensions; social, environmental, economic, stakeholders and voluntariness. He contested the lack of a universally accepted definition of SR and insisted that the limitations of SR stem from a lack of understanding by businesses of how it is socially constructed within the specific context and business strategy they are working in [32].

SR has become a new business reality and making profits without consideration of societal impacts is no longer publicly acceptable [66], [65]. For instance, [84] observes that SR is now considered one of the most important success factors for businesses. Along the same line of thinking, [53] views that the notion of doing well by doing good becomes part of a company's competitive stance, and hence SR should be fully embedded into the company's operations. To facilitate profitability and accomplish "shared value" with the communities in which organisations do business SR is now seen as a strategic resource [101], [86], [80]. Therefore, a better understanding of the relationship between the economic, environmental, and social systems is fundamental to the practical application of the concept of SR, aiming to maintain a balance between social progress, preservation of the environment and assurance of economic growth.

Although [89] maintained that social performance and the understanding of social impacts remain unclear and lack robustness, an increase in awareness of SR among stakeholders is building pressure on organisations to take active measures to improve their sustainable development efforts [116]. To complement the above assertion, [64] also reported that many corporations lack the appropriate processes, tools and frameworks that can be adopted by companies; which is observed to have direct and indirect impact especially on social, economic and environmental aspects of the stakeholders. The main objective of SR is to maintain a balance between social, environmental and economic dimensions to achieve sustainable development with a proactive attitude [77], [120]. The following conceptual model Fig. 1 was constructed to illustrate the SR concept.

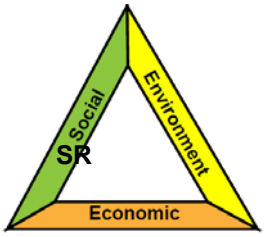


Fig. 1 SR concept

B. SR within Mega Construction Projects

Social responsibility within mega construction projects is aimed at achieving various objectives that can precede quality, time and cost, in order to respond to the modern social and environmental problems within a project lifecycle [77]. Compared to other industries, the field of SR within construction projects is still an understudied area [75], [126]. Various authors have highlighted the prevalent research gaps in SR within the construction industry, particularly in developing countries [92], [74], [63]. Reference [80] suggests that the problem of poor SR implementation is not limited to developing economies alone. Nevertheless, SR is an essential in overcoming the challenges associated with urbanisation, resource depletion and population growth.

Irrespective of the construction industry's environmental

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and social impacts, it is poorly engaged with the SR agenda [94]. At present, construction companies focus mainly on economic objectives, with little consideration of their social and environmental impacts [105], [7], [1]. Lack of SR has resulted in issues concerning waste generation, misuse of resources, and occupational hazards. For example, according to [119] the UK construction industry has a reputation for poor quality and services, a history of broken promises and a bad safety record. Indeed, globally the construction industry does not have a favorable occupational health and safety (OH&S) record and creates a disproportionate number of fatalities, injuries and disease [92], [79], as can be seen in the UK example in Fig. 2.

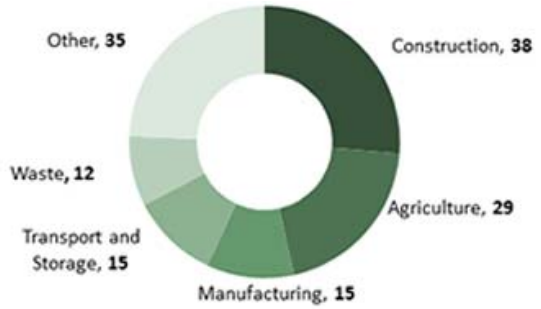


Fig. 2 Fatal injuries to workers in each major industry in the UK [104]

Poor OH&S performance represents a key challenge for the construction industry. It is imperative that social outcomes, including OH&S, are measured and reported alongside traditional indictors of project success, such as cost and time performance [92]. For projects to succeed, there is a need to go beyond the primary and traditional objectives of cost, time and quality, and consider the socio-economic objectives and environmental sustainability [100], [34], [7], [93], [109].

Within the construction industry worldwide, there is a lack of SR reporting frameworks and a coherent strategy for optimising the impact of construction projects on society [118], [80]. Reference [127] attempted to develop a framework for SR indicators relating to construction companies worldwide as a tool for SR performance. However, concerning frameworks, measurement and empirical methods of SR and sustainability, main issues have not been resolved because earlier studies have been too fragmented or largely concentrated on the organisational level of analysis, with little attention to individuals and groups [96].

