

Research Article

Exploring Social Sustainability in the Built Environment

Cheng Siew Goh ^{1,*,†}, Jia Ning Ting ^{1,†} Arun Bajracharya ²1. Heriot-Watt University Malaysia, Putrajaya, Malaysia; E-Mails: c.goh@hw.ac.uk; tj6@hw.ac.uk2. Sohar University, Sultanate of Oman; E-Mail: abajracharya@su.edu.om

† These authors contributed equally to this work.

* **Correspondence:** Cheng Siew Goh; E-Mail: c.goh@hw.ac.uk**Academic Editor:** Francesco Minichiello**Special Issue:** [Green Built Environment](#)*Adv Environ Eng Res*

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Abstract

Following the establishment of the United Nations' Sustainable Development Goals, sustainability has been given increasing attention in the agenda of the built environment. Sustainability embraces three key elements, i.e., environment, economy and society. However, the social dimension receives the least attention and is largely overlooked compared to the environmental and economic sustainability. To bridge the gap, this paper will examine the various dimensions of social sustainability involved in the built environment and identify perceptions of construction stakeholders towards social sustainability. Social sustainability is closely linked to human well-being, quality of life, and inclusiveness and these are the pivotal factors in ensuring a healthy, safe and resilient built environment. Sustainable buildings require close interactions between humans and buildings to optimize the values of the designed functions. By intertwining with social sustainability, the performance of a sustainable built environment can be significantly improved. This could contribute to the attainment of environmental and economic sustainability by engaging stakeholders since the project's inception. This paper contributes to the body of knowledge of social sustainability and increases stakeholders' awareness of social sustainability. The research outcomes help



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promote a more balanced development within the sustainable built environment practice, with more integrated and concerted efforts of developing social sustainability for community benefits.

Keywords

Social sustainability; built environment; social dimensions; sustainable construction

1. Introduction

The importance of sustainable development has been growing in the past two decades and the concept of sustainable development has been increasingly embedded in the local, national and global agenda. The United Nations launched 17 sustainable development goals for the Agenda 2030 for sustainable development. This has placed a call for action by all participating countries to tackle climate change while addressing social needs and economic growth. Following the establishment of the United Nations' sustainable development goals, sustainability is given more attention in either new construction projects or existing buildings and infrastructure development.

Sustainability embraces three pillars, i.e., environment, economy and society and a balance in the three pillars are emphasized. However, the three pillars are not treated equally in pursuing sustainable development. Most of the sustainable efforts in the transformative processes are largely oriented toward environmental sustainability such as energy efficiency, carbon emissions, resources consumption, ecology and waste management [1, 2]. Nonetheless, achieving sustainability goals requires the delivery of social development for enhancing connectivity between people; embracing diverse needs from different groups of people; ensuring health and safety; conserving cultural heritage; and promoting good quality of life.

Buildings and construction practices play an imperative role in ensuring social sustainability considering the significant amount of time people spend in buildings for work, play and living. Interventions are created within the urban social context by which actions are induced by various social actors in the environment [3]. The contribution of the built environment and construction projects to social sustainability should not be understated since improper building design and site planning could, directly and indirectly, affect the quality of life of end-users and surrounding communities, triggering more social issues and dampening economic growth. Furthermore, when the social aspect is not preconceived, the dynamics of development projects together with the participation and interactions of various actors would prompt the emergence of other potential risks such as technical and economic complexities, and eventually jeopardize the quality of intragenerational life [4]. The social dimension is unquestionably essential in developing a more sustainable built environment.

Despite the importance, social sustainability in the built environment is not widely promoted in the transition process of sustainable development. The social pillar receives the least attention and is largely overlooked compared to the development of the environmental and economic pillars [1, 2, 4-7]. As described by Zuo, Jin and Flynn [1], social sustainability is the weakest pillar of sustainable development, and lacks theoretical underpinning and measurement. Edum-Fotwe and Price [3] also found that issues around the social dimension of sustainability are less appreciated and addressed

by stakeholders in the development process. In line with that, Sierra, Pellicer and Yepes [4] also highlighted a lack of adequate consideration for social sustainability and some public projects have not adequately considered social performance targets in their development.

