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Perspective and Practices of Social Sustainability across Construction Project Lifecycle

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Abstract

Previous research has suggested incorporating social sustainability into the construction project lifecycle. However, the understanding and means of incorporating social sustainability practices throughout the project lifecycle remain unclear. Therefore, the purpose of this paper is to fill a knowledge gap by investigating the "real experiences" and "perspectives" of industry practitioners on social sustainability practices throughout the construction project lifecycle. The study began with a literature review to identify social sustainability attributes, which were then confirmed through structured interviews with 15 practitioners, and the data were then analysed thematically. The practitioners unanimously agreed that the social sustainability attributes could be divided into nine (9) main attributes along with the 20 sub-attributes, namely: 1) safety and health; 2) impact assessment; 3) employment; 4) stakeholder involvement; 5) satisfaction; 6) quality education; 7) social procurement; 8) protection design/belonging; and 9) human right. The practitioners have positioned the nine main social sustainability attributes into the different phases of the construction project lifecycle, based on actual practices in their projects and their professional opinion on the subject matter. Stakeholder Involvement shows the largest gap for improvement (31.7%), followed by the attributes of Worker Health and Safety (23.3%), Protection of Cultural Heritage (21.7%), and Social Procurement (21.7%). Findings from this study would benefit the industry stakeholders in incorporating social sustainability at different phases of the construction project lifecycle. The framework gives a comprehensive understanding of social sustainability that can be utilized to enhance construction project planning and sustainable development. The novelty also lies in the consolidation of social sustainability attributes for practitioners in construction that could act as a reference for any future developments related to social sustainability in construction.

Keywords: Construction, perspective, practices, project lifecycle, social sustainability

1.0 INTRODUCTION

Sustainable construction is often described from the point of three main sustainable pillars: economic, environmental, and social sustainability (SS) from the context of construction projects (World Commission on Environment and Development, 1987). Numerous researchers have highlighted the advantages of sustainable construction, including reduced construction time, lower construction costs, improved quality, improved architectural appearance, improved occupational health and safety, reduced construction site waste, decreased environmental emissions, and decreased energy and water consumption (Wang et al., 2018). Thus, the practice of sustainable construction should incorporate all three pillars of sustainability without neglecting any, in meeting the objective of sustainability.

Recently, there has been increased pressure for construction projects to be more socially responsible (Mavi et al., 2021). As construction projects are known to affect and be affected by the diverse interests and demands from various dynamic stakeholders, integrating SS into the construction project is crucial for the benefit of the broader group of stakeholders (Aaltonen & Kujala, 2016). Nevertheless, SS should cover all the phases of a project lifecycle through planning, design, construction, and operation in order to fully comply with the stakeholders' demands. However, profound insights into integrating SS practices in the project lifecycle remain elusive (Mavi et al., 2021). Typically, there are stakeholders at the receiving end of a project lifecycle that has to frequently deal with the consequences from the decisions made by internal stakeholders at the front end of the lifecycle (Atanda, 2019). Existing SS research has been criticised for advocating static views, rather than the dynamic perspective of stakeholders (Aaltonen & Kujala, 2016). The current process creates isolation among the stakeholders, resulting in a lack of understanding of social sustainability, thus negatively influencing the end product (Lin et al., 2017).

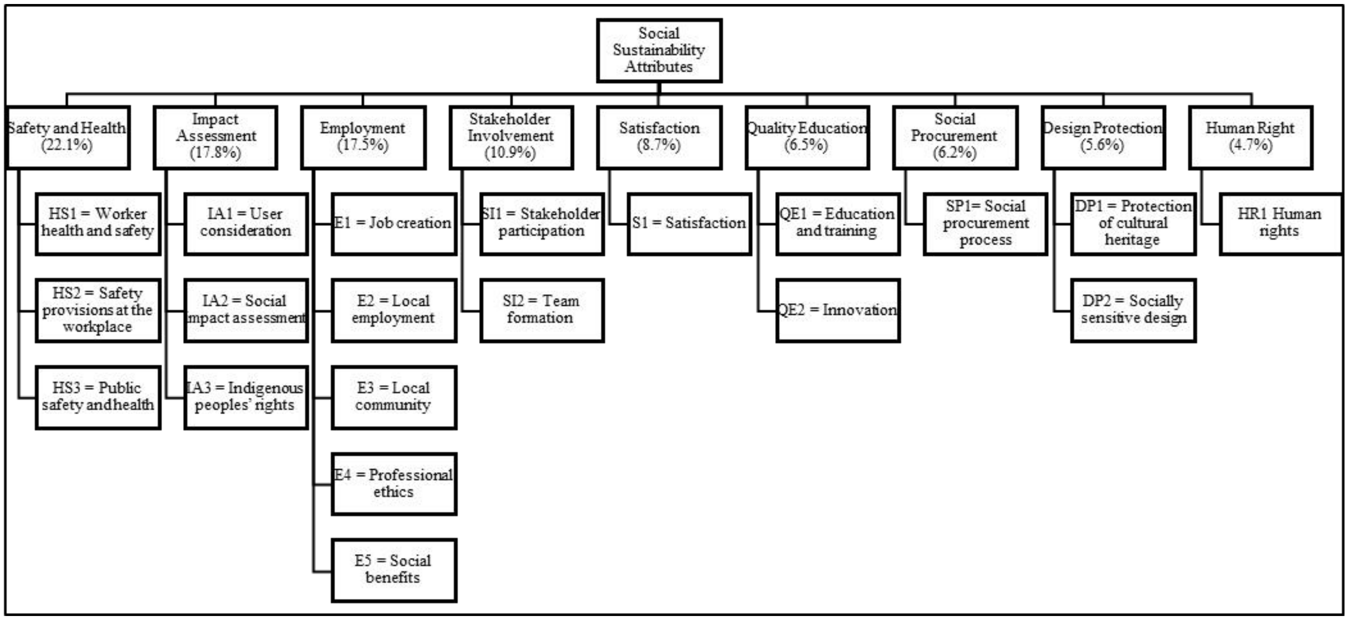
Thus, this study intends to establish the related SS attributes across the construction project lifecycle based on "real experiences" and "perspective" from construction industry practitioners. This study begins with the establishment of the SS attributes that have been developed from the literature review (LR), where the respondents were requested to comment on the main and sub-SS attributes, to identify the most significant practices of SS in construction projects. Further on, the respondents were asked to identify the construction project lifecycle phases that necessitate the embedment of the SS attributes, based on their past or current real project experiences and their professional opinion on the subject matter. Within this study, the following questions were answered: "What are the gaps of SS attributes between practices and perspective of the practitioner?" and "how the SS attributes should be prioritised across the different phases of the construction project lifecycle?" The results of the review can be of interest to practitioners as well as decision-makers, where it supports the implementation of appropriate SS attributes towards sustainable development. The subsequent findings from this study would benefit the industry stakeholders in orientating and deciding on incorporating SS at different phases of the construction project lifecycle. New evidence is added to the current field of study based on real experience/ practices of social sustainability, as well as the perspectives of SS across the project lifecycle.