C. SR Indicators

Construction companies and their projects are facing increased pressure from governments and other stakeholders to go beyond economic benefits and consider the social and environmental effects of their work [127]. However, SR can mean different things to different people [52]. To achieve a balanced SR system there must be reconciliation between social, environmental and economic dimensions. Many organisations use sustainability to associate their company image with a positive image (e.g. good deeds, philanthropy, different areas of sustainability). As argued by [36], construction projects have an important social role in creating new relationships and interactions within a community, and with its environment.

Indicators are a valuable tool to monitor progress over a period of time, detect problems associated with performance improvement and identify considerations that may be disregarded from pervious analysis [17]. Unlike other commercial sectors, construction activities are fundamentally project-based; therefore, actions causing impacts can be characterised by two major approaches, such as, project orientation and organisational orientation [38]. The identification of a suitable set of SR indicators within the context of mega construction projects is difficult, as the definition of what constitutes SR may depend on the context, the participants' perspectives and the lifecycle stage [18], [115], [12]. Due to a deficiency of analytical and theoretical underpinning, the social dimension is considered to be the weakest pillar of sustainable development [71].

There are various frameworks related to SR in the literature. However, these frameworks are not specifically related to mega construction projects and are either complex to be used by Small and Medium Enterprises (SMEs) or too abstract to be applied at a practical level. One example of these frameworks is ISO 26000—a widely used framework within the construction industry—which acknowledges SR activities. However, this framework has been blamed for dealing with private and public organisations using the same method [43]. In addition, most of the indicators are focused on environmental protection during the construction phase [127], [76]. There is little knowledge about how organisations carry out SR activities in practice, how they incorporate SR into their commercial strategies and what shapes these strategies they take. In addition, due to the multi-dimensionality of SR objectives and the complexity of the socio-economic system, the perception and opinion of different stakeholders should be taken into consideration and formally integrated into decision-making processes [76]. Lastly, as noted by [36] construction projects play an important social role in creating new relationships and interactions within a community, also between a community and the environment. Therefore, it is important that construction projects do not conflict with sustainable development objectives and positively contribute to the social and economic needs of society.

IV. Research Methods

Given the identified limitations in the research and existing literature, and in the interest of identifying the key variables for SR implementation within construction projects, a qualitative approach was adopted to explore and identify related indicators which can help to construct a SR framework. This approach is particularly useful when concepts and contexts are ill defined, as it enables the derivation of in-depth understanding and explanation [15]. The literature review is regarded as a useful method to gain an in-depth understanding of the key variables and concepts within the topic. Additionally, a systematic examination of

existing publications can help researchers in identifying the current body of knowledge and stimulate inspiration for future research. To ensure a sufficient thorough coverage of this research field we chose to target our literature search to journals which are listed in the word-cloud shown in Fig. 3. Relevant literature was identified through Electronic Library Catalogue and integrated search engines hosted by Loughborough University, as well as internet-based search engines comprising Google Scholar, Elsevier Science, Emerald Database and ProQuest. As SR has several synonyms, specific attention was paid to selecting the right keywords to retrieve papers including SR, social accountability, corporate sustainability, sustainable development and ethical business.



Fig. 3 Journals reviewed for SR relevant literature

The SR indicators identified from the literature, were divided into the three domains of SR; economic, environmental and social. The indicators were then sent (via email) to four experts within mega construction projects to be validated and mega construction project is defined as projects worth more than 1 billion USD or a project with huge investment [57]. The experts were subsequently interviewed from 35 - 50 minutes each. Table I presents the profile of interviewees. The experts were requested to assess whether the proposed SR factors covered all potential factors, considering the background of SR adoption within the KSA construction context, and whether any factors could be added or removed. Based on the feedback, the SR factors were finalised and the list truncated, this methodological process is illustrated in Fig. 4. These factors are mapped against its coding in Table II for economic factors, in Table III for environmental factors and finally in Table IV for social factors. The main questions asked were:

- what does SR mean to you?"
- what does SR entail?
- how comprehensive are these indicators?