Ignorance of social sustainability has resulted in ambiguity and uncertainties in defining social indicators or dimensions for sustainability. As Karji et al. described [8], there have been difficulties in defining social sustainability and recognizing the social components. Social sustainability is the most challenging sustainability pillar to assess due to the inability to determine the impacts to be considered and their quantification methods [9]. In addition, there appears to be a significant gap in identifying the key dimensions of social sustainability in the built environment as the built environment is a complex system of nature and human interactions. Social sustainability requires a complex measurement method, which could be attributed to the inherent challenges in formulating quantifiable social sustainability dimensions, which are highly subjective in nature [7]. The capabilities and resilience of vulnerable groups will not be improved if the social dimension is not considered in sustainable city planning and building design. As indicated by Li et al. [10], the relatively low level of social sustainability in China's public megaprojects has undeniably controverts the intended project purposes for sustainable development.

With a low awareness and knowledge of social sustainability, construction projects are often developed in favor of the economy and environment. Efforts to measure and benchmark social sustainability performance appear less promising. As a result, there is a lack of conceptualization and assessment approaches to social sustainability [11] and construction stakeholders encounter huge challenges in making informed decisions for social sustainability in construction. Therefore, social dimensions or indicators need to be identified to embed social goals in sustainable construction practice.

Some researchers responded to the social sustainability agenda, but most works focus on literature or content analysis [7, 12, 13], the development of frameworks [5, 6, 7, 11, 14, 15] and mega projects or infrastructure projects [4, 10, 16]. While some researchers studied the social sustainability dimensions, investigations are confined to architecture or urban planning aspects and project phases [3, 5, 17-19]. For instance, Dempsey et al. [18] identified social dimensions from the urban planning perspective while Kefayati and Moztaarzadeh [19] examined social sustainability dimensions from the lens of architecture. Despite the existing body of literature on social dimensions of sustainability, there is still need for a better understanding of social sustainability in the construction context, particularly in exploring social sustainability from the standpoints of different construction stakeholders. Researchers such as Zuo et al. [1] and Kordi, Belayutham and Che [7] made attempts to investigate social sustainability dimensions in the construction context with proper relevance placed on construction stakeholders' influences and attitudes. However, their works used either a systematic review or a qualitative approach that may require further studies. This study attempts to fill the gap by exploring the social sustainability dimensions from the lens of industry stakeholders using a two-stage research design approach.

This paper examines the key social sustainability dimensions embedded in the built environment and identifies construction stakeholders' perceptions of social sustainability. Focus is also placed on the interrelationships between the identified social sustainability dimensions and the stakeholder attitudes and expectations of the shift of social sustainability in construction. Social dimensions are examined from the lens of building-and construction-related applications such as buildings, urban planning, infrastructure, and construction practices, with general business excluded. The research

paper is expected to increase the awareness of construction stakeholders towards social sustainability, thus promoting a more balanced development of sustainability by making necessary efforts in developing social sustainability.

2. Theoretical Background

2.1 Social Sustainability

The burgeoning discourse on sustainable construction practices has created more awareness of social sustainability over recent years. An increasing number of studies attempt to conceptualize and delineate the definition and principles of social sustainability. Nevertheless, there have been ambiguities and disparities in defining social sustainability since it involved subjectivity and varying priorities from stakeholders. It often led to various discipline-specific definitions considering the application contexts, the participants' perspectives and lifecycle stages [4, 20]. Woodcraft et al. [14] described social sustainability as a process of understanding people's needs in their working and living places while creating a sustainable place that supports wellbeing. From a political perspective, Sachs (cited in [20]) viewed social sustainability as the basis of value equity and democracy. From a sociological view, Littig and Griessler [21] defined social sustainability as the quality of societies which manifests the relationship between nature and society.

The concept of social sustainability varies in the industry, depending on the stakeholder's interest and perspectives and the involved project life cycle. Social sustainability generally encompasses health, safety, human rights, child labor, gender discrimination, community initiatives, and employment benefits [9]. In the Global Reporting Initiative (GRI) Standards, social sustainability considers impacts created by an organization on the social system within which it operates and it includes a total of 18 dimensions: employment; labor/management relations; occupational health and safety; training and education; diversity and equal opportunity; non-discrimination; freedom of association and collective bargaining; child labor; forced or compulsory labor; security practices, right of indigenous peoples; human rights assessment; local communities; supplier social assessment; public policy, customer health and safety; marketing and labeling; customer privacy; and socioeconomic compliance [22]. The scope and dimensions of social sustainability are sector-specific, and it is therefore essential to analyze the social sustainability aspects particular to the construction sector in more detail.

