



# The state of play regarding the social sustainability of the construction industry: a systematic review

Argaw Gurmu<sup>1</sup> · Salman Shooshtarian<sup>2</sup>  · Muhammad Nateque Mahmood<sup>1</sup> · M Reza Hosseini<sup>1</sup> · Asheem Shreshta<sup>1</sup> · Igor Martek<sup>1</sup>

Received: 5 April 2021 / Accepted: 18 February 2022 / Published online: 5 May 2022  
© The Author(s) 2022

## Abstract

The social dimensions of sustainability's three bottom lines are often overlooked in the construction industry. This is despite attempts to find optimal trade-offs between economic growth, environmental impacts, human health and well-being, as well as social considerations. This study reviews the literature on social sustainability (SS) within the construction arena, identifies research gaps and proposes a forward-looking research agenda. This critical review employs the 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses' (PRISMA) technique to retrieve secondary data on SS from available academic, government and industry documents. The literature analysis focuses on seven themes: (1) definition of SS, (2) the theoretical dimensions of SS, (3) primary stakeholders, (4) policy and guidelines, (5) major SS performance indicators, (6) barriers to SS uptake in the construction industry, and (7) SS drivers in the construction industry. The review identifies primary stakeholders and proposes a list of assessment criteria that can be used by the construction industry in measuring progress towards SS. The study proposes a conceptual model that maps out key stakeholders, the major barriers, and enablers of SS in construction projects. The findings will support the development of SS guidelines specific to the construction industry in Australia as well as overseas.

**Keywords** Social procurement · Government support · Local communities · Stakeholders · Social impacts

---

✉ Salman Shooshtarian  
salman.shooshtarian@rmit.edu.au

<sup>1</sup> School of Architecture and Built Environment, Deakin University, Geelong, Victoria, Australia

<sup>2</sup> School of Property, Construction and Project Management, RMIT University, Melbourne, Victoria, Australia

## 1 Introduction

Rapid global population growth has resulted in a rise in construction activities across both developing and developed countries, in order to meet national needs. The forecasts provided by GlobalNewswire (2020) reveal that the global construction industry can be expected to record a Compound Annual Growth Rate (CAGR) of 9.2%, reaching USD 11093.7 billion by 2024. Due to its sheer size and significance, the construction industry has a considerable impact on society, the environment, the economy and on people (Zuo et al., 2012). These are collectively known as the four pillars of sustainability (Dawodu et al., 2017). While research around environmental and economic dimensions of sustainability in the construction industry context is extensive, social sustainability (SS) is not well studied (Hossain et al., 2018). Indeed, research in construction sustainability tends to put stress on economic and environmental dimensions, while construction projects have profound social impacts. These include a wide range of ramifications for the community: people's life quality, health and safety; employment opportunities; and cultural heritage conservation programs (Hossain et al., 2018, Montalbán-Domingo et al., 2018).

Traditionally, politicians tend to favour the economy at the expense of social and ecological issues (Bouzuenda et al., 2019). However, currently, the increased level of public awareness of sustainability and relevant education is becoming evident in the agendas of political parties in different countries (Martek et al., 2019, Zhang et al., 2019). This, in turn, is echoed in industry and businesses sustainability practices which justifies the efforts to measure and benchmark the sustainability of products and services (Hutchins and Sutherland, 2008). To a large extent, lifecycle assessment techniques have been used to assess construction environmental and economic impacts and to make informed decisions (Edum-Fotwe and Price, 2009), whereas social lifecycle assessment (S-LCA) has lately received the attention of the construction industry stakeholders. S-LCA, as a promising benchmarking tool, has undergone rapid development in terms of assessment framework and methodology (Hossain et al., 2018). In S-LCA, construction social impacts could be quantified through SS performance indicators (SSPI) mapped out across the entire life cycle of built environments (Martínez-Blanco et al., 2015). These SSPIs, however, are identified according to several factors such as contextual conditions, stakeholders (Edum-Fotwe and Price, 2009, Goel et al., 2020), and governing policies and regulations (Hutchins and Sutherland, 2008). These factors are fully reviewed and analyzed in this review study.

Lastly, construction firms have embraced the concept of Corporate Social Responsibility (CSR) to pursue SS in their practices (Awale and Rowlinson, 2014). In the business world, CSR refers to a condition in which firms are profitable, law obedient and ethical while presenting themselves as good corporate citizens (Carroll, 1991). It is now drawn increasing attention from scholars and managers across all sectors (Lin et al., 2018). Murray and Dainty (2013) state construction-specific CSR studies have primarily focused on issues such as corruption, community involvement, sustainable development, health and safety practice and the role of construction firms to alleviate poverty. Research by Petrovic-Lazarevic (2008) on the Australian construction industry showed that a company could be recognised as socially responsible when it applies a corporate governance structure taking into account working environment issues, improve their sustainability, occupational health and safety measures, relationship with suppliers and commitment to a local community engagement. There is an urgent need for the application of CSR in the construction industry because

different sectors in the industry are publicly viewed as irresponsible about adverse social effects of high carbon emissions, resource exploitation and disturbance on environments (Lin et al., 2018). With an increased level of public awareness and knowledge about the impact of construction projects on society and individuals lives, the investigation of construction social impacts has become a priority research topic among scholarly communities.

This review paper aims to explore the issues around the implementation of SS in the construction industry, identify gaps and provide an agenda for research in the construction industry context. The review covers two major sectors in the construction industry, namely building construction and heavy and civil engineering construction. This review includes an analysis of seven themes frequently cited in the relevant literature, namely (1) existing definitions, (2) theoretical foundations, (3) key stakeholders involved in the implementation of SS, (4) relevant policies and guidelines, (5) barriers (6) drivers of SS implementation, and (7) assessment criteria to develop a framework used to benchmark the construction industry social impacts.

## 2 Background and research gap: Social sustainability

### 2.1 Social sustainability origin

Despite its long history in literature and industry dating back to two centuries ago (Bakić et al., 1820), SS continues to be an unclear concept with no universal definition or assessment guideline (McGuinn et al., 2020). Traditionally, SS in most policies, government documents, industry reports and academic literature is considered as one of three key pillars (i.e., environment, economy, and society). At the start of the twenty-first century, there was still a lack of conceptualization and assessment approaches to social sustainability. Thus, this concept had little implicit meaning (McGuinn et al., 2020). Today, SS is a wide-ranging, multifaceted concept with an underpinning quest to find out the social goals of any sustainable development (Bouzguenda et al., 2019). The investigation of SS has been on the agenda of scholars from various disciplines, including construction (Valdes-Vasquez and Klotz, 2013), aviation (Kumar and Anbanandam, 2019), manufacturing (Berlin et al., 2013, Brent and Labuschagne, 2006), the health sector (Khan et al., 2018), supply chain management (Mani et al., 2015, Benoit-Norris et al., 2012, Ehr Gott et al., 2011, Govindan et al., 2020, Hutchins and Sutherland, 2008), urban planning (Manzi et al., 2010, Landorf, 2011), business management (Ajmal et al., 2018), and waste management and resource recovery (Hossain et al., 2018, Lu et al., 2019). Recently, in each of these disciplines, policymakers have started to develop an assessment framework to measure and improve the implementation of SS in the relevant industry practices and businesses management strategies.

### 2.2 Social sustainability in the construction industry

Social sustainability in the context of the construction industry was first defined in the 1990s when Hill and Bowen (1997) urged the stakeholders to consider social principles of sustainable construction and provided one of the earliest definitions for SS. The definition describes SS as the way of improving the quality of human life, making provisions for social self-determination and cultural diversity, implementing skills training and capac-

ity improvement of disadvantaged people, seeking intergenerational equity and seeking equitable allocation of construction social costs and benefits (Hill and Bowen, 1997). This definition has been the foundation of many policies, theoretical models, and SS assessment guidelines. However, a major issue in studies on construction social impacts is the lack of comprehensive, compatible, and widely applicable definition (Almahmoud and Doloi, 2015, Alotaibi et al., 2019) serves to indicate what SS means to the stakeholders of the construction industry.

### 2.3 Research gap

Previous studies have addressed several aspects of sustainability in the construction industry with emphasis on the evolution of the scope and methodologies used for environmental assessment and the allocation of the on-site work phases (Alencar et al., 2020), management for sustainability in construction projects and drivers of sustainable construction (Kiani Mavi et al., 2021), examination of the environmental and social dimensions of sustainability (Misopoulos et al., 2019), and study the validity and reliability of the indices used to quantify sustainable performance in the construction sector (Othman and Nadim, 2010). It is observed that most of the literature provide a broader context of sustainability with less focus specifically on the SS. Zou et al. (2012) has attempted to explore the social sustainability issues in the construction sector with a particular focus on how social performance is measured in construction projects. However, this individual study has not put forward a comprehensive insight into universal challenges and opportunities and the latest trends regarding the implementation of SS across the globe. Hence, a critical analysis of these pieces of literature serves to build a pathway for researchers as well as policymakers to develop a social sustainability assessment throughout the life cycle of construction projects.

**Table 1** Keywords and their variations used in data acquisition

No	Main term/target	Other variations / extended target
1	Construction industry	Construction projects, construction social impacts
2	Social sustainability	Barriers, issues, enablers, drivers, socially sustainable development, socially responsive, socially responsible
3	Social sustainability assessment	Assessment framework/criteria, cultural diversity, traffic, equity, employment, ecological impacts, community engagement, health and safety, quality of life, security, training and education, cultural heritage, infrastructure provision and access, end of life responsibility, social life cycle assessment
4	Related to seven themes	Definitions, stakeholders (builders, community, government, manufacturer, and client/customer) policies, guidelines,

### 3 Materials and methods

#### 3.1 Data acquisition

The study employs a structured qualitative content analysis to collect data on the issues related to SS in the construction industry. This approach was inspired by ‘Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) described by Moher et al. (2009) and five key phases and eight steps outlined by Denyer and Tranfield (2009). The goal is to understand how SS is and should be considered in construction activities. The main search keywords and their variations (Table 1) were generated based on the researchers’ expertise and included assessment framework/criteria, stakeholders, social procurement, construction industry and social impacts. The additional keywords were added to the search pool as the critical review progressed.