TABLE I
PROFILE OF INTERVIEWEES

Interviewee Reference	Organisation/ Job Role	Number of ears in the industry	Area of specialisation
W	Consultant	20	CSR and Sustainability
A	Client	15	Project management
S	Contractor	20	Sustainability
M	Consultant	10	Sustainable construction & shared value

TABLE II
ECONOMIC INDICATORS AGAINST CODES

Code	Economic Factors
ECO1	Ensuring construction quality
ECO2	Increasing productivity and profitability
ECO3	Ensuring reasonable return on investment
ECO4	Ensuring high performance of construction materials
ECO5	Ensuring long term financial viability
ECO6	Preventing corruption behaviour
ECO7	Supporting local economy
ECO8	Delivering of value for money
ECO9	Ensuring cost control and timely completion
ECO10	Minimisation of maintenance and operation cost

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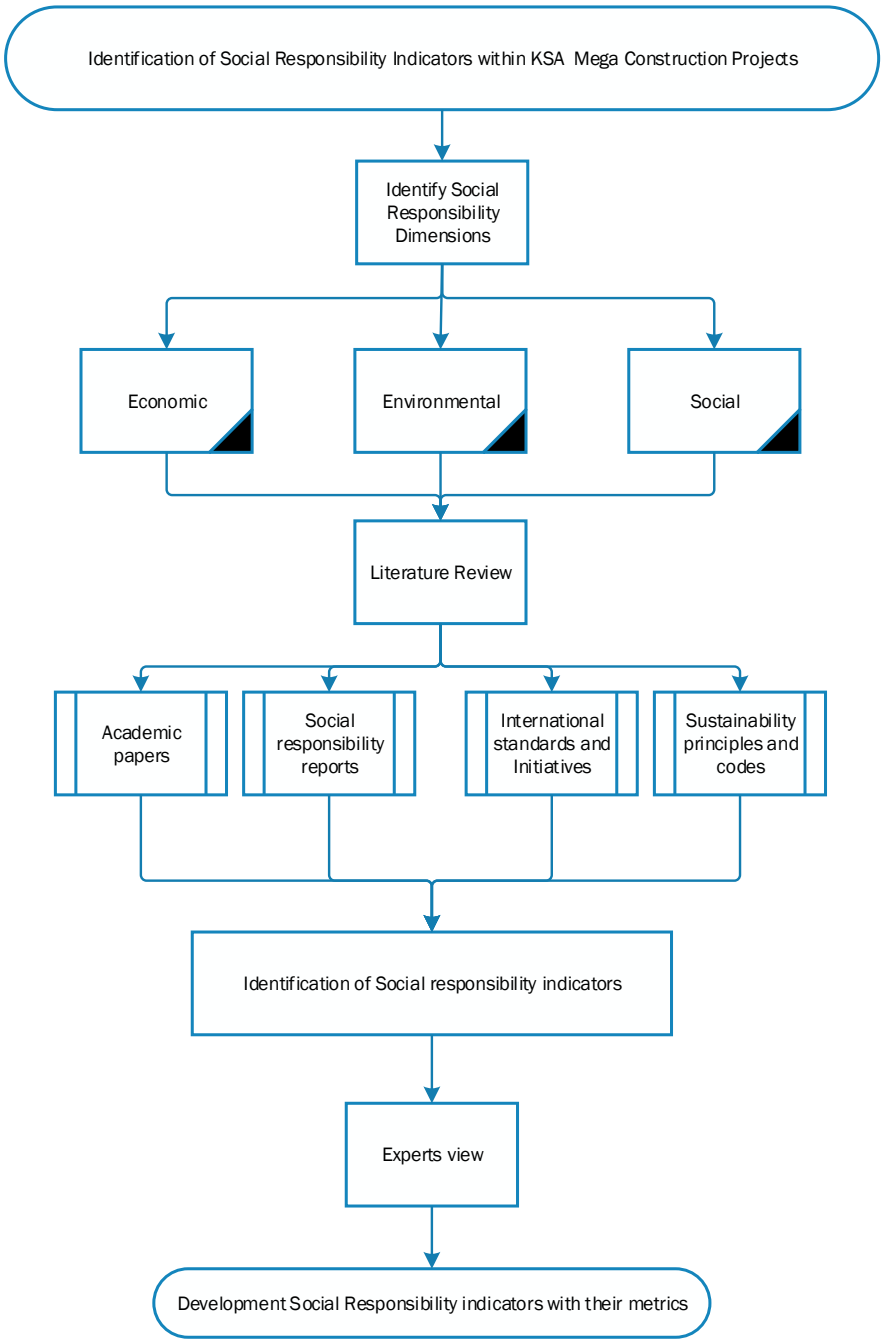