2.2 Social Sustainability in Construction

In the context of construction practice and the built environment, social sustainability is more concerned with social development, user satisfaction, comfort, health and safety, accessibility, and equality. It is about constructing physical, cultural and social places to support the human wellbeing and encouraging a sense of community [23]. Almahmoud and Doloi [6] advocated reflecting social sustainability by managing varying stakeholders' needs including users, neighbourhoods, and communities by considering the impacts of the built environment on existing communities and future generations. Similarly, Bramley et al. [17] also described the community aspect as a key consideration of social sustainability which includes pride and a sense of belonging, social interactions among the neighborhood, safety and security, the quality of the environment, contentment with home, stability and engagement.

Social sustainability is regarded as an important sustainability dimension that is linked to community development. Although there are various interpretations of social sustainability, it can be generally contextualized as the fulfillment of health and well-being, safety, accessibility, quality of life, community development, cultural heritage, stakeholder participation, welfare, and human equity or diversity [2, 15]. The purpose of delivering social sustainability is to offer a conducive, healthy, safe and comfortable environment to the involved project stakeholders.

However, it is interesting to note that social sustainability should not be treated equally as corporate social responsibility (CSR), although some overlaps underpin these two concepts. While social sustainability considers the overall society development, corporate social responsibility embraces the accountability of an organization in caring for societies, thereby giving positive public relations for the long term.

3. Dimensions of Social Sustainability

Social sustainability encompasses richer information on a system, process, organization, activities of people and social life. It is of great importance to appreciate social sustainability by acknowledging the multi-dimensional perspectives of social sustainability. Social sustainability involves individual values and collective visions of people in social realities. As Edum-Fotwe and Price [3] suggest, the conceptualization of a social system entails social actions and behavior, occurrences and properties into entities, structures or processes that enable social sustainability.

The literature discusses a wide variety of social dimensions of sustainability with little consensus. By blending similar characteristics of social dimensions, this paper categorized social sustainability in the construction and building sector into three key themes: a) health and wellbeing; b) stakeholder engagement and social interaction; and c) safety and security.

3.1 Health and Wellbeing

Health and well-being are critical concerns of social sustainability. Indoor environmental quality is crucial to provide users good quality of life. There are five aspects of health and well-being in the built environment: a) thermal comfort, b) acoustic comfort, c) daylighting, d) ventilation and e) indoor air quality.

Thermal comfort is defined by ISO7730:2005 Standard [24] as the condition of mind which conveys satisfaction with the thermal environment. Temperature changes can significantly affect mood which in turn causes behavioral changes. While people tend to be aggressive at lower temperatures, higher temperatures can result in aggression and apathy [25]. Thermal comfort is therefore acknowledged as a key parameter ensuring users and occupants perform at their maximum capability in their workplace and home [26]. Evidence shows that thermal comfort directly impacts environmental sustainability particularly in terms of the building energy consumption since users would adjust the heating, cooling and ventilation systems to non-optimal levels when there is a sense of discomfort [27].

Apart from thermal comfort, indoor air quality is also known to affect health and well-being of building users. Indoor air quality refers to the air quality within and around buildings and structures to determine the existence of pollutants leading to comfort and indoor health concerns [28]. Exposure to pollutants would induce short-term sicknesses such as headaches and irritation as well as long-term diseases such as respiratory and heart diseases. Good indoor air quality is closely linked

to proper ventilation by providing a good circulation of fresh air in accordance with the demand. Ventilation is the exchange of indoor air to outdoor to remove contaminants and carbon dioxide [29]. Poor ventilation rate could result in sick building syndromes which may eventually impact the delivery of economic sustainability if proper measures are not taken.

Acoustic comfort should not be overlooked in ensuring user health and comfort. It provides a good acoustic environment by blocking unwanted noises for health and user privacy. Acoustic discomfort would pose mental and physical health risks to occupants. For instance, intruding noises can give rise to activity disturbance, annoyance and distress in the short term while chronic noise exposure would bring adverse pathophysiological effects leading to cardiovascular disease [30]. Daylighting is also a determinant for bringing visual comfort to building occupants by providing appropriate access to natural and artificial lighting. To ensure an adequate lighting level, the architectural layout, window geometry, photometry of surfaces and glazing amounts together with artificial lighting are important to maintain a level of lighting optimality [31].