The main research databases, Scopus and Web of Science, were used to identify relevant research outputs. The review was conducted between June to November 2020. The following selection criteria were adopted to select studies with the most relevance to the objectives:

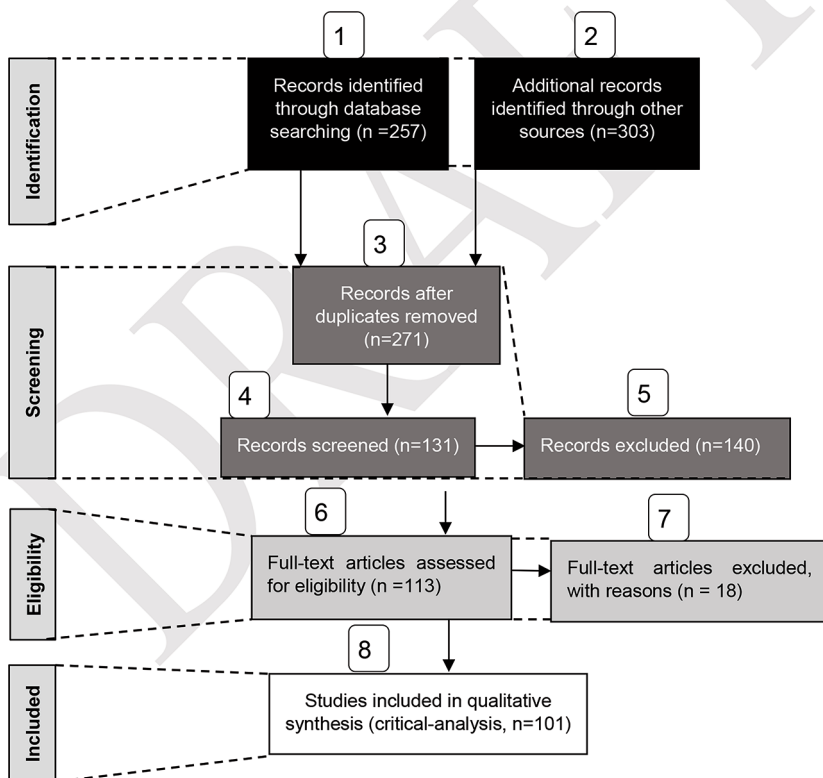


Fig. 1 PRISMA flow diagram. Source: adapted from Moher et al., (2009, p. 8)

(1) Studies published recently in English to reflect the current conditions of the industry and regulatory landscape;

(2) Studies based on interview/survey or focus group methods (or review of these studies) with key stakeholders of the construction industry or closely relevant industries; and.

(3) Studies with a focus on understanding stakeholders' perceptions on barriers and drivers on SS implementation in the construction industry.

A critical search was conducted on the most recent literature (Fig. 1); this resulted in 257 research outputs (Step 1) which then increased to 303 through the identification of other sources (i.e. journal articles, conference papers, books, and reports) referenced in the initial research outputs (Step 2). The duplicates were removed (Step 3), and the most relevant research for SS was considered. Finally, after removing duplicates and applying the inclusion and exclusion criteria, 101 publications were selected for the review. The reasons for exclusions in step 7 (Fig. 1) include issues such as the inapplicability of information to the context of the construction industry. The selection process is presented in the PRISMA flow chart in Fig. 1, and the analysis of the key literature was undertaken in two stages of descriptive analysis and thematic analysis.

## 4 From data to findings

### 4.1 Descriptive findings

In terms of types of research publications, most sources had been published in the form of a journal article, followed by reports and guidelines. The reports and guidelines were issued by various public authorities and industry associations and were publicly available

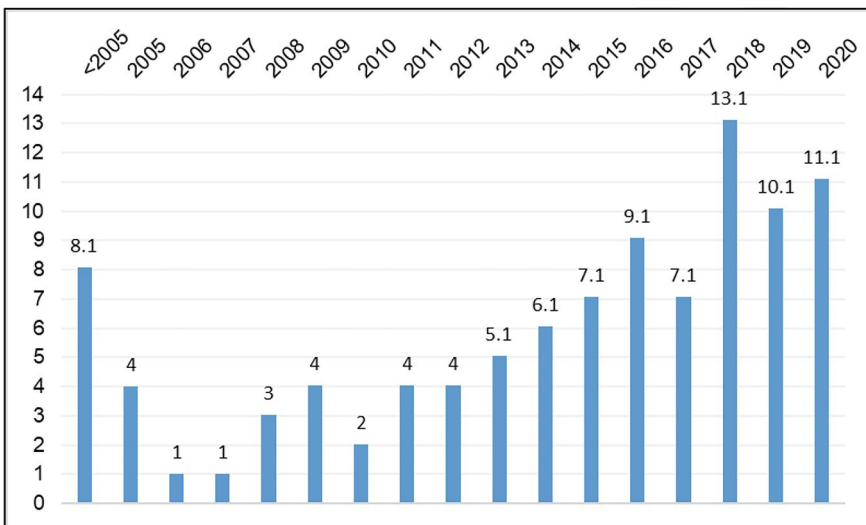


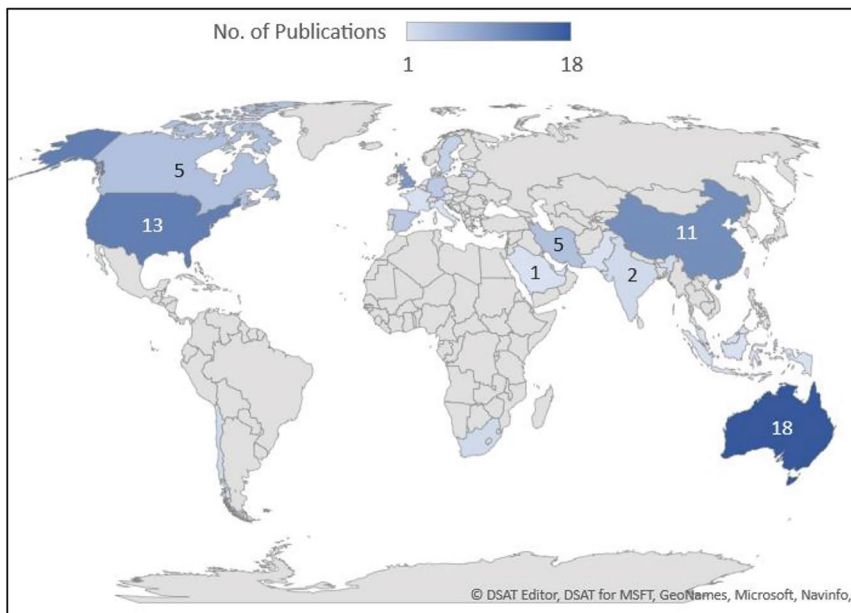
Fig. 2 Distribution of the year of publication of research outputs reviewed in this study Source: Authors.

on the worldwide net. Of the 101 outputs selected for the review were, 71 journal articles, 13 conference papers, eight books/book chapters, and nine guidelines and reports. As depicted in Fig. 2, more than 50% of the outputs reviewed were published in the last five years (2016–2020). This shows that the significance of SS in the construction industry has recently become apparent for policy makers and researchers.

In terms of the geographical location of the review publications, the largest number of studies were conducted in Australia, followed by that in the USA and China. Figure 3 illustrates the geographical presentation of research studies investigated on SS in the construction industry.

## 4.2 Thematic findings and discussion

Aligned with the review scope, the findings of qualitative content analysis are presented under the seven key themes that are widely investigated in SS studies. These include (1) definition of SS; (2) theoretical foundation of SS studies; (3) stakeholders and their interaction with SS issue, (4) SS policies and guidelines, (5) SS assessment, and (6) barriers towards the adoption of SS, and (7) SS drivers in the construction industry. These seven themes were developed based on the literature survey and bibliometric analysis of the selected literature (Table 2). Each of themes were identified at least in 52% (i.e. 52 / 101) of the literature reviewed.



**Fig. 3** Visual presentation of the geographical distribution of research outputs on SS in the construction industry. Source: Authors

**Table 2** Frequency distribution of the major themes identified in the selected literature

Theme	Frequency distribution (%) - ( $N_t=101$ )
Definition	65
Theoretical foundation of SS studies	52
Stakeholders	81
Policies and guidelines	73
Assessment of SS	61
Barriers	76
Drivers	70

$N_t$  = total number of the selected literature

Source: Authors.

#### 4.2.1 Definition of social sustainability

To be able to improve SS in the construction industry, the first step is to clarify what SS means. To date, several definitions of SS are provided, and no consensus has been accomplished in providing a universal definition. This review identified the history of defining SS dates back to the 1990s when Hill and Bowen (1997) urged the construction industry stakeholders to consider social principles of sustainable construction and provided one of the earliest definitions for SS. Since then, several researchers have attempted to define this concept in broader terms and from different perspectives. Their differences primarily root in the conceptual variations caused by stakeholders' perspectives, different issues to be addressed and the phase of the project lifecycle (Valdes-Vasquez and Klotz, 2013, Ahmad and Thaheem, 2017).

Literature analysis reveals that there are two schools of thought about the definition of SS; one stresses the necessity of a universal SS definition, while the other one suggests a pluralism in the definition according to contextual factors. Landorf (2011) reported the definitional ambiguity and fragmented approaches to SS, and Almahmoud and Doloi (2015) further elaborated the issue by indicating that SS involves subjective attributes that are influenced by complex social values and different stakeholders. One study in Sweden found that in projects, there is no common definition of SS among clients of construction, but its definition is underpinned by their contribution to improving SS in construction projects (Miree and Toryalay, 2016). Furthermore, Colantonio (2009) indicated that in SS research, authors derive their own definition based on discipline-specific criteria or study perspective, and this makes obtaining a universal definition difficult.

Conversely, some believe that variations in SS definitions is appropriate and preferred to a universal definition (McKenzie, 2004, Bouzguenda et al., 2019). This line of reasoning has a long history where Lehtonen (2004) specified that "different geographical and temporal scales, as well as situational contexts, require their own frameworks, which do not necessarily provide a coherent picture, but a mosaic of partly contradicting views of reality" (p. 211). By and large, it can be argued that the concept of SS is neither absolute nor a constant. Instead, it is a dynamic notion that changes over time and context (Dempsey et al., 2011). The study identified 14 definitions from key authors (Table 3).