Fig. 4 Research methodology process

V. Analysis and Discussion

Having amalgamated the list of variables from the literature and validated them with the interviewees, it is important to note that the lack of coherent strategies within the context of construction projects for SR implies that construction organisations are given the right to select when, how or whether they partake in social and environmental issues. This was supported by the feedback from the interviews, alongside the indication that the absence of regulatory intervention is likely to lead organisations to simply replicate other organisations to decrease their uncertainty and alleviate their dilemma in terms of choosing SR activities [120]. Furthermore, there is likely to be a reluctance to commit to SR issues in the long term due to increasing barriers, which can be found as well in Singapore construction industry context [78]. If SR is to be taken seriously within the construction industry, there is a dire need for consistency in SR activities and principles. A system of incentives, either positive or negative, will be needed to establish a regulatory framework for SR, which is required for best practices to be rewarded and worst practices to be eliminated [107].

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TABLE III
ENVIRONMENTAL INDICATORS AGAINST CODES

Code	Environmental Factors
ENV1	Implementation of environmental regulations
ENV2	Biodiversity protection
ENV3	Reduction of waste produced
ENV4	Efficiently utilises resources (site and office) (e.g. waste, energy)
ENV5	Establishment of environmentally sustainable designs
ENV6	Usage of environmentally friendly materials and technology.
ENV7	Water conservation and protection of water courses from pollution during the lifecycle of the work
ENV8	habitat creation and protection
ENV9	Nuisances to the local community
ENV10	Protection to the ecosystem through good construction practices.
ENV11	Minimisation of construction and demolition waste sent to landfill
ENV12	Reduce transport impact

TABLE IV
SOCIAL INDICATORS AGAINST CODES

Code	Social Factors
SOC1	Operating within a professional health and safety management system
SOC2	Inductions to work areas and health and safety (H&S) training
SOC3	Building long-term favourable relationships with local communities
SOC4	Support and protects local community's culture, heritage and education development
SOC5	Use of local contractor and suppliers
SOC6	Minimising traffic disruption to local neighbourhood
SOC7	Protecting the local community during construction/ demolition phase of a project
SOC8	Considering the needs of end-users with particular needs
SOC9	Provision of breaks, reasonable working hours and holidays for staff
SOC10	Ensuring employees fair wages
SOC11	Respecting labour rights and engagement
SOC12	Encourage workforce participation in the community
SOC13	Ongoing support of any charity
SOC14	Preventing modern slavery and child labour
SOC15	Discourage anti-social behaviour
SOC16	Improve quality of life
SOC17	Ensure accessibility and connectivity to local services

Approximately 80% of the reviewed papers indicate that mega construction projects have considerable economic, environmental and social impacts as shown in Table V. Therefore, the performance of these projects must address the needs of society, provide environmental protection and improve economic growth. All of the interviewees agreed that all of the indicators are critical. However, they have not been fully implemented due to a lack of guidance frameworks, awareness, lack of client's requirements as well as the associated cost. This is linked to the argument raised by [79] wherein barriers that hamper effective implementation of SR include "lack of leadership" and "management skills", "lack of SR data and scepticism" about "return on investment". It was mostly agreed among the interviewees that SR indicators are not well established within the context of the construction industry and that they instead follow sustainability reports which have been criticised for mainly focusing on the environment. This is supported by the argument that the ultimate limitation of sustainability is clear: It largely focuses on environmental and economic considerations of the constructed environment [110], [111]. This is aligned with the argument that the sustainability agenda will not be enough to meet SR theory. Thus, industry has to develop a social conscience in its business strategy [102], [118], [120]. The international environmental management standard (EMS) is a performance measurement tool which has been developed to improve environmental performance; however, waste is a common issue within the industry [127]. Therefore, a holistic approach for the construction industry must be developed with a full set of indicators capturing the three dimensions of SR—economy, environment and social. It was asserted by those interviewed that these indicators must be tested and validated with a real-world project.