3.2 Stakeholder Engagement and Social Interaction

Stakeholder engagement is vital to ensure that buildings and structures are properly designed and constructed to meet the intention of serving people. Social consideration should be extended to end-users of buildings and structures and the community in close vicinity that are likely to be affected [5]. Active stakeholder participation helps give more cohesion and a sense of belonging to communities and end users. With early involvement, the stakeholder understanding of the construction projects for informed decision-making is increased. Public engagement should be held to seek people's opinions on developing new buildings, infrastructure projects or facilities. In addition, social consideration should also be given to temporary user groups such as construction workforce, since their livelihood and well-being could also be significantly affected if their needs are not considered.

Civic participation and localized empowerment can be attained via social interactions [18]. Social interrelations should be embedded in the planning, design, construction and operation of buildings and structures to promote social interactions among users. People living in the neighborhood cannot be regarded as a community without social interactions. They are individuals who live their own lives with little sense of community. The socialization feature of architectural spaces can affect the level of social interactions among communities and subsequently influence social capital as well as the development of social sustainability [19]. Because social capital is established through interactions, creating good spaces for community interaction is crucial in developing social capital and social sustainability.

Social inclusion is essential in stakeholder engagement to ensure the needs of all user groups are taken into account in planning and designing buildings. The principle of social inclusion is to address the diverse needs of different user groups, including the elderly and disabled. Equality shall give no "exclusionary" or discriminatory practices preventing individuals from participating economically, socially and politically [18]. Accessibility to facilities and services should be provided to ensure all user groups can access the open space, public services, infrastructure, culture, recreation, and neighborhood without difficulties. The provision of services and facilities should be embedded within the built environment and urban forms directly or indirectly.

3.3 Safety and Security

Safety is a fundamental part in buildings and structure and various measures should be incorporated into construction practices to prevent against both natural and man-made accidents such as fire attack, flood and social crime. Appropriate design and effective use of building spaces make occupants feel secure and could reduce the occurrence of crime, subsequently improving the quality of life [19]. For example, buildings can be designed with adequate lighting systems and minimal shaded areas or dark corners, which provides opportunities for burglary and robbery [1]. Architecture design with safety measures shall offer improvement in user controllability, the inclusion of safe urban façade, and allocation of defensible spaces [19].

The safety of onsite workers is also a key factor in attaining social sustainability goals [1, 6], in which the construction industry is acknowledged as a hotbed of fatal work injuries and accidents. Safety provision in the workplace and protection of the community during the construction and demolition stages are of great importance in considering social sustainability. Sustainable construction promotes the concept of a safer and more secure workplace. It is necessary to decrease the exposure to risks of working in a hostile and dangerous environment in construction. As Zuo et al. [1] revealed, occupational health and safety is a major concern of social sustainability in construction agreed upon both internal and external stakeholders. Safety provision such as safety barriers, personal protection equipment, and communication of hazards shall be made to ensure free of safety risks for construction workers. In addition, it is also critical to ensure public safety. Erecting adequate fencing, proper traffic management, managing security, providing covered walkways, providing means of the disposal of hazardous materials, good site logistic arrangement and providing safe storage for construction materials on site are measures required to ensure the protection of the community [1].

Security design is also a key aspect of social sustainability in construction. Built assets shall be designed to be well-lit, lively, and with minimized hiding places that might offer mugging and theft opportunities [1]. Designing for security will improve safety, requiring an early plan to incorporate good features for security implications in the design.

4. Research Method

A two-stage research design was used in the study to identify the awareness and understanding of construction stakeholders toward the development of social sustainability in the built environment. The two-stage design was used because they integrate qualitative and quantitative methods in two distinctive stages for generating confirmatory results. The two-stage method can also offer greater opportunities to closely examine emerging issues by comparing and contrasting the structured quantitative results with the explorative qualitative responses with a focus on filtered variables. In the first stage, this study employed questionnaires as the exploratory approach to identify key social variables from a wider group of respondents. A total of 118 electronic and postal surveys were distributed to construction professionals with some levels of involvement in sustainable construction projects. The overall response rate of the survey was 36%. The response rate is deemed reasonable since a typical survey in the construction sector normally has a response rate in the range of 20%-30%.

The respondents consisted of a wide range of construction stakeholders to reduce bias in the results. As shown in Figure 1, they included quantity surveyors (28%), architects (19%), engineers

(12%), contractors (23%), site supervisors (9%) and project managers (9%). In the questionnaire, a five-point Likert scale was used to facilitate the rating of the respondents' knowledge and attitude toward social sustainability.