**Table 3** Various definitions suggested for SS

Ref.	Definition	No. citations
Missimer et al. (2017)	In a socially sustainable society, people are not subject to structural obstacles to health, influence, competence, impartiality, and meaning-making	178
Almahmoud and Doloi (2015)	SS is reflected through meeting and managing the needs of the sectors different stakeholders.	66
Partridge (2014)	A socially sustainable society is just, equitable, inclusive, and democratic and provides a decent quality of life for current and future generations	14
Bacon and Caistor (2014)	A process for creating sustainable and successful places.	2
Surbeck and Hilger (2014)	The social, societal, and human engagement, impact and vulnerabilities in a project.	7
Valdes-Vasquez and Klotz (2013)	An engagement between employees, clients, local communities, and the supply chain.	212 24
Gates and Lee (2005)	SS is made up of three components, i.e. basic needs, individual or human capacity and social or community capacity	4
Littig and Griessler (2005)	SS is given if work within a society and the related institutional arrangements satisfy an extended set of human needs.	880
McKenzie (2004)	The life-enhancing condition and a process within communities.	936
Barron and Gauntlett (2002)	SS occurs when formal and informal processes, systems, structures, and relationships actively support the capacity of future generations to create healthy and livable communities.	51
Polèse et al. (2000)	Development that is compatible with the harmonious evolution of civil society.	537
Sachs (1999)	SS includes achieving a fair degree of social homogeneity, equitable income distribution, and equitable access to resources.	331
Hill and Bowen (1997)	SS is the way of improving the quality of human life, making provisions for social self-determination and cultural diversity.	682

Source: Authors

#### 4.2.2 Theoretical foundations of social sustainability

Social sustainability has been described as the “weakest pillar of sustainable development” (Brent and Labuschagne, 2006). It is argued that this has been the result of the lack of analytical and theoretical foundations (Zuo et al., 2012). Several researchers have theorized SS to provide a pathway for improving SS in different contexts, including the construction industry. The existing frameworks and models are underpinned by various premises that are directly or indirectly related to affected societies. Table 4 provides a summary of these

**Table 4** Summary of SS-driven theoretical framework and models

Source	Theoretical framework/model	Description
Govindan et al. (2020)	A conceptual framework	It is developed to address sustainability tensions along with drivers, issues, barriers, and practices
Hossain et al. (2018)	SS grading (SSG) model,	The SSG model was proposed based on the UNEP/SETAC guidelines published in 2009 (UNEP/SETAC, 2009) and the methodological sheets published in 2013 UNEP (2013).
Wang et al. (2018)	Multilayered Social Network Analysis based Conceptual Framework	Based on the framework, effective operational methods can be derived to measure and analyze the working relationships.,
Eizenberg and Jabareen (2017)	Conceptual Framework of Social Sustainability	The model consists of urban form, equity, safety and eco-presumption.
Awale and Rowlinson (2014)	Creating Shared Value (CSV): competitiveness conceptual framework	The aim of the framework is to assist construction firms in implementing the CSV concept and evaluating their competitiveness in terms of business success and future growth and development.
Doloi (2012)	Social Sustainability Three subsystems	<b>Economic system:</b> the monetary economic activities in the project. <b>Political system:</b> it consists of political attitudes, orientations, decisions, and activities implemented by different institutes. <b>Cultural system:</b> includes all culture-related practices and patterns of the society.
Brent and Labuschagne (2006)	Social Impact Indicator	This model focuses on the four main social criteria, namely internal human resources, external population, macro social performance, and stakeholder participation.
Hill and Bowen (1997)	A practical framework for the attainment of sustainable development	There are four pillars of sustainable construction, i.e. social, economic, biophysical and technical. The social 'pillar' of sustainable construction is based on the notion of equity or social justice.

Source: Authors

frameworks and models. Eizenberg and Jabareen (2017) proposed a conceptual framework for SS with the aim of protecting people irrespective of their demographic factors (i.e. origin, culture, colour, and socio-economic status). This framework consists of four components: equity, safety, urban form and eco-presumption. In this framework, equity (justice) aims to reduce the alienation of communities from their living spaces, and hence enhance their concern with environmental issues, this premise is underpinned by three dimensions including redistribution, recognition and participation; safety is concerned with the people's

rights of protection and secureness in conditions of vulnerability, the concept of urban forms proposes that physical dimensions of people living spaces are necessary for the attainment of SS, mitigating environmental risks and improving people's health and well-being through various concepts and activities including compactness, mixed land uses, diversity, clean energy, passive solar design, greening, sustainable transport, and renewal and unitization; and eco-presumption deals with risk-mitigating efforts that aim to reduce the source of factors inducing climate change such as greenhouse gas emissions.

\_ENREF\_38Govindan et al.'s (2020) analysis of the literature shows that the most frequently used theories in SS studies include stakeholder theories, transaction cost economics theory, grounded theory, agency theory, paradox theory, and resource-based view theory. Their review showed that about 70% of studies had not applied any theory to their data, and about 20% used multiple theories, such as Jensen et al. (2012), who used both transition theory and ecological modernization theory to investigate SS in Danish buildings. In 2016, Boyer et al. (2016) proposed five approaches to integrate SS in sustainable development as (1) a stand-alone pillar; (2) a constraint to other pillars; (3) the foundation for the other dimensions; (4) a causal mechanism of environmental and economic change; and (5) place-based, process-oriented, and fully integrated concept or idea. Table 4 summarizes the examples of theories/models used in SS studies.

The review of theoretical foundations of SS studies allows for comparing and understanding the magnitude of differences and similarities in interpreting data obtained from the investigation of SS implementation in the construction industry. Such a comparison also underpins the decision to select and further develop an adequate theoretical framework that aims to navigate future research and policy development.

#### 4.2.3 Stakeholders and their interaction with social sustainability

To better understand how SS practices should be planned and exercised in the construction industry, the key stakeholders who have a decisive role in the process of SS implementation are to be identified. Identification of stakeholders is also of particular importance from a stakeholder management standpoint because inefficient communication and collaboration between stakeholders could put the achievement of desired sustainability outcomes at risk (Zhang et al., 2019, Doloi, 2012). Furthermore, decision making about social aspects depends on the stakeholders' viewpoints involved as well as on the contexts of application (Sierra et al., 2016).

The term stakeholders are used to designate all individuals or groups who are directly and/ or indirectly involved in the selected scales and beyond and whose lives, environment or business are affected by construction projects (Edum-Fotwe and Price, 2009). It is noteworthy to know that SS might be interpreted differently among various stakeholders (Watts et al., 2015), which could result in disagreements, confusion and undesirable sustainability outcome. Watts et al. (2015) reported that while public sectors clients and builders have the same motivation for participation in the SS schemes, there are fundamental differences in the definition of applicable SS activity, the understanding of how SS is reached, and the support from fellow organizational staff. Furthermore, impact categories are defined to determine stakeholders' impact on SS.

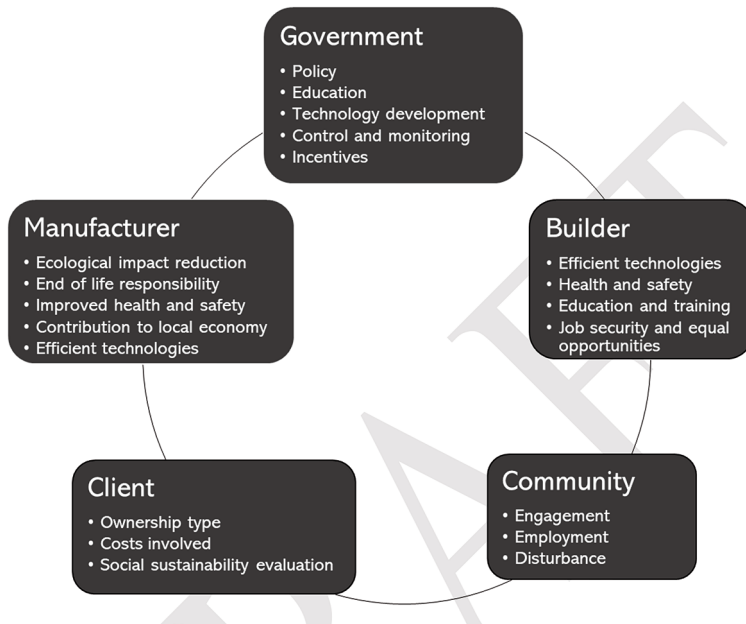
To date, several studies have investigated the stakeholders and corresponding impact categories in the occurrence of SS in the industry (Brent and Labuschagne, 2006, Herd-

Smith and Fewings, 2008, Hossain et al., 2018, Goel et al., 2020). Edum-Fotwe and Price (2009) suggested fivefold stakeholders' classification, which includes those that make the decision, those that facilitate decisions, those that are affected by the decision, those that are affected by the sustainability issues, and building stakeholders. According to this classification, the authors identified 29 stakeholders, directly and indirectly, involved in the sustainability assessment of construction projects (Edum-Fotwe and Price, 2009). Ma (2011) divided construction stakeholders into three simple groups: interested (e.g. local communities), involved (contractors/clients/suppliers), and committed (e.g. investors). Almahmoud and Doloi (2015) considered three major stakeholders in assessing SS: industry, user, neighbours. A review by Govindan et al. (2020) showed that SS drivers in the construction industry include pressure from stakeholders such as government and middle management from construction firms and community, the commitment of top management, collaboration with suppliers, client value, and the competitive advantages of being sustainable. It is often argued that pressure from stakeholders is a powerful force as it is served to make business organizations aware of sustainability concepts leading to the adoption of such practices (Mani et al., 2015, Golicic et al., 2020).

In an attempt to address the issues around SS, Brent and Labuschagne (2006) proposed a model that suggests that two of the three categories of issues are related to internal stakeholders and external stakeholders. Internal and external stakeholders are those who work in the construction sector and those who are affected by a construction project, respectively. In another research (Herd-Smith and Fewings, 2008), the main stakeholders were reported to be employees, local communities, clients and supply chain, and it was argued that this is their interaction that guarantees SS. In a joint effort between the United Nations Environment Programme (UNEP) and the Society of Environmental Toxicology and Chemistry (SETAC) to develop a lifecycle initiative, UNEP/SETAC (2009) developed guidelines for social life cycle assessment of products (Martínez-Blanco et al., 2015). UNEP/SETAC (2009) defines five stakeholder categories employees, society, local community consumers, and value chain actors. In 2018, Hossain et al. (2018) proposed five categories based on the 2009 UNEP/SETAC framework: producer, employees, the general public, society and government, and traders of materials.