2.0 LITERATURE REVIEW

2.1 Social Sustainability Attributes across Construction Project Lifecycle

Social sustainability refers to the 'people' dimension of sustainable development (Goel et al., 2020). Accordingly, SS is widely perceived as improving people's well-being and quality of life (Valdes-Vasquez & Klotz, 2013; Zuo et al., 2012). Research efforts were made to construct the fundamental knowledge of SS, as the means to facilitate the implementation of SS in construction projects (Lin et al., 2017). However, the conceptualisation of SS in construction projects that aims at achieving the objectives of sustainable development is contentious, all the more so when viewed in the perspectives of various stakeholders and projects (López-Concepción et al., 2022). Furthermore, most of the studies on SS in construction projects have been selective, in regards to the choice of case studies as well as projects (Gatti et al., 2013), without adequate considerations given to the stakeholders responsible on the aspect of SS throughout the construction project lifecycle. Ideally, more comprehensive and inclusive SS attributes need to be considered for construction projects across the different project lifecycle. The notion is to work towards establishing such SS attributes. Figure 1 depicts summaries of the nine main SS attributes, as well as 20 sub-attributes, that were derived from literature review (LR) involving various construction projects. Safety and Health is the most dominant attribute, whilst Human Rights is the least acclaimed attribute for social sustainability. The main attributes were determined based on the number of articles that have highlighted the relevant attributes in the papers. From the findings (Figure 1), most attention was given to Safety and Health (Rostamnezhad et al., 2020), followed by Impact Assessment (Goel et al., 2020), Employment (Almahmoud & Doloi, 2020), Stakeholder Involvement (Hendiani & Bagherpour, 2019), Satisfaction (Karji et al., 2019), Quality Education (Hendiani & Bagherpour, 2019), Social Procurement (Loosemore & Reid, 2019), Design Protection (Mulholland et al., 2019), and Human Right (Almahmoud & Doloi, 2020).

The top main attribute, Safety and Health (SH), considers employees' (SH1) and publics' (SH3) health and well-being by providing safe and healthy workplace and its surrounding. Additionally, it seeks to forecast catastrophic events to decrease hazards to construction workers on the job, such as having safety plan and training (SH2). Impact Assessment (IA) is the second most frequently mentioned main attribute, which aims to increase the mobility, access, and liveability of communities (IA1). Impact mitigation strategies are required to minimise disruptions to the public (IA2) caused by factors such as construction procedures, especially when project locations are within the proximity of public amenities (hospital, school, etc.), in order to ensure the public's efficiency and convenience. Sub-attribute IA3 is concerned with the rights and impact of the project on the indigenous population. This is to avoid any impact from the project that may adversely affect the indigenous people's way of life. The third main attribute, Employment (E) intends to contribute to new employment opportunities (E1), local job availability (E2), employment of disadvantaged groups, and engagement with small and medium-sized businesses. In order to avoid potential conflicts between local and migrant employees (E3), the attribute includes also the percentage of locally hired workers and the expenditures spent on locally sourced suppliers. However, scholars often ignore this issue, having the minimum score of 1.8%. The ethical components of work growth (E4) and employee social benefit programmes (E5), which include company automobiles, meal allowances, and subsidized cell phones, are most significant under the Employment main attribute. The fourth main attribute, Stakeholder Involvement (SI), encourages engagement among internal and external stakeholders in the decision-making process (SI1) and instils a sense of gratitude for their positive contribution to team development (SI2). The fifth main attribute, Satisfaction (S), intends to improve the net quality of life for all stakeholders affected by the project and to mitigate adverse impacts to the public (S1). The sixth essential characteristic is "Quality Education" (QE). It strives to improve employees' skills by expanding access to high-quality education and increasing opportunities for lifelong learning (QE1). Additionally, as a result from the project's lesson learned, further development of innovative technical solutions (QE2) aimed at improving employees' performance and productivity. The seventh main attribute, Social Procurement (SP) is the deliberate purchasing of materials and equipment from manufacturers and suppliers who employ sustainable techniques that maximise social advantages and generate social value in local communities (SP1). Design Protection/Belonging (DP), the eighth key attribute, aims to protect cultural heritage (DP1) and to provide design features that foster a sense of ownership among users and the local community as well as acceptance among the following generation of stakeholders and disabled persons (DP2). Human Rights (HR) is the final main attribute that concerns human rights issues such child labour, forced labour, associational liberty, and workers' rights (HR1).