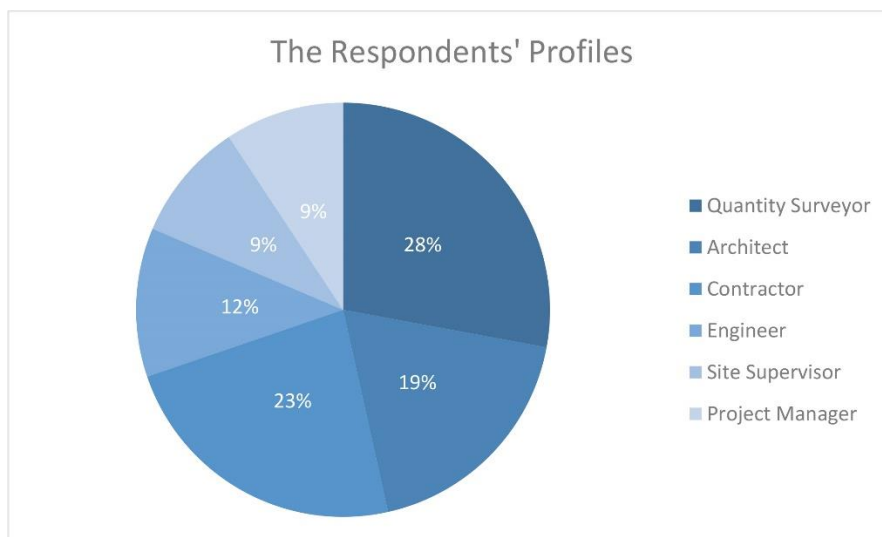


Figure 1 The distribution of questionnaire respondents in accordance with job.

Expert interviews were conducted in the second stage. Two experienced construction professionals extensively involved in sustainable construction projects were identified as the experts in the study to provide their insights into complicated social sustainability issues. Due to practical reasons such as difficulty in accessing experienced stakeholders in social sustainability in construction, a small sample was involved in the expert interviews. On the qualitative ground, the expert interviews, while limited in size, still offer rich data and capture the complexity of social sustainability required in the study. Interviewee A is a project manager with 10-year experience in the construction field while interviewee B is a contractor with 13-year experience in the construction industry. The interview explored the stakeholder perceptions about the complex issues associated with social sustainability such as the interferences of social dimensions in the built environment. Interview findings helped validate the survey results and advanced the understanding of the contextual information of social sustainability in construction. Apart from generating confirmation results, the findings of expert interviews also give more new insights into the application of social sustainability that was unable to be revealed by the survey instrument, due to its limitations in exploring the required information depth.

5. Results and Analysis

5.1 Questionnaire Results

Descriptive analysis was used in analyzing questionnaire survey results. The results suggested that the implementation of social sustainability is higher than expected in which approximately 79% of the respondents have implemented social sustainability in past projects. The respondents were then asked to rate the importance of social sustainability in past projects. As shown in Figure 2, only 34% of the respondents regarded social sustainability as important and very important. While 21% respondents held a neutral view, about 21% of the respondents considered social sustainability

unimportant. Despite the implementation, it appears that construction players still do not fully appreciate social sustainability. The result also illustrated an absence of sound stakeholders’ perception and awareness of the importance of the social pillar in delivering sustainable development goals within the built environment. This finding also reinforces the past research findings [1] that social sustainability is still largely overlooked by construction practitioners in their sustainable initiatives and there is a lack of sound understanding of the importance of social sustainability in delivering sustainable construction projects.