In terms of impact categories, studies proposed a different list of categories. In 2008, Jørgensen et al. (2008) suggested four S-LCA impacts can be categorised into four groups of factors: 'human rights', 'labour practice and decent work conditions', 'society', and 'product responsibility'. In 2009, UNEP/SETAC's initiative linked stakeholders and decision-makers' interest with social impact factors and proposed six impact categories: human rights, working conditions, health and safety, cultural heritage, governance, and socio-economic repercussions (UNEP/SETAC, 2009). Hossain et al. (2018) identified 30 impact factors in relation to stakeholders' categories ranging from health and safety issues to technology development, fair competition and biodiversity. The survey results indicated five 'very important' categories are ensuring the health and safety of the products by the producers, the health and safety of the workers of the relevant industries, the company's commitment to sustainability, and energy and water consumption.

From the literature review and policy analysis, it was found that government, builders, clients, manufacturers, and communities are the major stakeholders in SS in the construction projects (Fig. 4).



**Fig. 4** Major construction industry stakeholders with respect to SS implementation Source: Authors.

Below, the role of each stakeholder in planning, development, and implementation of SS in the construction industry is explored in turn.

Government is most likely to have the main role in SS development in the construction industry. The government, through its policy-making power, incentives, education, technology development and statutory power to control and monitor the sustainability performance of construction-related businesses, could ensure that public construction projects are completed while social requirements are met. A survey study found that among five impact categories (i.e. commitment to sustainability, contribution to economic development, technology development and support from the government) linked to the government role in supporting SS in the construction (Hossain et al., 2018), commitment to sustainability, is very important. Governments policies and guidelines related to development practices have recently been used to promote SS in different industries, including the construction industry. In Australia, some state and territory governments have incorporated sustainable procurement guidelines in their procurement processes requiring government organizations to consider social benefits when awarding contracts (Shoostarian et al., 2020b). Such policies have proven to have improved SS in the construction industry in Spain (Reverte, 2015), Chile and Colombia (UNEP, 2013). Government incentives are a popular tool to encourage construction related businesses to increase SS adoption (Mani et al., 2015). These incentives can be provided in different forms, including tax rebates, monetary enticement, extending property rights, motivational programs, and long-term partnership initiatives. Previous research mostly reported the positive role of the government in the adoption of SS in various industries (Karji et al., 2019, Golcic et al., 2020, Sancha et al., 2015). Karji et al. (2019) reported that among all the stakeholders since city development plan rules are imposed by

the government codes in the first place, the role of the government is central to the pursuit of sustainability. Government pressure, along with consistent community and consumer pressure, is found to increase SS implementation in supply chain activities (Golicic et al., 2020). However, some studies indicate that government pressure does not meaningfully impact the adoption of SS (Ehrgott et al., 2011, Alotaibi et al., 2019).

The builders' category covers builders, sub-contractors and sole traders. There is evidence that builders acknowledge SS in construction-related activities (Watts et al., 2015, Jensen et al., 2012, Huang et al., 2017). A study in Australia reported that builders consider health and safety, education, job security and equal opportunities the most important SSPIs (Zuo et al., 2012). Builders are the major practitioners of construction activities; they need to balance the expectations of different stakeholders to be socially responsible firms (Huang et al., 2017, Zhang et al., 2019). Several research studies have investigated the motivation of builders to participate in SS (Watts et al., 2015, Almahmoud and Doloi, 2015). A study of the UK's builders' motivation of following SS objectives was to give back to society and to continue winning public works (Watts et al., 2015). A review by Zhang et al. (2019) identified six motivations for construction firms for SS implementation: financial benefits, branding, reputation and image, relationship building, organizational culture, and strategic business direction. Builders also have an important role in improving SS through the utilisation of efficient technologies that will have a positive impact on traffic congestion, security, health and safety, ecological impacts, and end of life responsibility. However, not all builders are willing to adopt new technologies due to a range of reasons, including additional costs, lack of expertise, and awareness about new technologies. A study in Denmark showed that professional builders are slow in the adoption of new technologies as there was a lack of knowledge to demand such products (Jensen et al., 2012).

Client as the owners of construction projects has a significant influence on the implementation of SS in the construction industry. According to Edum-Fotwe and Price (2009), clients are classified in the primary stakeholder category who directly influence or are affected by the major issues of sustainability in construction projects. The three major types of project ownership include a public, private, and public-private partnership. In an exploratory study on the Australian construction industry, Zuo et al. (2012) found that project owners see the cost involved in implementing activities related to SS as the biggest barrier to improving SS performance in the industry. However, this might be different in the case of public sector clients, where they actively promote the adoption of SS in construction projects (Watts et al., 2015). Hence, if construction firms wish to win public works, they have to produce evidence that not only do they have SS strategies in place, but that these strategies are in alignment with those of the client (Snider et al., 2013). The complexity of assessing SS measures have hindered the compliance of clients in following SS objectives. Hence, several studies (Staniškienė and Stankevičiūtė, 2018, Hutchins and Sutherland, 2008, Ahmad and Thaheem, 2017) have proposed various assessment frameworks to facilitate measuring progress towards SS.

The community is considered an external stakeholder of construction projects. Local communities link with the SS of construction projects is best evident in their engagement, the economic contribution such as the possibility of employment in the project and disturbances that occur during the construction phase. Local communities are the important stakeholders of construction projects and must be taken into consideration throughout the design, planning and construction lifecycle (Valdes-Vasquez and Klotz, 2013, Goel et al.,

2020). Notably, in public works, it is highly recommended that communication between decision-makers and communities be made to prevent project failures, to create value concerning public opinions and to identify and address issues (Jami and Walsh, 2017). The impact of construction projects on surrounding communities has to be estimated in relation to where users live, work, play and engage in cultural activities (Valdes-Vasquez and Klotz, 2013). Hence, collecting, evaluating, and incorporating community input into each phase of the project life is required based on the development of community relations programs such as public hearings, which ensures its effective implementation (Montalbán-Domingo et al., 2018). When communities are involved in a transparent decision-making process, they are more likely to have their needs and preferences reflected in the overall solution (Valdes-Vasquez and Klotz, 2013). Community experts suggest that despite these social benefits may be intangible to other stakeholders such as clients and builders, they are equally important as economic and environmental ones (Hammer, 2009). Almahmoud and Doloï (2015) suggested that neighbourhood communities benefit from building construction projects in their area because it offers social interaction within their vicinity, and these interactions can lead to economic benefits. Such a project will eventually add to the economic stock and infrastructure of the neighbourhood community.

Manufacturers and suppliers of construction materials and structures are important actors in construction-related supply chains. Manufacturing industry through production/supplying of materials and services (e.g. distribution method) with minimum ecological impacts (e.g. less production of GHG), using efficient technologies, improvements in employees' and community's health and safety (e.g. prefabricated components), contribution to the local economy (collaboration with local suppliers), end of life responsibility (reducing waste during manufacturing/supplying) serve SS objectives. In literature, government financial and regulatory support is deemed to be necessary for manufacturers to move towards SS (Hossain et al., 2018); that might be the reason why some studies have shown that SS is less important than economic perspectives among manufacturing industry professionals (SO SMART, 2014) although awareness of these topics is found to be high.

#### 4.2.4 Social sustainability policies and guidelines

At the highest level, SS is considered in the UN's global indicator framework for Sustainable Development Goals (SDG). The SDGs consist of 17 main goals (dimensions) and 169 targets, measured through 232 individual SSPIs (McGuinn et al., 2020). Of the 17 specified goals, goals 3, 4, 5, 8, 10 and 16 directly deal with SS (Table 5). Social procurement aims to deliver additional social benefits and generate social value in local communities. This can be done by specifying products that their procurement supports fair trade or getting project owners to deal with businesses and suppliers that employ disadvantaged and marginalized groups (Loosemore and Denny-Smith, 2016). Social procurement initiatives are the government means to create and stimulate the market for target minorities and social purpose businesses, with the aim of diversifying their supply chains leading to achieving economic and social values (Furneaux and Barraket, 2014). McCrudden (2004) indicated that the use of public procurement to put social policies into effect has a long history in countries such as the USA or the UK. Table 5 presents some of the policies and guidelines that outline SS requirements in general terms and/or specific to the construction industry.

**Table 5** SS-related policies and guidelines that are applicable to the construction industry

Title	Ref	Context	Social sustainability requirements
2017 UN Sustainable Development Goals	UN (2017)	Global – United Nation	• Goal 1, 3, 4, 5, 8, 10 and 16.•
2017 European Pillar of Social Rights (EPSR)	The European Parliament (2017)	Europe- European Union	• The EPSR contains 20 key principles and rights structured into three categories: (1) equal opportunities and access to the labour market, (2) fair working conditions, and (3) social protection and inclusion.
2020 EU Sustainable Development Indicator Set (EU SDIS)	EURO-STAT (2020)	Europe- European Union	• 52 SSPIs set for appraisal of social sustainability•
2018 Sustainable Procurement Guide	Australian Government (2018)	Australia- Federal government	• It considers social impacts such as labour conditions in the manufacture, use and disposal of goods or delivery of services.♣
Engineers without Borders (EWB-USA) Principles of Development	EWB'S USA (2009)	USA	• Community Driven– “each program has a well-defined community that has requested assistance. •
2017 Guidelines of Sustainable Infrastructure for Chinese International Contractors (SIG)	SIG (2018)	China	• The Guidelines offer a five-pronged approach to SS with 94 SSPIs.♣

Source: Authors

The analysis of guidelines and policies related to SS reveals that the significance of the social dimension of construction projects has been increasingly recognized by policymakers in different contexts. These policies will pave the way for the development and implementation of regulations that will mandate the consideration of social issues in construction projects.