Note: SH = Safety and Health, SH1 = Worker health and safety; SH2 = Safety provisions in the workplace; SH3 = Public health and safety
IA = Impact Assessment, IA1 = User consideration; IA2 = Impact Assessment / Accessibility; IA3 = Indigenous peoples' impacts/rights
E = Employment, E1 = Employment; E2 = Local employment; E3 = Local community; E4 = Professional ethic; E5 = Employee social benefit program;
SI = Stakeholder Involvement, SI1 = Stakeholder participation; SI2 = Team formation
S = Satisfaction, S1 = Satisfaction
QE = Quality Education, QE1 = Education and training; QE2 = Innovation
SP = Social Procurement, SP1= Social procurement process
DP = Design Protection, DP1 = Protection of cultural heritage; DP2 = Socially sensitive design
HR = Human Right, HR1 = Anticorruption / human right / bribery

Figure 1 The main and sub-attributes of SS in construction projects

2.2 Stakeholders' Involvement in the Lens of Social Sustainability

All of the aforementioned attributes are expected to facilitate the implementation of sustainable construction by providing a foundation for future policy development on SS in construction without neglecting the perspectives of stakeholders in every phase of construction project lifecycle. Stakeholders in the construction industry are often classified as internal or external stakeholders, depending on their relationship with the project organisation. Following the original definition by Freeman (1984), stakeholders are defined as individuals or organisations that are actively involved in the project (Project Management Institute, 2004). There are dynamic circumstances for stakeholders' behaviour in a construction project, including individuals or groups of organisations that may be impacted during the project lifecycle process and who may also have an influence on the project's future trajectory (Yuan et al., 2018). Given the complexity of different construction projects, a coordinated effort for the involvement of key stakeholders is necessary. This effort may include internal stakeholders who are formally members of the project coalition (i.e., clients, designers, contractors, vendors), external stakeholders who are not directly involved in the economic activity but are still influential to the project organisation (i.e., suppliers, local authorities), and end-users (i.e., customers) (Andrade-Rhor et al., 2019). The various stakeholders in a construction project have diverse roles and responsibilities to play on SS issues across the construction project lifecycle. Kordi et al. (2021) have proposed the mapping of SS attributes to construction stakeholders' involvement with respect to the different phases in construction project lifecycle. This study further investigates on the real practices of SS, subsequently highlighting gaps between experiences and perspectives of the practitioners on SS across construction project lifecycle.

3.0 METHODOLOGY

In order to achieve the goals stated in the previous section, this study has adopted a LR approach to review previous studies conducted on the attributes of SS in the construction domain. Following that, face-to-face structured interview was conducted to identify the most significant SS attributes in construction projects lifecycle, further distinguishing the differences/ gaps between the practices and perspectives as an output from the expert panels.

3.1 Literature Review (LR) on the Identification of SS Attributes in Construction Project Lifecycle

The purpose of the LR was to explore SS attributes in construction projects. A three-stage process (i.e., journal selection, selection of articles and content analysis) was adopted. The identification of journals related to the study was conducted using Scopus and WoS Database as the main sources of literature. The key search words used were: "social sustain*" OR "social value*" OR "social impact*" OR "social criteria" OR "social dimension*" OR "social impact assessment" AND "construction project*" within the period 2012–2020. Manual screening was done by deleting items that were incomplete or duplicate, as well as material written in languages other than English. Patterns were observed in the extracted data of the reviewed articles and a sorting mechanism was used to reduce the number of attributes. This method aims to eliminate the redundancies among the attributes. Further on, pertinent sub-attributes were identified and classified under the relevant main attributes, which were then iteratively re-examined to ensure accurate representation of the data. Throughout the process of developing the main attributes, the researchers have brainstormed till reaching consensus on the attributes, to ensure no discrepancies, divergent concepts, or ideas that might result from having several interpretations of the data. Finally, quantitative analysis of the data was presented using descriptive analysis.

3.2 Developing Questionnaire in Identifying SS Attributes in Construction Project Lifecycle

The design of the questionnaire survey in this study was based on SS attributes that have been identified from the LR. The questionnaire survey was divided into three sections. The first section was the demographic of participants. The point system (Table 1) suggested by Hallowell and Gambatese (2010) was used to determine the respondents' level of competencies, where the expert's profile must meet a minimum of four requirements from the proposed list and a total of 11 points.

In the second section, the participants were required to evaluate each of the SS attributes (shown in Figure 1) based on the followings; i) Based on past or current real project experiences, which of the construction project phases have incorporated the SS attributes? and ii) Based on your expert opinion, at which phase of the construction project lifecycle should the SS attributes be incorporated?. Four phase scale questions for each of the attributes were used in the questionnaire. Phase scale of P, D, C, and O, which represents "planning", "design", "construction", and "operation" were used. Data analysis was performed to identify construction project lifecycle phases that requires the embedment of the SS attributes, investigate on the correlations, and uncover the underlying social attributes. Descriptive analysis was undertaken to assess the distribution of the attributes. Attributes with a high average value in certain phases were prioritised, leading to the proposed SS attributes to be embedded in construction projects. Attributes with a low average value were classified as having low priority. Further on in the last section, there were open-ended questions where experts were encouraged to provide detailed feedback and suggestion for additional SS attributes based on their knowledge.