M declared that the proposed indicators are suitable and have the potential to reduce negative social and environmental practice and satisfy the needs of various stakeholders. M revealed that the construction industry is not willing to go beyond the requirements of the client; therefore, involvement of SR at the early stages of a construction project is necessary to maintain and ensure implementation. M indicates that health and safety performance is a critical issue for construction projects and must be considered as the highest priority. This would indicate that training and compliance with international standards are important. It was noted, however, that an overall international standard might not be suitable for every country due to cultural, language and contextual differences. Therefore, the engagement with the best practices requires considerable guidance stemming from theory. As health and safety form a substantial part of SR, much attention must be paid to this area. M declared that the successful implementation of comprehensive SR indicators requires many resources and changes to organisations, whether that is cross-functional, collaborative or basic thinking in daily work practices.

Interviewee S stated that mega construction projects provide critical government establishments for economic growth, social production and daily life which form the foundation of modern societies. S also stated that all the indicators are reasonable and can be attached to mega construction projects; however, they do not have a specific guideline for SR indicators within their current projects. Additionally, Interviewee S also stated that the construction process from planning and designing through to constructing, use and finally demolition has a massive impact upon the surrounding community. Therefore, there is a need for more consideration to improve the image of the industry. It was also stated by S that in the context of mega construction projects strong commitment and understanding of all management levels—from laborers to senior managers—are needed to effectively implement SR activities during the whole project lifecycle. This is aligned with [83] who stated that different levels of management must be involved to achieve a well implemented process. This can be achieved either through awareness, which is highly needed within construction projects, or benefit realisation.

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S stated that their company does not have a SR guidance or framework and they are more into adopting sustainability agenda, such as Leadership in Energy and Environmental Design (LEED) and British Building Research Environmental Assessment Method (BREEAM). This is corresponding with the findings that the concept of SR in the construction industry differs from company to company and is often misaligned with the client definitions—which tend to be linked to local needs and it includes a more integrated sustainability focus [80].

Interviewee A indicated that they were not fully aware of SR indicators, but gave a high level of importance to the proposed indicators. A stated that SR is mainly adopted to improve reputation and enhance a company's brand to increase their competitiveness. This can be aligned to the study by [99] which indicated that many Australian construction companies apply SR practices to maintain their corporate image. Thus, corporate image can be viewed as a driver for organisations to implement SR within their activities. Additionally, there must be an emphasis on the development and training of construction staff on the use of indicators, particularly as the construction industry is known for hiring low skilled people. The advantages of being socially responsible are formulated by [24] as: enhancing reputation among employees and customers, improving productivity via increased innovation and efficiency and increasing personal satisfaction of management.

Interviewee W stated that a strategic approach is needed to assess the current situation, the target that needs to be achieved and how to achieve it. This is aligned with [47] who indicated that the strategic direction of the firm plays an important role in SR implementation. W also revealed that these sets of indicators must be tested in real-life situations, to ascertain their suitability. W emphasized that there is a low level of commitment towards social and environmental indicators because they are viewed as an extra expense rather than as a benefit. This is similar to [27] and [49] who found that firms avoid implementing SR due to the high associated cost. This indicates that the benefits of SR cannot be seen in the short-term. Therefore, a better understanding of the long-term benefits of SR could be helpful in encouraging industry-wide implementation of SR practices. W also stated that the construction industry generally demonstrates poor ethical consideration which leads to corruption. This might also lead to poor quality of work so strong legislation must be employed to prevent this behavior. References [112] and [90] also found that the construction industry is considered an unethical industry for several reasons including corruption, health and safety issues and negative environmental activities.

SR plays an important role within organisations; however, its direction, variables, metrics and benefits remain unclear. The interviewees in the KSA supported the findings from the literature and outlined the need for a strategic direction that incorporates SR and the importance of involving the various key stakeholders within the decision-making processes. The finalised list of SR variables can now be tested in practice by construction industry organisations in the KSA to assess their suitability as a measurement tool. These factors are mapped against their dimensions in Fig. 5.