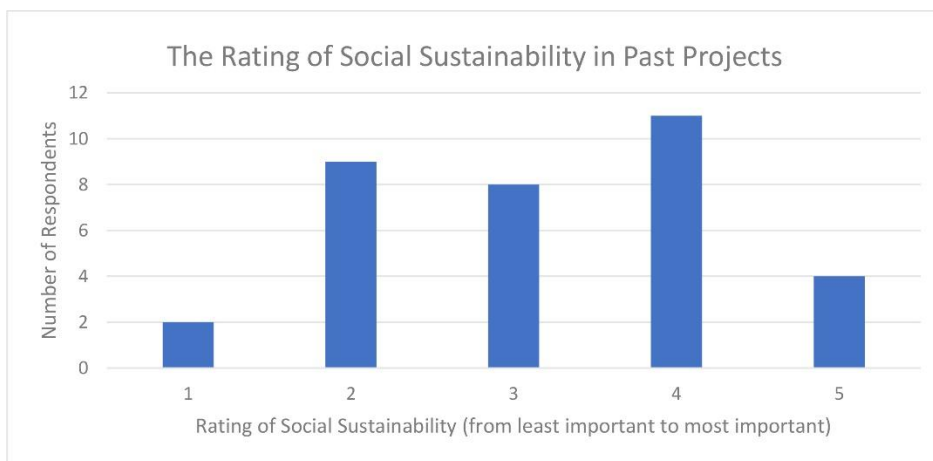


Figure 2 The performance rating of social sustainability in the past projects.

The result portrayed in Figure 3 shows that safety is ranked as the most important dimension followed by health and well-being and social interactions. Around 86% of the respondents agreed that “safety and security” is a fundamental dimension of social sustainability, followed by “health and wellbeing” (74%). However, only about half of the respondents (53%) considered stakeholder engagement and social interaction as an important dimension of social sustainability. Undeniably, safety, security and health and well-being are given more recognition since they are closely related to people’s basic needs and have been a concern of construction practices. The finding is consistent with the results of previous studies [1] in which occupational health and safety are highlighted as the major concern of social sustainability within the construction context.

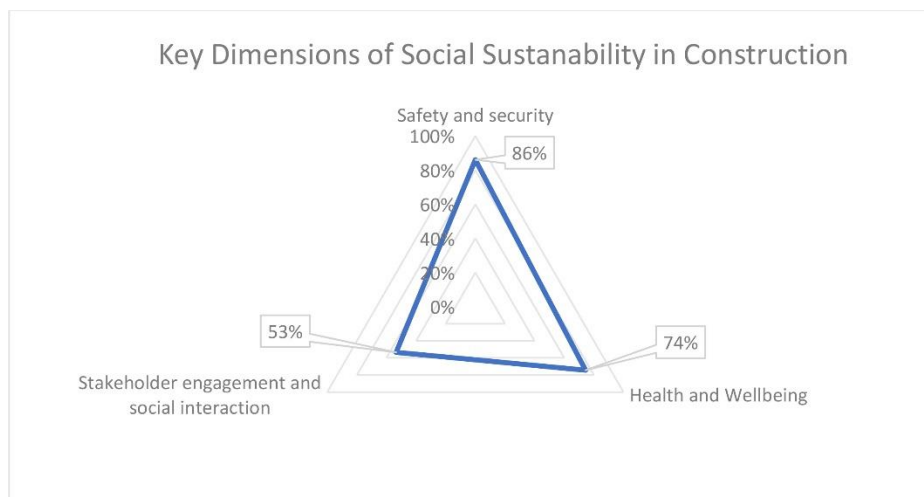


Figure 3 Key dimensions of social sustainability.

Meanwhile, social interaction is perceived to be less important. A lack of proper understanding of social interaction’s importance could result in poor connectedness between people, thus affecting social capital. Social cohesion and stakeholder participation are significant factors in delivering connectedness and contributing to making strategic decisions for social sustainability.

Figure 4 presents the identification of social sustainability dimensions by different stakeholder groups. The distribution of the three dimensions of social sustainability is generally uniform, except for “stakeholder engagement and social interaction.” It appears that "security and safety" is well recognized across different stakeholders for their role in social sustainability. Meanwhile, “health and well-being” is also generally favored by all stakeholders, with more weight given by project managers. Project managers seem to have different perceptions of social interaction, hence giving less acknowledgement. It appears that not a single dimension can overshadow the others in delivering social sustainability.