Table 1 Point system for the qualification of expert panels

ID	Achievement	Point
A	Years of professional experience in the construction industry	1 point for every year
B	Advanced degree in the field of civil engineering or other related areas	Bachelor's degree: 1 point; Master: 2 points; PhD: 4 points
C	Involved in any related SS construction project	2 points for each related SS project construction
D	Member (or chair) of the professional committee(s)	Member: 1 point for each membership; Chair: 3 points for each membership
E	Leading position(s) held on current or previous organisation concerning social sustainability	3 points for each leading position
F	Publication on the topic of construction	Journal article: 4 points; book: 2 points; conference paper: 1 point
G	Attended any related social sustainable training	1-point for each related social sustainable training

3.3 Face-to-Face Structured Interview

To validate the SS attributes obtained from the LR, structured interviews were considered appropriate because the method allows the researchers to interact thoroughly with the experts (Li et al., 2018). Input from all the associated practitioners, including developers, contractors, consultants, owners, and educational bodies were solicited in delivering a full and comprehensive review of SS practises in construction project lifecycle. This study intends to attain construction practitioners' SS attributes based on their actual work experiences, as well as expert opinion. From January to March 2021, face-to-face interviews were performed with 15 practitioners, who were selected based on their affiliation with an organisation. The organisation that the experts represent should have significant experience with SS-based activities in order to ensure that they are qualified to share their knowledge and expertise on SS.

Scholars have advised having various expert panel sizes to improve the interview process. According to Hallowell and Gambatese (2010), eight to twelve expert interviewees is an adequate number to confirm any construction study indicators. Yin and Caldas (2020), Jafari et al. (2019), Tsolakis et al. (2019), Loosemore and Reid (2019), and Awwad et al. (2016) have utilized 12, 11, 14, 12, and 15 experts in their studies. Consequently, our study has used a similar range of individuals and selected eligible participants based on their experience and skill through the purposive sampling method. Five panels from the academia and ten panels from the industry were purposely chosen and invited to participate as expert panels in the structured interview. The presence of the industry experts and academics ensures that the study's discoveries have both practical and theoretical implications. Additionally, the research team has selected specialists from a variety of disciplines to eliminate possible biases against one or more of the attributes (Karakhan et al., 2020). The participants were also briefed on the study's background, needs, purpose, and objectives before the interview session to ensure they aware and understood their role and contribution to this study.

4.0 RESULTS AND FINDINGS

4.1 Profiling of Respondents

Table 2 shows qualifications of the 15 identified participants. In reference to Table 2, all participants received a score greater than 11 and were considered qualified experts for this study. Notably, the total number of points for the experts have surpassed the threshold of 11 points. where all the experts have scored at least 20 points, with the vast majority scoring 30 and above. The high number of points earned indicates that the chosen panelists were experts in their field. Although there are differences in the academic publications and professional experiences between academics and industry experts, such differences are to be expected. The characteristics and expectations of an academic employment are distinct from those of a career in the industry; therefore, variance is to be anticipated. Different levels of research and industry experience among the specialists are viewed by the researchers as strengths of the current study.

Based on Table 2, eighty percent of the participants had more than ten years of professional experiences in the construction industry, with two experts having more than fifteen years of experiences. There were five academic experts, and 10 construction industry experts present. Among the industry panels, one expert represented senior management, seven were project managers, and the remaining experts were from a variety of different backgrounds: main contractors (n = 4), developer (n = 1), government departments (n = 2), and consultants (n = 3).

Table 2 Profiles and qualifications of the experts (N = 15)

Expert Panellists		Qualifications							Total points
		A	B	C	D	E	F	G	
Academic	A-1	17	4	20	9	0	16	2	68
	A-2	10	4	12	2	0	4	1	33
	A-3	8	4	6	3	0	4	1	26
	A-4	10	2	20	1	3	5	20	61
	A-5	12	2	20	2	3	5	1	45
Industry	I-6	11	1	20	2	3	0	11	48
	I-7	8	2	12	2	0	0	8	32
	I-8	11	1	20	1	3	0	11	47
	I-9	12	2	12	1	3	0	12	42
	I-10	12	1	20	1	0	0	12	46
	I-11	10	1	6	1	0	0	10	28
	I-12	18	1	20	3	0	0	18	60
	I-13	8	2	12	1	0	0	8	31
	I-14	13	1	6	1	0	0	13	34
	I-15	12	2	20	1	3	0	12	50

4.2 SS Attributes in Construction Project Lifecycle

A key goal for achieving sustainable development is to ensure that a construction project performs well throughout the project lifecycle. The SS attributes are classified into the following lifecycle phases: planning, design, construction, and operation. This study has identified and empirically validated the SS attributes that could lead to sustainable construction, where the attributes could be incorporated throughout the project lifecycle.

In general, there was gap identified between real project experiences and the practitioners' opinion of SS across the different phases of construction project lifecycle, as shown in Figure 2 to Figure 5. In general, the respondents' professional opinion (red bar) has overshadowed the real project experience (blue bar). The respondents have mostly emphasised on the incorporation of SS attributes across the construction lifecycle, more than it has been implemented in their projects.

4.2.1 Planning Phase

At the planning phase, the project team establishes and defines the project's objectives. The tasks and resource requirements for the project are identified, alongside the strategies for completion. Figure 2 shows that HS1 was the least implemented attribute (33%) in this phase, with only five experts stating that it was executed; nonetheless, 11 experts agreed that this attribute should be embedded at the planning phase. The biggest disparity on HS1 (40%) demonstrates that workers' health and safety were not prioritised in practice but were critical to be considered at the planning phase in pursuant of sustainable construction. The second widest gap were also under the health and safety category with HS2 and HS3 (27%), further highlighting the need to prioritise health and safety at the planning phase. Meanwhile, the stakeholder involvement (SI1) attribute was exceptionally well executed in the current projects' practices and should be sustained.