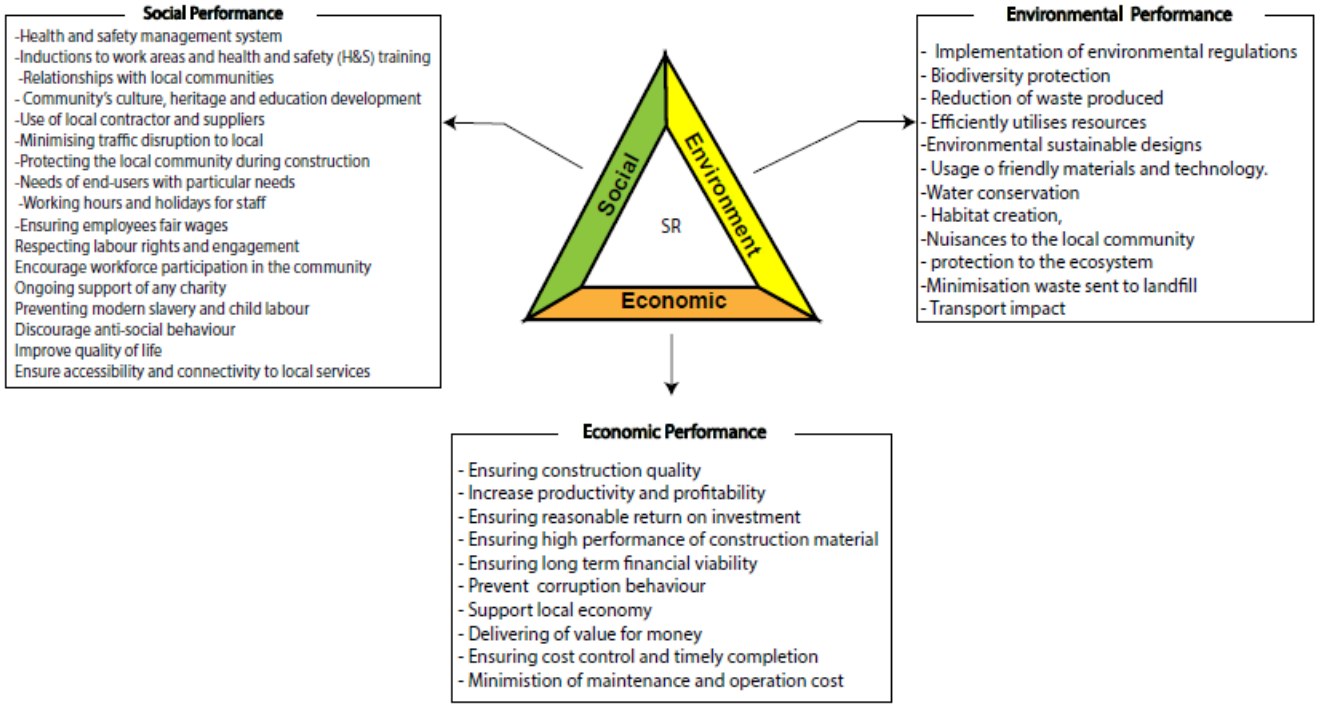


Fig. 5 Dimensions mapped against their factors

TABLE V
SR INDICATORS IDENTIFIED IN THE LITERATURE DIVIDED INTO ECONOMIC, ENVIRONMENTAL AND SOCIAL DIMENSIONS

Code		ECO1	ECO2	ECO3	ECO4	ECO5	ECO6	ECO7	ECO8	ECO9	ECO10
Chang et al.	[25]	√					√				
Yu et al.	[123]	√	√		√			√	√	√	√
Loosemore et al.	[78]						√				
Loosemore et al.	[81]						√				
Liao et al.	[73]	√					√			√	
Lin et al.	[77]						√				
Martens and Carvalho	[85]			√			√			√	
Lim and Loosemore	[80]						√				
Zhao et al.	[126]	√				√	√	√		√	
Lin et al.	[76]	√		√	√		√			√	√
Weisheng et al.	[33]						√				
Darko and Chan	[63]										√
Jiang and Wong	[125]	√				√				√	
Zeng et al.	[69]						√	√			
Lam and Javed	[48]									√	
Goyal et al.	[124]							√	√		
Yung and Ping	[7]	√					√				
Almahmoud and Doloi	[128]	√						√			
Zhu and Zhang	[59]	√			√						
Husgafvel et al.	[10]						√			√	
Amiril et al.	[67]	√			√					√	√
Koppenjan	[51]										
GRI	[72]						√				
Lenferink et al.	[91]										
Murray and Dainty	[87]						√				
McCarthy et al.	[127]										
Zhao et al.	[20]	√			√		√	√		√	√
Bowen et al.	[30]						√				
Couth and Trois	[129]										
Zuo et al.	[98]							√			
Peloza and Shang	[29]								√		
Constructing Excellence	[122]					√					
Griffith	[54]	√							√	√	
Willetts et al.	[22]										
Yao et al.	[31]	√		√		√			√	√	
BS ISO	[108]						√		√		
Cuthill	[68]		√							√	√
Shen et al.	[36]		√	√				√		√	
Lai and Lam	[37]	√	√							√	
Edum-Fotwe and Price	[75]										
Lim	[70]									√	√
Ke et al.	[99]										
Lau and Douglas	[28]										
Lazarevic	[113]										
Clark	[62]		√								
Clark	[64]		√								√
Shen et al.	[40]							√	√	√	
Ugwu and Haupt	[88]	√								√	
Robinson et al.	[56]		√						√		
Jefferies	[19]		√								
Jones et al.	[21]	√					√				
Forsyth	[14]										√
Mercer	[25]										
Horsley et al.	[123]										
Bossink	[78]										
Brereton and Temple	[81]							√			
Bennett	[73]		√								