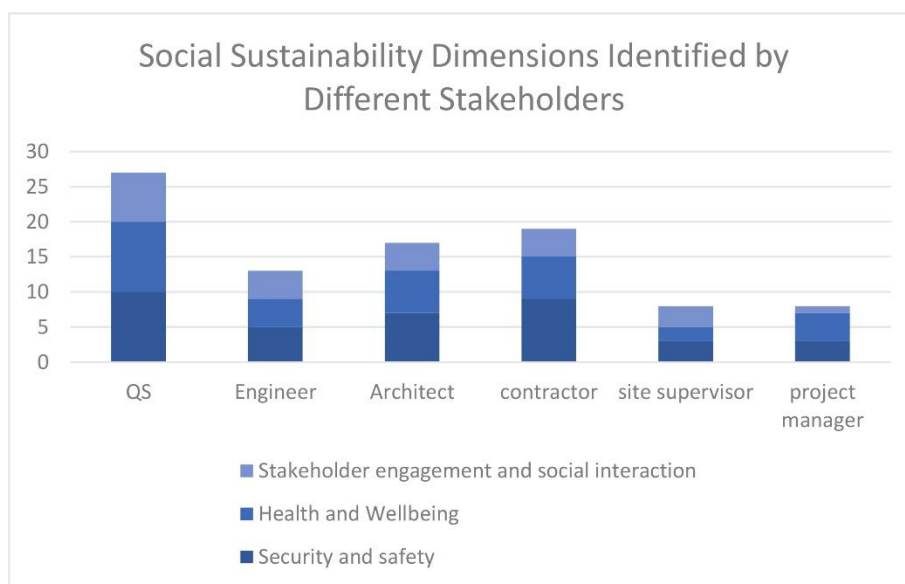


Figure 4 The identification of social sustainability dimensions from different stakeholders’ perspectives.

The chi-square test of independence was carried out to determine whether there is association between different dimensions of social sustainability. In the test, the chosen significance level was 0.05. From Table 1, it can be observed that there is not enough evidence to suggest an association between safety and health and well-being as the p-value is greater than 0.05. Meanwhile, the corresponding p-value for safety and social interaction is less than 0.05 (as displayed in Table 2), it can therefore be concluded that safety is significantly related to social interaction. The interrelation between these two variables can be clearly observed in community development since good social interactions can only nurtured when a place’s safety is ensured. The result also shows that health and well-being are tied to social interaction. As shown in Table 3, the p-value is lower than 0.05, i.e., 0.043, with a Pearson chi-square value of 4.083. It underscores the association of social interactions in promoting health and well-being discussed in the literature.

Table 1 Chi-square test for safety and health and wellbeing dimensions.

	Chi-Square Tests				
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.397 ^a	1	0.122		
Continuity Correction ^b	1.090	1	0.297		
Likelihood Ratio	3.869	1	0.049		
Fishe''s Exact Test				0.312	0.149
N of Valid Cases	43				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.53.

b. Computed only for a 2 × 2 table.

Table 2 Chi-square test for safety and social interaction dimensions.

	Chi-Square Tests				
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.063 ^a	1	0.014		
Continuity Correction ^b	4.085	1	0.043		
Likelihood Ratio	8.352	1	0.004		
Fishe''s Exact Test				0.023	0.017
N of Valid Cases	43				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.79.

b. Computed only for a 2 × 2 table.

Table 3 Chi-square test for health and wellbeing and social interaction dimension.

	Chi-Square Tests				
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.083 ^a	1	0.043		
Continuity Correction ^b	2.790	1	0.095		
Likelihood Ratio	4.170	1	0.041		
Fishe''s Exact Test				0.078	0.047
N of Valid Cases	43				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.12.

b. Computed only for a 2 × 2 table.

5.2 Results of Expert Interview

Both interviewees reflected social sustainability as providing quality of life by creating a healthy built environment. From the perspective of interviewee A, social sustainability is a subjective

concept in relation to people's basic needs by creating a place that supports the people's needs, hence improving the quality of life. The main dimensions of social sustainability proposed by interviewee A include health and safety, happiness and quality of life. Because the construction industry is often pictured as dirty, difficult and dangerous, health and safety play an important role in delivering social sustainability goals. Besides, he also perceived happiness as a key dimension because all stakeholder's emotional needs must be addressed to achieve win-win situations.

Similarly, interviewee B also held that sustainable communities as a significant aspect of social sustainability to serve existing communities and future generations well. According to interviewee B, good quality of life helps create a healthy environment. In addition, 'a sense of place' and 'equal access to services' are also recognized as the key dimensions of social sustainability. Interviewee B added that a positive sense of belonging to a place is significant because it contributes to people's happiness in the neighbourhood. Besides, equal access to services promotes social equity, one of the main principles of sustainability to meet the needs of both the present and future generations.

In general, the interviewees agreed that proper identification of social sustainability dimensions would help improve the overall sustainable development goals in the built environment. However, interviewee A found that the awareness of social sustainability in the built environment is still low and excessive focus has been put on developing environmental sustainability. From his perspective, the development of social sustainability could gain more attention from the industry if those social dimensions are properly taken into account in the development, hence striking a good balance between the three pillars of sustainability goals in the long run. On the other hand, Interviewee B highlighted the interrelation between social, economic and environmental sustainability. He held that satisfying individual social needs would change one's attitudes and perceptions, improving the performance of other sustainability pillars: environmental and economic sustainability.