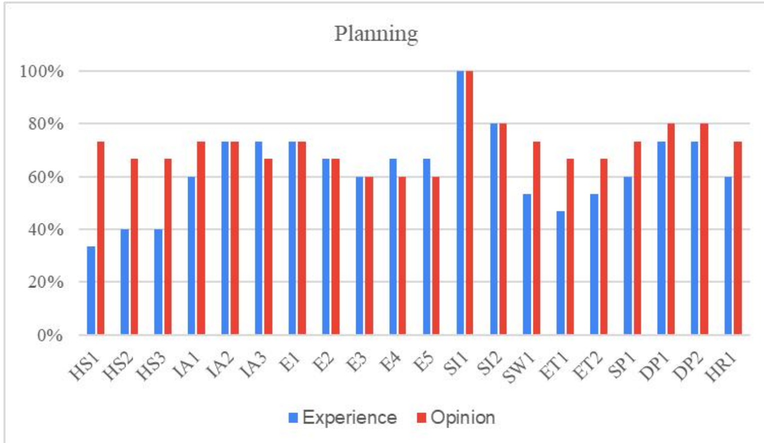


Figure 2 Experience vs opinion of practitioners on SS attributes during the planning phase

4.2.2 Design Phase

At the design phase, the determination of projects' tasks, resource requirements and strategies for completing them should involve most of the internal and external stakeholders. Figure 3 indicates that almost half of the experts (47%) reported experiencing the lack of Stakeholder Participation (SI1) in their project, even though stakeholders should have been fully included in this phase (Kordi et al., 2021). According to the experts, the absence of direct involvement from stakeholders and decision-makers impedes the implementation of SS in projects. Although internal stakeholders bear the primary responsibility to incorporate SS into projects, the perspectives from the various teams and individuals should be considered and aligned with the commitment and participation from all the stakeholders (Ershadi et al., 2021). The second widest gap attributes (33%) were HS1, HS2 and E4. At the design phase, the decisions made by the designers could have significant implications for the safety of the workers. Therefore, it is crucial to integrate safety elements at the design phase, such as Prevention through Design (PtD) in the United States, Design for Safety (DfS) in Singapore, Construction Design and Management (CDM) in the UK and Safe Design in Australia, which were predominantly introduced to encourage designers to incorporate OSH practices to eliminate or reduce construction site hazards at the design phase (Ibrahim et al., 2021). Also, the ethical aspect of professionalism should also be included to enhance workforce integrity.

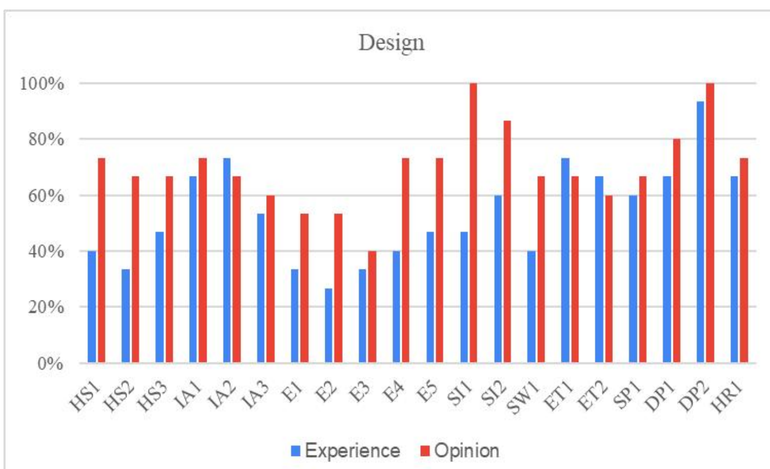


Figure 3 Experience vs opinion of practitioners on SS attributes during the design phase

4.2.3 Construction Phase

The construction phase is the implementation phase, where the project's strategies are implemented, with project works carried out practically at construction sites. Figure 4 shows SP1 showcases the most significant discrepancies between the SS qualities and public opinion throughout the construction period (40%). Thirteen experts recommended that SP1 should be implemented at the construction phase, as SP1 involves acquiring a variety of assets and services in generating the social effects.

However, many projects have failed to integrate sustainability into their procurement processes due to a lack of alignment between sustainability targets and procurement decisions, strategies, and actions (Ershadi et al., 2021). As a result, all arrangements made during the early phases should be consistent and aligned with the project's objectives to ensure satisfying outcomes. All experts agreed that HS2, SI1, and HR1 should be concurrently embedded in the construction phase.

Figure 4 Experience vs opinion of practitioners on SS attributes during the construction phase

4.2.4 Operation Phase

The operation phase is crucial since the deliverables are made available to the end-user. The least implemented attribute in this phase as shown in Figure 5 is DP1, which was predicted early because of the cultural heritage protection that should begin in the early stages of a project's lifecycle. The heritage should be preserved during the operation phase. However, the application of DP1 and SI1 attributes falls short from the experts' recommendations of 73% and 100%. SI1 should involve communications both within the stakeholders who developed the product and with the end-users, to establish and maintain a strong foundation for organisational synergy towards social sustainability. Additionally, the experts have recommended a 100% attribute of HR1 during the operational phase, as opposed to the current 87%.