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Code		ENV1	ENV2	ENV3	ENV4	ENV5	ENV6	ENV7	ENV8	ENV9	ENV10	ENV11	ENV12
Chang et al.	[25]	√	√	√	√	√	√	√		√		√	
Yu et al.	[123]	√	√	√		√	√	√	√	√	√	√	√
Loosemore et al.	[78]	√	√	√	√		√	√		√	√	√	
Loosemore et al.	[81]		√	√	√		√			√		√	
Liao et al.	[73]	√					√		√				
Lin et al.	[77]	√				√				√	√	√	√
Martens and Carvalho	[85]		√		√			√			√	√	
Lim and Loosemore	[80]	√	√	√	√		√			√		√	√
Zhao et al.	[126]	√	√	√	√		√	√	√	√	√	√	
Lin et al.	[76]	√	√	√	√	√	√		√				
Weisheng et al.	[33]		√		√		√	√		√			
Darko and Chan	[63]				√			√					
Jiang and Wong	[125]	√	√		√				√				
Zeng et al.	[69]		√	√	√	√	√		√	√			
Lam and Javed	[48]				√								
Goyal et al.	[124]	√		√	√					√		√	√
Yung and Ping	[7]	√			√	√	√	√				√	√
Almahmoud and Doloi	[128]			√						√			
Zhu and Zhang	[59]												
Husgafvel et al.	[10]				√			√		√		√	√
Amiril et al.	[67]		√	√			√	√	√	√			
Koppenjan	[51]						√	√					
GRI	[72]	√	√	√	√					√			
Lenferink et al.	[91]				√								
Murray and Dainty	[87]												
McCarthy et al.	[127]												
Zhao et al.	[20]	√			√	√	√	√		√		√	
Bowen et al.	[30]												
Haughton and Mcmanus	[129]												
Couth and Trois	[98]	√			√			√					
Zuo et al.	[29]								√				
Peloza and Shang	[122]												
Constructing Excellence	[54]			√						√	√		√
Griffith	[22]		√	√						√		√	
Willetts et al.	[31]									√	√	√	
Yao et al.	[108]			√	√			√	√	√			
BS ISO	[68]		√	√	√	√	√	√	√	√	√	√	√
Cuthill	[36]												
Shen et al.	[37]				√	√	√	√		√		√	
Lai and Lam	[75]		√			√							
Edum-Fotwe and Price	[70]												
Lim	[99]			√	√			√	√	√		√	
Ke et al.	[28]							√					
Lau and Douglas	[113]	√	√	√	√					√			
Lazarevic	[62]												
Clark	[64]	√			√					√			
Clark	[40]		√		√			√					
Shen et al.	[88]	√	√	√	√	√	√	√	√	√		√	
Ugwu and Haupt	[56]			√					√	√	√	√	
Robinson et al.	[19]	√		√						√			
Jefferies	[21]						√						
Jones et al.	[14]	√			√		√						
Forsyth	[25]				√			√					
Mercer	[123]												
Horsley et al.	[78]				√		√						
Bossink	[81]	√					√						
Brereton and Temple	[73]												
Bennett	[77]							√					