#### 4.2.5 Social sustainability performance indicators (SSPI)

To ensure that the social aspect is considered in the sustainability equation of the construction project, an assessment framework containing multiple SSPIs needs to be developed. Such a framework should streamline the evaluation of social requirements in a construction project. Sierra et al. (2018) claimed that the criteria used to assess SS in construction projects had not been clearly established, and in most cases, only a limited number of social aspects are considered. Furthermore, each study tends to include those factors that are most relevant to the project context. For instance, Xiahou et al. (2018) proposed indicators such



as patient satisfaction, healthcare and disease prevention, development of medical technologies and education, emergency healthcare serviceability for hospital construction projects. Another study in the context of rural areas listed context-specific factors such as sanitary conditions in toilets and livestock, cleanliness and stability of the water supply, level of disaster preparedness planning and education, level of cooperation with experts and professionals (Wan and Ng, 2018).

However, several researchers have proposed an assessment framework and subordinate SSPIs that are more applicable to a broader range of construction projects. For instance, Valdes-Vasquez and Klotz (2013) developed 50 SSPIs within six clusters of stakeholder engagement, user's consideration, team formation, management considerations, impact assessment, and place contexts. In this study, 14 factors that are widely cited in the literature are selected and explored below in turn (Table 6). These 14 criteria are deemed to be the most relevant SS measures to apply to the construction industry. The investigation of the listed criteria is practical, while different perspectives of SS in construction projects could be achieved. Furthermore, using SSPIs allows for cross-comparison studies where a large portion of the list is shared by various SS studies. A cross-comparison of the studies that proposed a checklist of SSPIs were conducted, and Table 6 shows to what extent the previous studies considered the assessment criteria list proposed in this study.

In total, 21 studies were identified in which various SSPIs were suggested; the number of SSPIs ranges from 9 (Pocock et al., 2016) to 50 (Valdes-Vasquez and Klotz, 2013). While some of these indicators might overlap with environmental and economic dimensions domains, their application outcome aligns with the focus of SS in the construction industry. In SS studies, several scholars have recommended the prioritization of SSPIs (Benoit-Norris et al., 2012, Garrido et al., 2018, Zanchi et al., 2018). The reason for such a recommendation is that quantification of the social impact is complex, time-consuming, expensive and at times unrelated to a particular case (Hossain et al., 2018). Among the SSPIs, traffic with five frequencies and health and safety considerations with 18 references are the least and most widely cited SSPIs in the reviewed literature, respectively.

Adequate traffic management is essential to make sure the local traffic is safe for road users. The practices that fall into this SSPI includes a change in speed limits and the provision of directional information to facilitate traffic and minimize confusion and accidents. Interrupted traffic can cause stress and anxiety for drivers and commuters, and excess levels may have physical health impacts (Nadrian et al., 2019, Levy et al., 2010).

According to multiple definitions for SS, it should facilitate a decent quality of life for current and future generations (Partridge, 2014, Barron and Gauntlett, 2002, Hill and Bowen, 1997). In the context of the construction industry, a sustainable construction project should address not only social concerns for end-users but also considerations such as the project's impact on the local community and the safety, health, and education of employees, which in turn they will improve both long-term project performance and the quality of life for those affected by the project (Valdes-Vasquez and Klotz, 2013). Hill and Bowen's first principle of SS framework in construction projects requires the industry practitioners to seek to 'improve the quality of human life by ensuring secure and adequate consumption of basic needs, which are food, clothing, shelter, health, education, and beyond that by ensuring comfort, identity and choice' (Hill and Bowen, 1997, p. 227).

Socially sustainable construction projects need to assess the ecological impacts of the project at design, planning and construction phases due to the significance of the envi-

**Table 6** The major SSPIs applicable to the construction projects

No. Reference	No. of factors	Traffic	Quality of life	Eco-logical impacts	Health & safety	Training & education	Security	Cultural diversity	Economic contribution	Equity	Employment	Cultural heritage	Infrastructure provision & access	Community life	End of life responsibility
1 Govindan et al. (2020)	30	×	✓	×	✓	✓	×	✓	×	✓	✓	×	×	×	✓
2 Rostamnezhad et al. (2020)	34	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×
3 Goel et al. (2020)	48	×	×	✓	✓	✓	✓	✓	×	✓	✓	✓	×	✓	×
4 Rivai and Rohman (2020)	22	✓	✓	×	✓	×	×	×	✓	×	✓	✓	✓	✓	×
5 Fatouhehi and Zarghami (2020)	17	×	✓	✓	✓	✓	×	×	×	×	×	✓	✓	✓	×
6 Karji et al. (2019)	33	×	✓	✓	✓	✓	×	×	×	✓	✓	✓	✓	✓	×
7 Zhang et al. (2019)	33	×	✓	✓	✓	✓	×	×	✓	✓	✓	×	✓	✓	×
8 Hendiani and Bagerpour (2019)	70	×	✓	×	✓	✓	×	×	×	✓	✓	×	×	✓	×
9 Hossain et al. (2018)	42	×	✓	✓	✓	✓	×	×	✓	✓	✓	✓	✓	×	✓

Table 6 (continued)

No. Reference	No. of factors	Traffic	Quality of life	Eco-logical impacts	Health & safety	Training & education	Security	Cultural diversity	Economic contribution	Equity	Employment	Cultural heritage	Infrastructure provision & access	Community engagement	End of life responsibility
10 Mon-talban-Domingo et al. (2018)	19	✓	×	✓	✓	✓	✓	✓	×	✓	✓	✓	×	✓	×
11 Xiahou et al. (2018)	18	×	✓	✓	✓	✓	×	×	✓	×	✓	×	✓	×	✓
12 Wan and Ng (2018)	22	×	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	×
13 Ahmad and Thaheem (2017)	39	✓	✓	×	✓	×	×	×	×	×	×	✓	✓	✓	×
14 Abdel-Raheem and Ramsbottom (2016)	10	×	✓	×	×	✓	×	✓	×	✓	×	✓	×	✓	✓
15 Pooock et al. (2016)	9	×	✓	✓	✓	×	×	×	✓	×	✓	✓	×	✓	×
16 Sierra et al. (2016)	36	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	×

Table 6 (continued)

No.	Reference	No. of factors	Traffic	Quality of life	Eco-logical impacts	Health & safety	Training & education	Security	Cultural diversity	Economic contribution	Equity	Employment	Cultural heritage	Infrastructure provision & access	Community engagement	End of life responsibility
17	Almahmoud and Doloi (2015)	20	x	√	√	√	√	√	x	√	√	√	√	√	x	x
18	Valdes-Vasquez and Klotz (2013)	50	√	√	√	√	√	√	√	x	x	x	√	√	x	x
19	Zuo et al. (2012)	13	√	√	√	√	√	√	√	√	√	√	√	√	x	x
20	UNEP/SETAC (2009)	31	x	√	x	√	x	x	x	√	√	√	√	x	√	√
21	Shen et al. (2007)	17	x	√	√	√	x	√	x	x	x	√	√	√	√	x

Source: Authors.

ronment to current and future societies. Globally, ecological impact assessment has now become an integral requirement of tender processes in public construction projects (Montalbán-Domingo et al., 2018). In SS research, ecological impacts typically entail sustainable land use where the construction project team needs to ensure that project land sites protect cropland and natural resources (Ahmad and Thaheem, 2017, Fatourehchi and Zarghami, 2020). Furthermore, this criterion is concerned with the conservation of energy, resources and saving in GHG emissions (Zhang et al., 2019).

The responsibility of provision of personal safety and protection equipment is debatable; while some employees are expected to provide them, others believe this is the responsibility of an employer (Zuo et al., 2012). However, the provision of safety imperatives such as signage, safety barriers, and communication of hazards is by law the direct responsibility of employers. This is of particular importance as not all employees are aware of unique conditions in each construction site. Employers also could set higher health and safety requirements at construction works than what they are enforced to by legal obligations. Through SSPIs, practices such as monitoring weather conditions, providing fresh water, site induction, safety barriers, permitting reasonable breaks, and working hours as contributors to SS in the construction industry are assessed. Montalbán-Domingo et al. (2018) analysis of 451 tendering documents for public-work procurement analysed in 10 countries showed that health and safety are the main social criteria.

Training and education opportunities should be provided to employees for their skills and awareness enhancement and professional development (Hossain et al., 2018, Montalbán-Domingo et al., 2018). Participants in a study in Australia (Zuo et al., 2012) commented that the more trained and educated people are more valuable to businesses related to the construction industry. Training and education are the main components of almost all SS assessment frameworks. Notably, Karji et al. (2019) stressed the significance of training local labourers, which further improves the SS of construction projects.

Security in SS is twofold. For those who are involved in construction activities and business, job security is a critical SSPI in the profit-driven construction industry. It is found that job security not only reduces stress but also can improve employees life quality (Zuo et al., 2012). For external stakeholders, local community security means that no threat is posed by the construction site and or the final product to those who live, use or communicate around it (Zuo et al., 2012). This can be achieved in planning and design phases by minimizing hiding places and maximizing light exposure.

The second principle of SS framework in construction projects proposed by Hill and Bowen (1997) states that the industry people should 'make provision for social self-determination and cultural diversity in development planning, and ensure that the operation of development (after the construction process is complete) is compatible with local human institutions and technology' (Hill and Bowen, 1997, p. 227). Cultural diversity and traditions are also included or suggested to be included in several sustainable development specific guidelines and frameworks as a substantive SS goal (McGuinn et al., 2020, The European Parliament, 2017).

SS often means the economic development of a society and individuals. Omann and Spangenberg (2002) contend that sustainable economic growth is deemed to be central to creating employment opportunities, which, in turn, meets one or more components of SS objectives. Almahmoud and Doloi (2015) indicated that each construction project fuels market through a continuous and long process from project planning through to demolition.

According to the authors' argument, the economic contribution is quantified based on the number of jobs and investment opportunities created, the number of materials produced locally, and the level of improved capacity of the local infrastructure.

Equality in the construction industry is related to the industry workplace issues and providing equal opportunities to the affected individuals and communities to use built environments. Equity in the workplace is considered to be an important matter, according to several research studies (Zuo et al., 2012, Almahmoud and Doloi, 2015), and it primarily deals with confidence insufficiency and effective choices to reduce the gap between different groups of people and preserve opportunity and capabilities for the future generation (Doloi, 2012). In the business world context, equity is linked to equal job opportunities, health and safety, training and learning, and professional growth (Ajmal et al., 2018).