Figure 5 Experience vs opinion of practitioners on SS attributes during operation phase

5.0 DISCUSSION

The development of SS is pivotal for the construction industry's growth. SS is necessary to meet basic human needs and encourage social equity, civic engagement, and human dignity during the entire project lifecycle. In reference to Figure 6, SI1 shows the largest gap between the perception and practice (31.7%), thus the need for improvements to narrow the gap. This is followed by the attributes of HS1(23.3%), DP1 (21.7%) and SP1 (21.7%). The results have explicitly pointed to the needs to address SS attributes related to stakeholders' participation, health and safety of workers, protection of cultural heritage, and social procurement. Specifically, the attribute of SI1was primarily neglected at the design phase, followed by HS1 in planning, SP1 in construction, and SI1 and DP1 respectively at the operation phase. In addition, the need to include SS considerations through early participation with the society and the end-users have also been highlighted.

Generally, the findings highlighted that SS attributes have been well practiced, with respect to its importance at the construction phase. This is in accordance with the narrowest gap found between the perception and practice for this phase of lifecycle. On the other hand, the planning phase showcases a distinct difference (32%) between the real project experiences and professional opinions. The project managers should address the SS requirements at the early stages of a project to avoid any further changes that could result in project delays and eventually cost increase. Although most of the experts have positive perception towards the health and safety attribute, the practice side is still lacking in the construction industry. As shown in Figure 3, the widest gap of HS1 (40%) occurs at the planning phase, followed by HS2 (33%) at the design phase and HS3 (27%) at the planning phase. In line with a study by Toh et al. (2017) stated that 29.8% of the respondents have never been involved in safety reviews at the design stage and only 20.2% who often participated in safety reviews. Thus, there is still much room for improvement for the health and safety practices in the construction industry.

For the attribute of SI1, all practitioners agreed that the attribute should be embedded in all phases of a project lifecycle. However, as discussed earlier, SI1 has the widest gap between the perception and implementation; therefore, the emphasis is on the collaborations between all stakeholder to create synergy that could potentially deliver a cost-effective clean design, value adding, satisfies customers' expectations and also the delivery of project on time and budget. Thus, there is a need for further actions to be taken to improve the status quo. For example, there is a constant need to improve the attributes of HS1, SW1, SP1, DP1, DP2 and HR1 at every phase of the project lifecycle.

Findings from this study (through open-ended discussion) have also raised several critical elements about social sustainability, given as follows: (i) role of stakeholders in construction project lifecycle; (ii) SS measurement and the associated scales in measuring project performance; and (iii) the applicability of a SS assessment tool in construction project lifecycle. The respondents have also mentioned that the concept of sustainability should be included in construction projects from the early phases of planning and must be monitored throughout a project's life. The lack of awareness and inadequate collaboration between the stakeholders was identified as a barrier. Thus, encouraging stakeholders to engage in SS can be a potential solution (Bal, 2014). In this regard, incorporating SS performance and incentives in contractual agreements with contractors would be a solution to motivate contractors and suppliers to practice SS in project activities (Ershadi et al., 2021).

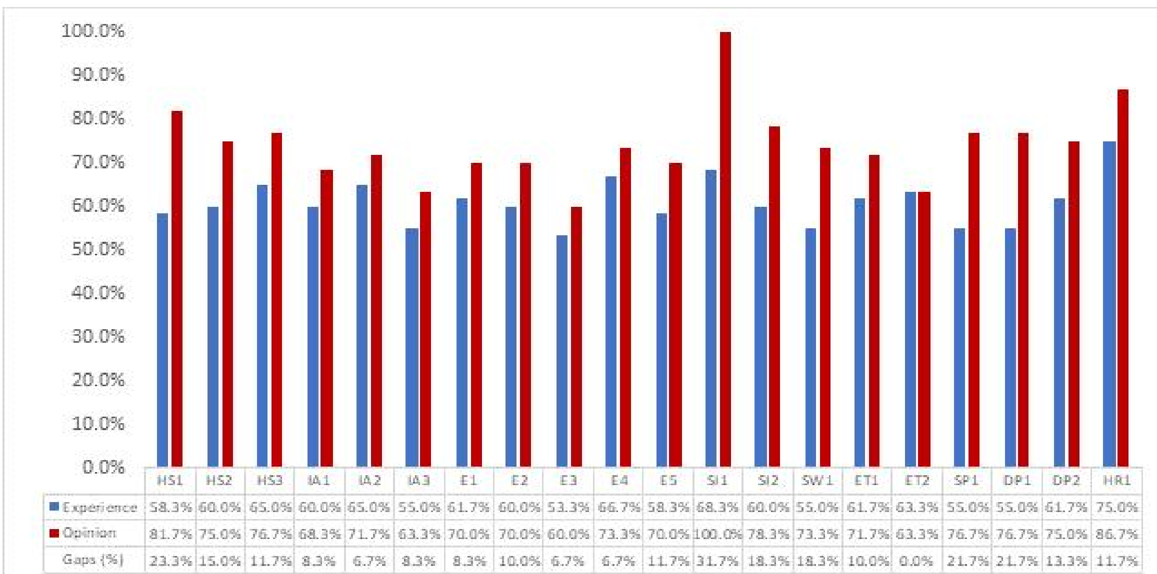


Figure 6 Gaps between experience with opinion of practitioners on SS attributes across the project lifecycle

5.1 Prioritisation of SS in Construction Project Lifecycle

It is envisaged that embedding SS into projects can potentially increase the project costs (Çelik et al., 2017). Special measures in project phases such as design changes would necessitate more effort, resulting in increased scope. Similarly, addressing SS requirements such as health and safety standards expands the scope of site operations. Contracting and management of the project will almost certainly become more complicated due to the SS requirements for construction projects. Particular measures are required, such as to include land use in accordance to SS standards in order to preserve current ecological growth, but may also result in the need for additional land. Consequently, this need may increase the project's budget requirements. Thus, by prioritising the established SS attributes throughout the construction project lifecycle, Malaysian practitioners would have a starting point in incorporating the attributes into their projects.