Code		SOC1	SOC2	SOC3	SOC4	SOC5	SOC6	SOC7	SOC8	SOC9	SOC10	SOC11	SOC12	SOC13	SOC14	SOC15	SOC16	SOC17
Chang et al.	[25]	√	√		√					√	√	√			√	√		
Yu et al.	[123]	√	√	√	√							√		√			√	
Loosemore et al.	[78]	√		√					√	√	√	√	√	√		√		
Loosemore et al.	[81]	√						√	√			√	√	√				
Liao et al.	[73]	√	√	√	√					√				√				
Lin et al.	[77]	√	√		√	√	√	√		√	√	√			√			
Martens and Carvalho	[85]	√						√										√
Lim and Loosemore	[80]	√	√	√	√				√			√	√	√	√			
Zhao et al.	[126]	√	√	√	√			√		√	√	√		√	√	√		
Lin et al.	[76]	√	√	√	√	√		√			√			√	√	√	√	√
Weisheng et al.	[33]	√	√	√						√	√	√			√	√		
Darko and Chan	[63]	√		√								√						
Jiang and Wong	[125]	√		√	√			√			√	√		√			√	√
Zeng et al.	[69]	√	√							√	√	√	√	√	√	√		
Lam and Javed	[48]																	
Goyal et al.	[124]				√							√						
Yung and Ping	[7]	√	√	√		√							√	√	√			
Almahmoud and Doloi	[128]	√		√	√	√	√		√				√				√	√
Zhu and Zhang	[59]	√	√	√	√							√		√	√			
Husgafvel et al.	[10]	√	√							√	√	√						
Amiril et al.	[67]		√	√	√													
Koppenjan	[51]																	
GRI	[72]	√	√	√							√	√			√	√	√	
Lenferink et al.	[91]																	
Murray and Dainty	[87]	√			√									√				
McCarthy et al.	[127]									√	√	√			√	√		
Zhao et al.	[20]	√	√	√	√				√	√	√	√	√	√	√	√		
Bowen et al.	[30]																	
Haughton and Mcmanus	[129]																	
Couth and Trois	[98]																	
Zuo et al.	[29]	√	√		√		√					√					√	
Peloza and Shang	[122]																	
Constructing Excellence	[54]	√		√	√	√	√	√	√	√	√	√			√	√		
Griffith	[22]	√	√															
Willetts et al.	[31]	√	√							√	√	√						
Yao et al.	[108]				√												√	√
BS ISO	[68]																	
Cuthill	[36]	√			√													√
Shen et al.	[37]	√																
Lai and Lam	[75]	√	√		√							√						
Edum-Fotwe and Price	[70]	√			√													
Lim	[99]																	
Ke et al.	[28]	√	√	√					√			√		√				
Lau and Douglas	[113]	√	√	√	√			√			√		√	√	√	√	√	v
Lazarevic	[62]																	

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Clark	[64]	√		√	√							√							
Clark	[40]	√									√							√	√
Shen et al.	[88]	√				√						√							
Ugwu and Haupt	[56]	√		√								√							
Robinson et al.	[19]																		
Jefferies	[21]	√	√			√					√	√	√						
Jones et al.	[14]																		
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Bossink	[78]																		
Brereton and Temple	[81]																		
Bennett	[73]																		

IV. Conclusion

This research paper adopted a holistic approach to investigate SR indicators across social, environmental and economic dimensions within large construction projects in the KSA and mapped against their factors. This holistic approach differs from most existing studies, which mainly concentrate on and investigate only the environmental dimension or the economic dimension of SR. This study has developed its own conceptualisation of SR, which might be useful for future studies as a theoretical foundation. There is a dire need to explore the benefits of SR which is thought to lead to increased implementation of SR practices. Although SR has become a global trend, empirical research on the SR of the construction industry remains insufficient. The biggest barriers to improving social performance in the construction industry include cost, knowledge, awareness and education. The limited number of SR studies within the context of construction also limits SR improvement in the industry. A better and deeper understanding of SR indicators is essential to help decision-makers realise what SR entails and encourage widespread adoption of SR in the construction industry.

As a theoretical contribution, this research paper summarises key factors in the extant literature that provide initial insights at the nexus of SR and construction projects for subsequent empirical development, see Table V. These factors/variables can now be taken to organisations for practical assessment and evaluation. This research paper also explores the research gaps within the context of mega construction projects and SR implementation. As suggested, there is a large amount of room for additional research within the context of SR and construction projects. Despite increasing numbers of studies and publications on the topic, knowledge is fragmented and there is no framework to tackle issues related to SR in the context of construction industry. Finally, recommendations for governments and stakeholders need to be integrated. The government needs to play a major role in the implementation of SR while companies need to realise the long-term benefits of SR incorporation and avoid focusing on the short-term reactive approaches to increased economic costs.

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Digital Open Science Index, Economics and Management Engineering Vol:13, No:1, 2019 waset.org/Publication/10009917