5.3 Discussion

From the survey results, the dimensions of social sustainability include safety and security, health and well-being, and social interactions, which were agreed upon by more than half of the respondents. On the other hand, the interview findings suggest that sub-dimensions of social sustainability shall expand to include quality of life, sense of a place, equal access to services, and happiness. Various social dimensions found in the interview and survey results imply various social sustainability dimensions perceived by different construction stakeholders due to their vested interests and needs. Rather than discrepancies, the results show that social sustainability should embrace vast considerations and cover a wide scope of social dimensions. As Li et al. [10] revealed, multiple construction stakeholders rated the relative importance of social sustainability dimensions differently. While stakeholder participation is a main concern of government officials and the public, industry practitioners and academics prioritize mechanisms to cope with stakeholder conflicts. This shows that the social sustainability dimensions are greatly determined by the nature and objectives of the involved stakeholder's organization.

The identified social sustainability dimensions align with previous studies [1, 4, 10, 18]. Zuo et al. [1] highlighted the importance of health and safety, access to services and resources, locality, and impacts of communities in the practice of social sustainability. Meanwhile, Li et al. [10] revealed the quality of daily life, appropriate macro policies, harmonious connection with the surrounding, unique local identity, effective public participation and others. These results again suggest social

sustainability is a 'people-oriented factor' by improving human well-being and giving equal access to resources, while decreasing social exclusions and conflicts with the surrounding.

6. Limitations and Future Studies

The study has some limitations. The concept of social sustainability is at its early stage of development in the construction and building sector. There is a lack of widespread implementation of social sustainability in construction, which poses some challenges in collecting data. As a result, the study sample is relatively smaller, and the study has a low response rate. Nonetheless, the result still offers good insights into developing key dimensions of social sustainability and the stakeholder perceptions of developing social sustainability in the construction context. More empirical studies should be conducted to observe and determine the main indicators and sub-indicators for each social sustainability dimension in the built environment.

7. Conclusions

Sustainable development has been promoted in the construction and building industry, but social sustainability still receives less appreciation from construction stakeholders. The paper advances the literature by identifying several main themes and dimensions of social sustainability within the context of construction. The main dimensions of social sustainability identified in the study are "safety and security," "health and wellbeing," and "stakeholder engagement and social interactions." Focusing on the identified main areas of social sustainability can avoid drifting into a very convoluted list of social sustainability dimensions, guiding addressing social sustainability principles in practice.

The paper also contributes to ongoing debate about defining social dimensions according to the industry nature and stakeholders' interests and expectations. Despite the adoption of social sustainability in practice, there are respondents who lack sound awareness of the importance of social sustainability. Different stakeholders appear to give similar attention to all the identified dimensions in delivering social sustainability. Sub-dimensions such as quality of life, sense of place and equal access to services are proposed to be considered in the spectrum of social dimensions in construction. In addition, the study found that "happiness"—a mental health indicator- is also crucial to achieving social sustainability within the construction sectors.

The findings also revealed the interconnections between various social sustainability dimensions in construction. Safety is found to have a significant relation to social interaction but a less strong association with health and well-being. The result also shows that health and well-being are tied to social interaction. The increased understanding of the interconnections of social sustainability dimensions in construction projects would serve as a basis to assist future researchers in developing frameworks for assessing the performance of social sustainability in the built environment.

Social sustainability is a dynamic process, and it constantly evolves. Considerations should also be given to offering more depth and breadth in improving social sustainability implementation in the built environment. The sub-dimensions of social sustainability shall be further developed by more in-depth empirical studies and content analysis, with construction sector-specific indicators. The knowledge of social sustainability needs to be enhanced to encourage a wider application of social aspects in meeting sustainable development goals. More rigorous actions shall be called for to promote social sustainability to give a more balanced development in delivering sustainable

development goals. Future studies should be carried out to appreciate the roles of social sustainability in contributing to the overall sustainable development goals in the built environment.

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Author Contributions

Each author has contribution to this work in conception or design of the work, drafting the article, data interpretation and critical revision of the article. The second author also contributed to data collection and data analysis.

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Competing Interests

The authors have declared that no competing interests exist.

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