This section provides a detailed perspective on the incorporation and prioritisation of SS across the lifecycle of a construction project. This provides value to identifying the priorities for initiating circular actions immediately, thereby assisting decision-makers in implementing policies and innovative solutions to facilitate the transition to the SS agenda in the construction projects lifecycle. The mapping (Figure 7) shows the priority of SS attributes (y-axis) and the major phases in a project lifecycle (x-axis). In general, the mapping plots the nine mains SS attributes against the opinion of expert panels. The derivation for each of the social attributes in terms of priority and the corresponding phases in a project lifecycle are provided below to further clarify the concept of this mapping.

The Human Rights (HR) attribute was perceived to have the highest priority at the construction and operation phase. Although HR would involve stakeholders ranging from the developer to local authorities during the planning and construction phases (Kordi et al., 2021), it was recommended that the good idea be maintained until the operation phase because, ultimately, the end-users are the ones who would be affected by any potential law or rights modifications.

The construction industry has one of the worst health and safety records among any other industrial sector (Rostamnezhad et al., 2020). Due to workforce health and safety engagement, the influx of migrant workers, and the effect on communities and employees' lifestyle, Safety and Health (SH) was considered as the second-highest priority throughout the construction phase. During the construction phase, the organisation should cover employees’ health and wellbeing (e.g., healthcare security coverage, welfare facilities at construction sites, a platform for sharing session), safety provisions at the workplace (e.g., safety training, reportable injuries, or fatal involving worker), and public safety and health (e.g., awareness program for public safety and health).

To achieve SS goals in the construction industry, an organisation must collaborate with other stakeholders (Stakeholder Involvement, SI). It is necessary to include SS at all phases of the project's lifecycle. It is critical to specify early in the contract (planning and design phase) that the project will incorporate SS features. The organisation should select a team with necessary academic credentials in sustainability, expertise, and understanding in conducting SS projects and the ability to apply sustainable guidelines.

Design Protection and Belonging (DP) is the second priority at the design phase. They entail harmonising the interests of all stakeholders, including end-users, to provide design features that instil the pride of ownership in users and the surrounding community (Mulholland et al., 2019). The organisation should have a policy addressing cultural heritage, collaborate with historical or cultural preservationists, and create solutions for inclusive design, starting with planning and design for diverse groups of people, including disabled people.

Social Procurement (SP) in construction projects seeks to acquire equipment and materials from manufacturers/suppliers who apply sustainable practices, to maximise social benefits and produce social value in local communities (Loosemore & Reid, 2019). This attribute is recommended as the fourth priority in construction projects, particularly during construction. Organisations must incorporate SP into the contracting process by adding social value requirements into the contracts and then delivering those requirements accordingly during the construction phase.

Employment (E) aims to promote sustainable employment growth and development, particularly during the construction period, when more workers are required on the construction site. This attribute helps to create new employment possibilities, job security, the employment of vulnerable populations within and around the project region, and the participation of small and medium-sized businesses (Almahmoud & Doloi, 2020; Goel et al., 2020; Nasirzadeh et al., 2020).

The level of Stakeholder Satisfaction (S) can be gauged at various stages of a project by comparing the actual performance to stakeholder expectations (Kordi et al., 2021). In order to ensure a project that addresses the satisfaction and well-being of all stakeholders, including the end-user, input from all stakeholders is required (Chang et al., 2017; Xiahou et al., 2018), which was placed at the operation phase.

The Quality Education (QE) attribute typically involves the developer, consultant, and contractor throughout the project’s lifecycle, from planning to operation. The objective is to enhance the workforce’s technical and sustainability abilities, resulting in more innovative technical solutions, particularly during construction. The organisation may have a human resource development policy, encourage, sponsor, and provide opportunities for its employees to achieve and maintain professional licensure and certification to enhance their knowledge, abilities, and capacity for growth and development.

Impact Assessment (IA) involves all stakeholders, particularly in the early stages of the project (Rostamnezhad et al., 2020). It is necessary to identify the impact of the construction design and project, further developing mitigation plans to minimise any disturbances to the public (Almahmoud & Doloi, 2015; Rohman et al., 2017). The social impact assessment (SIA) report is one of the indicators used to evaluate a project’s SS performance. It is required to be prepared during the planning phase and monitored during the construction phase.