Employment which is an important social criterion, faces some social issues due to the nature of the construction industry that engages the workforce through subcontracting and increasing casualization and self-employment (Montalbán-Domingo et al., 2018). A powerful tool in addressing the issues in construction employment is social procurement policies that serve to enforce a series of employment requirements for both procuring organisations and suppliers (Petersen and Kadefors, 2016).

Cultural heritage is part of the history of societies, and replacement of these assets leads to losing communities' cultural backgrounds as well as upsetting their beliefs and values. In many countries, their assets are regulated by legal obligations (Conejos et al., 2016). Any construction project should ensure that the heritage value of existing cultural relics and intangible cultural heritage is maintained (Wan and Ng, 2018). The objective of SSPIs is to encourage the feeling of respect toward the communities and to protect unrenovable cultural assets, which are crucial elements for current and future human development (Abdel-Raheem and Ramsbottom, 2016). However, under certain circumstances, cultural heritage sites may be deemed as a hindrance to the progress of a construction project. In the planning stage, proper care must be taken to make sure that the development of adequate infrastructure is contemplated for current and future needs (Almahmoud and Doloi, 2015). SSPIs also represents the issues around individual urban mobility between built environments, such as disruptions in pathways and lack of convenient access for disabled users (Sierra et al., 2018, Thomopoulos and Grant-Muller, 2013).

Effective community engagement practices are reported to have a positive impact on SS (Bouzguenda et al., 2019). Notably, it is maintained that communication between decision-makers and communities has been established to avoid public projects failures (Montalbán-Domingo et al., 2018). Missimer et al. (2017) conceptualize community engagement as a quantifiable indicator for SS. For instance, it can be measured based on the participation level in a collective decision-making process, which further could be linked to social justice, or the level of trust and satisfaction. Rostamnezhad et al. (2020) analyzed the application of 34 SSPIs on a highway case project and found that considering community concerns and perceptions is the most important construction social indicator.

Different to the linear approach where the materials are made, used, and disposed of, in the circular economy thinking, waste is a resource regardless of the end of its service life. Therefore, to improve the SS of construction projects, waste materials can be reused, recycled and even upcycled according to the hierarchy model of waste management and resource recovery (Shooshtarian et al., 2019). This criterion receives significant support

from policies that promote sustainability in businesses, such as extender producer responsibility, product stewardship, and polluters pay principle (Shooshtarian et al., 2020b).

### 4.3 Barriers to social sustainability adoption in the construction industry

Previous literature has identified the major barriers to the implementation of SS. As tabulated in Table 7, these include the lack of financial support from the government (Shooshtarian et al., 2020a), limited availability of bank loans for supporting sustainability-related activities (Govindan et al., 2020), the complexity in the quantification of SS measures (Montalbán-Domingo et al., 2018), perceived high costs of SS implementation (Alotaibi et al., 2019), lack of education and awareness (Zuo et al., 2012) and the tendency to main current practices (Lu et al., 2019).

Sustainability in the construction industry may not be achieved without the commitment of the government. For instance, Ametepey et al. (2015) opined that, since the government is a key stakeholder in the construction industry, it has to play a major role such as providing the enabling environment for effective implementation of sustainable construction. Further, to improve the sustainability of the built environment, there are additional costs that could increase initial capital costs. Thus, it would be difficult to get loans from banks or other financial institutions. Due to the lack of tools to appropriately quantify the social sustainability in construction, stakeholders may perceive the cost of SS implementation as very high.

### 4.4 Enablers of social sustainability adoption in the construction industry

Following the identification of barriers towards the adoption of SS in the construction industry, this section explores the main enablers that serve to increase SS uptake and minimize

**Table 7** Major barriers towards implementing SS in the construction industry

No.	Barrier	Ref.
1	Ambiguity in the definition of SS	Karji et al. (2019), Almahmoud and Doloi (2015)
2	Lack of government support	Shooshtarian et al. (2020a), Jiang and Wong (2016)
3	Limited availability of financial resources	Govindan et al. (2020), Zuo et al. (2012)
4	Complexity in measuring SS	Montalbán-Domingo et al. (2018), Sutherland et al. (2015), Jiang and Wong (2016), Rostamnezhad et al. (2020)
5	Perceived high costs of SS implementation	Zuo et al. (2012), Lu et al. (2019), Alotaibi et al. (2019), Abdel-Raheem and Ramsbottom (2016)
6	Lack of education and knowledge	Zuo et al. (2012), Montalbán-Domingo et al. (2018), Lu et al. (2019), Alotaibi et al. (2019), Watts et al. (2015), Abdel-Raheem and Ramsbottom (2016)
7	Resistance to change	Lu et al. (2019), Govindan et al. (2020)

Source: Authors

the impact of barriers. Overall, the literature review identified ten enablers that are found to have a significant influence on SS in construction projects (Table 8). The list of enablers builds on the recommendations provided in a study conducted by Mani et al. (2015) in the field of supply chain management. Many of the enablers are the product of the direct influence of stakeholders, including government, clients, investors, regulatory bodies, employee unions, entrepreneurs and social organizations on the implementing SS.

As discussed in the previous sub-section, the lack of SS awareness is one of the barriers to the implementation of SS. Nonetheless, raising stakeholders' awareness regarding the importance of SS can be considered as an enabler. Further, providing incentives for companies that implemented SS in the AEC industry can be considered as one of the enablers. For example, while evaluating contractors' bids, an additional score can be provided to contractors that have implemented SS. Hence, the inclusion of SS criteria as one of the evaluation criteria can increase competitiveness among contractors and suppliers. Besides, government regulation can put pressure on the stakeholders to implement SS in the AEC industry.

**Table 8** Enablers to increase SS adaption in the construction industry

Source: Authors

This extensive literature shows that SS is not recognised as an important managerial aspect of construction projects in the current AEC climate. However, due to the significant social impacts and a large number of stakeholders involved, the AEC industry needs to move towards socially sustainable projects in which the consideration of society becomes business as usual in planning, design and construction phases. Therefore, this study provides a framework for the assessment of SS in work practices of businesses operating with the AEC context. The framework can lend itself to developing policies that encourage socially sustainable construction projects

No	Enablers	Ref.
1	Awareness of SS and social concern	Mani et al. (2015), Lin et al. (2018), Zuo et al. (2012), Rostamnezhad et al. (2020)
2	Market pressure	Mani et al. (2015), Govindan et al. (2020), Zhang et al. (2019), Huang et al. (2017)
3	Client requirements	Mani et al. (2015), Ahmad and Thaheem (2017)
4	Direct and indirect incentives	Mani et al. (2015)
5	Ability to spend	Mani et al. (2015)
6	International certifications	Zhang et al. (2019), Mani et al. (2015), Govindan et al. (2020)
7	Investor pressure	Mani et al. (2015)
8	Easy to implement without resistance	Mani et al. (2015)
9	Regulatory compliance	Mani et al. (2015), Zhang et al. (2019)
10	Pressure from employee unions and social organizations	Mani et al. (2015), Govindan et al. (2020)



## 5 Conclusions

This review study analyses the literature on the application of SS in the construction industry. Several themes are identified. First, it is revealed that there is no universal definition for SS, with experts' opinions differing markedly. Second, the theoretical foundations of SS are analysed, and its representation through the literature is reviewed. Third, five key stakeholders with a direct impact on SS implementation are identified. These are client, government, manufacturer, builder and community. Fourth, SS specific national, regional, and international policies and guidelines vary widely in content and aims, revealing little standardization across the global common. Fifth, a list of SSPIs, including 14 criteria, are identified, with the potential to calibrate the extent to which construction projects are socially responsible. Sixth, an analysis of various barriers identified in the literature impeding the implementation of SS in construction projects are distilled into seven key barriers. Finally, to address these barriers and facilitate the adoption of SS within the construction industry, ten enablers are proposed.

In terms of the contribution to the body of knowledge in the field of building construction management and planning, this review study is significant in several ways. First, the review outcomes offer useful insights to decision-makers on effective approaches to construction project intervention that lift the benefits to impacted individuals, communities, and society as a whole. Second, the findings speak to the development of policies that aim to improve construction social impacts. Third, this study advances knowledge of SS through the development of a SS conceptual model that stands as a benchmark to progress SS implementation in construction projects. Finally, several research priorities are identified: (1) exploring the role of key stakeholders in implementing SS across various types of construction projects; (2) studying the feasibility of providing a comprehensive but specific definition of SS in the construction industry; (3) investigating links (both real and perceived) between SS measures and business performance; and (4) validating the conceptual model that is proposed in this study by further analyzing primary data.

**Funding** Open Access funding enabled and organized by CAUL and its Member Institutions

### Declarations

**Disclosure of potential conflicts of interest** There are no known conflicts of interest.

**Research involving Human Participants and/or Animals** Not applicable, the research does not involve human and/or animal subject

**Informed consent** Not applicable, the research does not involve human and/or animal subjects

**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

## References

- ABDEL-RAHEEM, M., & RAMSBOTTOM, C. (2016). Factors affecting social sustainability in highway projects in Missouri. *Procedia Engineering*, 145, 548–555
- AHMAD, T., & THAHEEM, M. J. (2017). Developing a residential building-related social sustainability assessment framework and its implications for BIM. *Sustainable Cities and Society*, 28, 1–15
- AJMAL, M. M., KHAN, M., HUSSAIN, M., & HELO, P. (2018). Conceptualizing and incorporating social sustainability in the business world. *International Journal of Sustainable Development & World Ecology*, 25, 327–339
- ALENCAR, L., ALENCAR, M., LIMA, L., TRINDADE, E., & SILVA, L. (2020). Sustainability in the construction industry: A systematic review of the literature. *Journal of Cleaner Production*, 125730
- ALMAHMOUD, E., & DOLOI, H. K. (2015). Assessment of social sustainability in construction projects using social network analysis. *Facilities*, 33, 152–176
- ALOTAIBI, A., EDUM-FOTWE, F., & PRICE, A. D. (2019). Critical barriers to social responsibility implementation within mega-construction projects: The case of the Kingdom of Saudi Arabia. *Sustainability*, 11, 1755
- AMETEPEY, O., AIGBAVBOA, C., & ANSAH, K. (2015). Barriers to successful implementation of sustainable construction in the Ghanaian construction industry. *Procedia Manufacturing*, 3, 1682–1689
- AUSTRALIAN GOVERNMENT 2018. Sustainable Procurement Guide Canberra, Australia Department of the Environment and Energy
- AWALE, R., & ROWLINSON, S. (2014). A conceptual framework for achieving firm competitiveness in construction: A'creating shared value'(CSV) concept. *Procs 30th Annual ARCOM Conference*, 1285–1294
- BACON, N., & CAISTOR, L. (2014). *Measuring Social Sustainability in Sutton*. London, UK: Sutton
- BAKIĆ, T. V., KOSTIĆ, S. C., & NEŠKOVIĆ, E. (2020). Model for managing corporate social responsibility. *Management*, 222, 47–56
- BARRON, L., & GAUNTLETT, E. (2002). Housing and sustainable communities indicators project: Stage 1 report—model of social sustainability. *WACOSS Housing and Sustainable Communities Indicators Project*
- BENOIT-NORRIS, C., CAVAN, D. A., & NORRIS, G. (2012). Identifying social impacts in product supply chains: overview and application of the social hotspot database. *Sustainability*, 4, 1946–1965
- BERLIN, C., DEDERING, C., JÓNSDÓTTIR, G. R., & STAHRÉ, J. (2013). Social sustainability challenges for European manufacturing industry: attract, recruit and sustain. IFIP International Conference on Advances in Production Management Systems, Springer, 78–85
- BOUZGUENDA, I., ALALOUCHE, C., & FAVA, N. (2019). Towards smart sustainable cities: A review of the role digital citizen participation could play in advancing social sustainability. *Sustainable Cities and Society*, 50, 1–15
- BOYER, R. H., ARORA, P. E. T. E. R. S. O. N. N. D., P., & CALDWELL, K. (2016). Five approaches to social sustainability and an integrated way forward. *Sustainability*, 8, 1–18
- BRENT, A., & LABUSCHAGNE, C. (2006). Social indicators for sustainable project and technology life cycle management in the process industry (13 pp + 4). *The International Journal of Life Cycle Assessment*, 11, 3–15
- CARROLL, A. B. (1991). The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders. *Business Horizons*, 34, 39–48
- COLANTONIO, A. Social sustainability: a review and critique of traditional versus emerging themes and assessment methods. In: HORNER, M., PRICE, A., BEBBINGTON, J. AND EMMANUEL, R., ed. SUE-Mot Conference 2009: Second International Conference on Whole Life Urban Sustainability and its Assessment: conference proceedings, 2009 Loughborough Loughborough University, 865–885
- CONEJOS, S., LANGSTON, C., CHAN, E. H., & CHEW, M. Y. (2016). Governance of heritage buildings: Australian regulatory barriers to adaptive reuse. *Building Research & Information*, 44, 507–519
- DAWUDU, A., AKINWOLEMIWA, B., & CHESHMEHZANGI, A. (2017). A conceptual re-visualization of the adoption and utilization of the Pillars of Sustainability in the development of Neighbourhood Sustainability Assessment Tools. *Sustainable Cities and Society*, 28, 398–410
- DEMPSEY, N., POWER, B. R. A. M. L. E. Y. G., S., & BROWN, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable Development*, 19, 289–300
- DENYER, D., & TRANFIELD, D. (2009). Producing a systematic review. In D. A. B. A. BRYMAN (Ed.), *The Sage handbook of organizational research methods*. Thousand Oaks, CA: Sage Publications Ltd. In:
- DOLOI, H. (2012). Assessing stakeholders' influence on social performance of infrastructure projects. *Facilities*, 30, 531–550

- EDUM-FOTWE, F. T., & PRICE, A. D. (2009). A social ontology for appraising sustainability of construction projects and developments. *International Journal of Project Management*, 27, 313–322
- EHRGOTT, M., REIMANN, F., KAUFMANN, L., & CARTER, C. R. (2011). Social sustainability in selecting emerging economy suppliers. *Journal of Business Ethics*, 98, 99–119
- EIZENBERG, E., & JABAREEN, Y. (2017). Social sustainability: A new conceptual framework. *Sustainability*, 9, 1–16
- EUROSTAT (2020). EU SDG Indicator set 2020. *Directorate E: Sectoral and Regional Statistics, Unit E-2: Environmental statistics and accounts; sustainable development*.
- EWB'S USA (2009). Principles of Development
- FATOUREHCHI, D., & ZARGHAMI, E. (2020). Social sustainability assessment framework for managing sustainable construction in residential buildings. *Journal of Building Engineering*, 32, 101761
- FURNEAUX, C., & BARRAKET, J. (2014). Purchasing social good (s): a definition and typology of social procurement. *Public Money & Management*, 34, 265–272
- GARRIDO, S. R., PARENT, J., BEAULIEU, L., & REVÉRET, J. P. (2018). A literature review of type I SLCA—making the logic underlying methodological choices explicit. *The International Journal of Life Cycle Assessment*, 23, 432–444
- GATES, R., & LEE, M. (2005). *Policy report social development*. Vancouver, Canada: City of Vancouver
- GLOBENEWSWIRE 2020. Global Construction Industry Report 2020: 40 + Market Segments, Opportunities in Top 100 Cities, and Risk Assessments. Dublin, Ireland
- GOEL, A., GANESH, L., & KAUR, A. (2020). Social sustainability considerations in construction project feasibility study: a stakeholder salience perspective. *Engineering, Construction and Architectural Management*
- GOLICIC, S. L., LENK, M. M., & HAZEN, B. T. (2020). A global meaning of supply chain social sustainability. *Production Planning & Control*, 31, 988–1004
- GOVINDAN, K., SHAW, M., & MAJUMDAR, A. (2020). Social sustainability tensions in multi-tier supply chain: a systematic literature review towards conceptual framework development. *Journal of Cleaner Production*, 123075
- HAMMER, J. (2009). Development that adds up: Accounting for the social bottom line of triple bottom line investment. *College of Urban and Public Affairs, Portland State University*
- HENDIANI, S., & BAGHERPOUR, M. (2019). Developing an integrated index to assess social sustainability in construction industry using fuzzy logic. *Journal of Cleaner Production*, 230, 647–662
- HERD-SMITH, A., & FEWINGS, P. (2008). The implementation of social sustainability in regeneration projects: Myth or reality. *Royal Institution of Chartered Surveyors (RICS), London*
- HILL, R. C., & BOWEN, P. A. (1997). Sustainable construction: principles and a framework for attainment. *Construction Management & Economics*, 15, 223–239
- HOSSAIN, M. U., DONG, P. O. O. N. C. S., LO, Y. H., I. M., & CHENG, J. C. (2018). Development of social sustainability assessment method and a comparative case study on assessing recycled construction materials. *The International Journal of Life Cycle Assessment*, 23, 1654–1674
- HUANG, C., LU, W., LIN, T., & WU, E. (2017). The current conditions of CSR implementation in construction industry: A lesson from Taiwan. *Applied Ecology and Environmental Research*, 15, 67–80
- HUTCHINS, M. J., & SUTHERLAND, J. W. (2008). An exploration of measures of social sustainability and their application to supply chain decisions. *Journal of Cleaner Production*, 16, 1688–1698
- JAMI, A. A., & WALSH, P. R. (2017). From consultation to collaboration: A participatory framework for positive community engagement with wind energy projects in Ontario, Canada. *Energy Research & Social Science*, 27, 14–24
- JENSEN, J. O., JØRGENSEN, M. S., ELLE, M., & LAURIDSEN, E. H. (2012). Has social sustainability left the building? The recent conceptualization of “sustainability” in Danish buildings. *Sustainability: Science, Practice and Policy*, 8, 94–105
- JIANG, W., & WONG, J. K. (2016). Key activity areas of corporate social responsibility (CSR) in the construction industry: a study of China. *Journal of Cleaner Production*, 113, 850–860
- JØRGENSEN, A., BOCQ, L. E., NAZARKINA, A., L., & HAUSCHILD, M. (2008). Methodologies for social life cycle assessment. *The International Journal of Life Cycle Assessment*, 13, 96–103
- KARJI, A., WOLDESENBET, A., KHANZADI, M., & TAFAZZOLI, M. (2019). Assessment of Social Sustainability Indicators in Mass Housing Construction: A Case Study of Mehr Housing Project. *Sustainable Cities and Society*, 50, 101697
- KHAN, M., AJMAL, M., HUSSAIN, M., & HELO, P. (2018). Barriers to social sustainability in the health-care industry in the UAE. *International Journal of Organizational Analysis*
- KIANI MAVI, R., GENGATHAREN, D., & KIANI MAVI, N. (2021). HUGHES, R., CAMPBELL, A., & YATES, R. Sustainability in Construction Projects: A Systematic Literature Review. *Sustainability*, 13(4), 1932