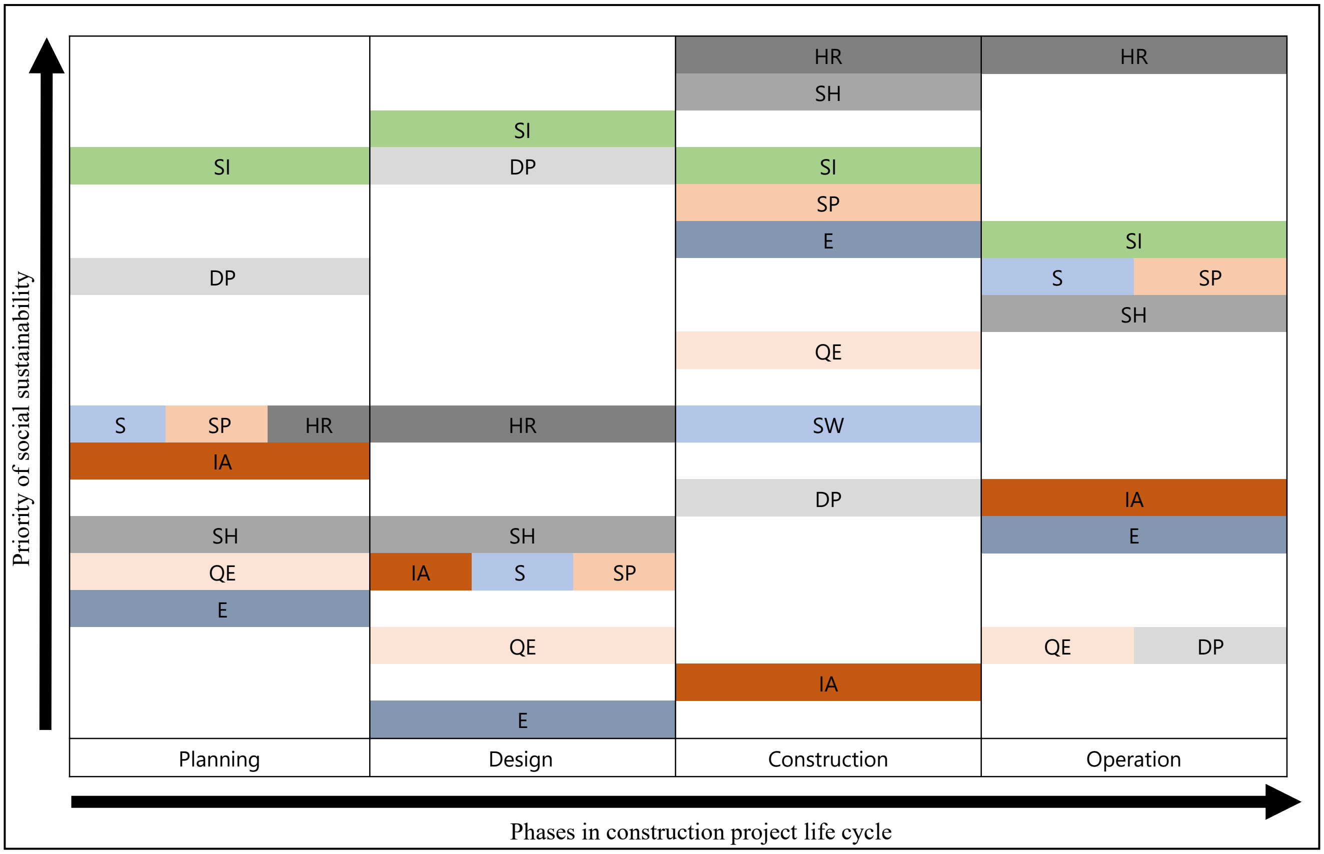


Figure 7 Proposed framework for prioritization of SS attributes in construction project lifecycle

6.0 CONCLUSION

A rising body of research in the field of SS is calling for more thoughtful approaches to sustainable project development around the world, but the notion remains ambiguous among vast majority of construction stakeholders. Hence, this paper has critically reviewed the most prominent SS attributes in the construction project lifecycle. Structured interviews with 15 experts have validated the 20 conceptually created SS attributes, which were then associated with the project lifecycle. According to the survey's findings, most respondents were familiar with some of the practices of SS. The interviews further highlighted that SS has been practiced for a long time, but often embedded into work processes without the realization that it is part of the practices that contribute to the whole system's well-being. The only difference is that technology has advanced, and the work process approach is becoming more innovative. This implies a solid need to spread the concept throughout the construction industry.

This research provides a comprehensive view of the SS attributes and their correlation with a project's lifecycle. This study's findings have consequences for both, the practitioners and the academics. For the practitioners, the results indicate shortcomings in the current incorporation of SS into the project lifecycle that require attention or additional activities to guarantee better incorporation of SS throughout the project lifecycle. For scholars, this study contributes to the SS research by highlighting the criteria required to ensure sustainability throughout construction project lifecycle. This necessitates further study in three crucial areas: (i) the coding for the conceptual model established here could be used as a framework for similar/other studies; (ii) the use of qualitative approach (e.g. interviews) to explore the underlying mechanisms and constraints for the acceptance or rejection of SS considerations in the construction project lifecycle; and (iii) use the current results to demonstrate the project-level advantages of incorporating SS considerations in the construction project lifecycle. Such findings would strengthen the case for integrating SS issues into the lifecycle of a construction project. The established framework will provide both academics and practitioners with a shared language and understanding of SS, creating common acceptance on the importance of SS in the construction project lifecycle.

Even though attempts were made to assure the thoroughness of this study, there are still some limitations that should be highlighted. The small sample size (15 interviews) suggests that the results may not be generalizable, which brings up the first limitation of the methodology. Second, most interviewees were either senior executives or employees of large organisations. Thus, their perspectives may differ from those stakeholders from smaller organisations. Therefore, future projects can incorporate insights from different management levels as well as disciplines, including industrial engineers and safety professionals. Third, no data on the organisation's size was collected during the interview. As a result, it is impossible to determine whether the importance of SS attributes is proportional to the organisation's size. Fourth, given the problems encountered in quantification and implementation in the past, the SS features might be evaluated more deeply. Additionally, the study was limited because it was done in the Malaysian construction industry. Thus, it is prudent to exercise caution while making assessments. Nonetheless, this study has provided a valuable beginning point for objectifying the characteristics of social sustainability, thereby empowering the frequently overlooked SS in construction project lifecycle.

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