- KUMAR, A., & ANBANANDAM, R. (2019). Development of social sustainability index for freight transportation system. *Journal of Cleaner Production*, 210, 77–92
- LANDORF, C. (2011). Evaluating social sustainability in historic urban environments. *International Journal of Heritage Studies*, 17, 463–477
- LEHTONEN, M. (2004). The environmental–social interface of sustainable development: capabilities, social capital, institutions. *Ecological economics*, 49, 199–214
- LEVY, J. I., BUONOCORE, J. J., & VON STACKELBERG, K. (2010). Evaluation of the public health impacts of traffic congestion: a health risk assessment. *Environmental Health*, 9, 65
- LIN, X., HO, C. M., & SHEN, G. Q. (2018). Research on corporate social responsibility in the construction context: A critical review and future directions. *International Journal of Construction Management*, 18, 394–404
- LITTIG, B., & GRIESSLER, E. (2005). Social sustainability: a catchword between political pragmatism and social theory. *International Journal of Sustainable Development*, 8, 65–79
- LOOSEMORE, M., & DENNY-SMITH, G. (2016). Barriers to indigenous enterprise in the Australian construction industry. *Management*, 2, 629–638
- LU, J. W., XIE, Y., XU, B., HUANG, Y., HAI, J., & ZHANG, J. (2019). From NIMBY to BIMBY: An evaluation of aesthetic appearance and social sustainability of MSW incineration plants in China. *Waste Management*, 95, 325–333
- MA, U. (2011). *No waste: managing sustainability in construction*. Ltd: Gower Publishing
- MANI, V., AGRAWAL, R., & SHARMA, V. (2015). Social sustainability in the supply chain: analysis of enablers. *Management Research Review*, 38, 1016–1042
- MANZI, T., JONES, L. U. C. A. S. K., T. L., & ALLEN, J. (2010). *Social sustainability in urban areas: Communities, connectivity and the urban fabric*. Routledge
- MARTEK, I., HOSSEINI, M. R., SHRESTHA, A., EDWARDS, D. J., & DURDYEV, S. (2019). Barriers inhibiting the transition to sustainability within the Australian construction industry: An investigation of technical and social interactions. *Journal of Cleaner Production*, 211, 281–292
- MARTÍNEZ-BLANCO, J., QUIROS, I. N. A. B. A. A., VALDIVIA, A., MILÀ-I-CANALS, S., L., & FINKBEINER, M. 2015. Organizational LCA: the new member of the LCA family—introducing the UNEP/SETAC Life Cycle Initiative guidance document. Springer
- MCCRUDDEN, C. (2004). *Using public procurement to achieve social outcomes*. Wiley Online Library
- MCGUINN, J., FRIES-TERSCH, E., JONES, M., CREPALDI, C., MASSO, M., KADARIK, I. ... GENY, B. (2020). *Social Sustainability: Concepts and Benchmarks*. Luxembourg, Belgium: Policy Department for Economic, Scientific and Quality of Life Policies
- MCKENZIE, S. (2004). Social sustainability: towards some definitions. *Working Paper Series No 27*. Adelaide, Australia Hawke Research Institute, University of South Australia
- MIREE, I., & TORYALAY, A. (2016). *Operationalization of Social Sustainability in the Construction Industry from a Client Perspective, How the concept of social sustainability in the construction industry is defined and communicated by Skanska's proposed clients?*. Master's: Chalmers University of Technology
- MISOPOULOS, F., MANTHOU, V., & MICHAELIDES, Z. (2019). Environmental and Social Sustainability in UK Construction Industry: a Systematic Literature Review. *European Journal of Economics and Business Studies*, 5(1), 100–115
- MISSIMER, M., ROBERT, K.-H., & BROMAN, G. (2017). A strategic approach to social sustainability—Part 1: exploring the social system. *Journal of Cleaner Production*, 140, 32–41
- MOHER, D., ALTMAN, L. I. B. E. R. A. T. I. A. T. E. T. Z. L. A. F. F. J., D. G., & GROUP, P. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS med*, 6, e1000097
- MONTALBÁN-DOMINGO, L., GARCÍA-SEGURA, T., SANZ, M. A., & PELLICER, E. (2018). Social sustainability criteria in public-work procurement: An international perspective. *Journal of Cleaner Production*, 198, 1355–1371
- MURRAY, M., & DAINTY, A. (2013). *Corporate social responsibility in the construction industry*. Routledge
- NADRAN, H., KHAZAEI-POOL, T. A. G. H. D. I. S. I. M. H. P. O. U. Y. E. S. H. K., M., & BABAZADEH, T. (2019). “I am sick and tired of this congestion”: Perceptions of Sanandaj inhabitants on the family mental health impacts of urban traffic jam. *Journal of Transport & Health*, 14, 100587
- OTHMAN, A. A. E., & NADIM, W. (2010, November). Towards establishing an international sustainability index for the construction industry: a literature review. In Proceedings of the First International Conference on Sustainability and the Future, the British University in Egypt, Cairo (pp. 23–25)
- OMANN, I., & SPANGENBERG, J. H. (2002). Assessing Social Sustainability The Social Dimension of Sustainability in a Socio-Economic Scenario
- PARTRIDGE, E. (2014). Social sustainability. Encyclopaedia of Quality of Life and Wellbeing Research, 6178–6186

- PETERSEN, D., & KADEFORS, A. (2016). Social procurement and employment requirements in construction. *Management*, 2, 1045–1054
- PETROVIC-LAZAREVIC, S. (2008). The development of corporate social responsibility in the Australian construction industry. *Construction Management and Economics*, 26, 93–101
- POCOCK, J., STECKLER, C., & HANZALOVA, B. (2016). Improving socially sustainable design and construction in developing countries. *Procedia Engineering*, 145, 288–295
- POLÈSE, M., STREN, R. E., & STREN, R. (2000). *The social sustainability of cities: Diversity and the management of change*. University of Toronto Press
- REVERTE, C. (2015). The new Spanish corporate social responsibility strategy 2014–2020: A crucial step forward with new challenges ahead. *Journal of Cleaner Production*, 91, 327–336
- RIVAI, F., & ROHMAN, M. (2020). A framework for mapping stakeholders interests related social sustainability in residential building. IOP Conference Series: Materials Science and Engineering, IOP Publishing, 012003
- ROSTAMNEZHAD, M., NASIRZADEH, F., KHANZADI, M., JARBAN, M. J., & GHAYOUMIAN, M. (2020). Modeling social sustainability in construction projects by integrating system dynamics and fuzzy-DEMATEL method: a case study of highway project. *Engineering, Construction and Architectural Management*, 27, 1595–1618
- SACHS, I. (1999). *Social sustainability and whole development: exploring the dimensions of sustainable development*. London, UK: Zed Books
- SANCHA, C., LONGONI, A., & GIMÉNEZ, C. (2015). Sustainable supplier development practices: Drivers and enablers in a global context. *Journal of Purchasing and Supply Management*, 21, 95–102
- SHEN, L. Y., LI HAO, J., TAM, V. W. Y., & YAO, H. (2007). A checklist for assessing sustainability performance of construction projects. *Journal of Civil Engineering and Management*, 13, 273–281
- SHOOSHTARIAN, S., MAQSOOD, T., KHALFAN, M., WONG, S. P., & YANG, J. R. (2019). Managing construction and demolition (C&D) waste in Australia. *CIB World Building Congress 2019 'Constructing Smart Cities'*. Hong Kong, China: Faculty of Construction and Environment, The Hong Kong Polytechniques University
- SHOOSHTARIAN, S., MAQSOOD, T., KHALFAN, M., YANG, J. R., & WONG, S. P. P. (2020a). Landfill levy imposition on construction and demolition waste. *Australian stakeholders' perceptions Sustainability*, 12, 1–15
- SHOOSHTARIAN, S., MAQSOOD, T., WONG, P. S., & KHALFAN, M. (2020b). Market development for a construction and demolition waste stream in Australia. *Journal of Construction Engineering*, 3, 220–231
- SIERRA, L. A., PELLICER, E., & YEPES, V. (2016). Social sustainability in the lifecycle of Chilean public infrastructure. *Journal of Construction Engineering and Management*, 142, 05015020
- SIERRA, L. A., YEPES, V., & PELLICER, E. (2018). A review of multi-criteria assessment of the social sustainability of infrastructures. *Journal of Cleaner Production*, 187, 496–513
- SIG (2018). Guidelines of Sustainable Infrastructure for Chinese International Contractors In: ASSOCIATION, C. I. C. (ed.). China
- SNIDER, K. F., HALPERN, B. H., RENDON, R. G., & KIDALOV, M. V. (2013). Corporate social responsibility and public procurement: How supplying government affects managerial orientations. *Journal of Purchasing and Supply Management*, 19, 63–72
- SO SMART 2014. Socially Sustainable Manufacturing for the Factories of the Future Coordination and Support and Action
- STANIŠKIENĖ, E., & STANKEVIČIŪTĖ, Ž. (2018). Social sustainability measurement framework: The case of employee perspective in a CSR-committed organisation. *Journal of Cleaner Production*, 188, 708–719
- SURBECK, C. Q., & HILGER, H. (2014). Social sustainability and important indicators in infrastructure. World Environmental and Water Resources Congress 2014. 2078–2093
- SUTHERLAND, V., GLASS, M. C. T. I. E. R. A., A., & MCGREGOR, A. (2015). *Analysis of the impact and value of community benefit clauses in procurement*. University of Glasgow: Training & Employment Research Unit (TERU)
- THE EUROPEAN PARLIAMENT. (2017). *European Pillar of Social Rights – booklet, Belgium*. The European Parliament
- THOMOPOULOS, N., & GRANT-MULLER, S. (2013). Incorporating equity as part of the wider impacts in transport infrastructure assessment: an application of the SUMINI approach. *Transportation*, 40, 315–345
- UN (2017). Sustainable Development Goals. United Nation
- UNEP. (2013). Sustainable Public Procurement: a Global Review. In O'Rourke, A., L. Charlotte, T. Bowden, F. Yaker and C. A. Enmanue (Eds.), *United Nations Environmental Program*. New York, US: United Nations, ISBN: 978-92-807-3332-7

- UNEP/SETAC. (2009). *Guidelines for social life cycle assessment of products*. UNEP/SETAC Life-Cycle Initiative. Paris, France
- VALDES-VASQUEZ, R., & KLOTZ, L. E. (2013). Social sustainability considerations during planning and design: framework of processes for construction projects. *Journal of Construction Engineering and Management*, 139, 80–89
- WAN, L., & NG, E. (2018). Evaluation of the social dimension of sustainability in the built environment in poor rural areas of China. *Architectural Science Review*, 61, 319–326
- WANG, H., ZHANG, X., & LU, W. (2018). Improving social sustainability in construction: conceptual framework based on social network analysis. *Journal of Management in Engineering*, 34, 05018012
- WATTS, G., DAINTY, A., & FERNIE, S. (2015). Making sense of CSR in construction: Do contractor and client perceptions align. Proceedings of the 31st Annual ARCOM Conference, Lincoln, UK, 7–9
- XIAHOU, X., TANG, Y., YUAN, J., LIU, C. H. A. N. G. T., P., & LI, Q. (2018). Evaluating social performance of construction projects: An empirical study. *Sustainability*, 10, 2329
- ZANCHI, L., DELOGU, M., ZAMAGNI, A., & PIERINI, M. (2018). Analysis of the main elements affecting social LCA applications: challenges for the automotive sector. *The International Journal of Life Cycle Assessment*, 23, 519–535
- ZHANG, Q., OO, B. L., & LIM, B. T. H. (2019). Drivers, motivations, and barriers to the implementation of corporate social responsibility practices by construction enterprises: A review. *Journal of Cleaner Production*, 210, 563–584
- ZUO, J., JIN, X. H., & FLYNN, L. (2012). Social sustainability in construction—an explorative study. *International Journal of Construction Management*, 12, 51–63

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.