

THE ATTRIBUTES OF SOCIAL SUSTAINABILITY IN CONSTRUCTION: A THEORETICAL EXPLORATION

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Sustainability in construction is a process of compliance to the three main pillars of sustainability, which are environmental, economy and social practices that influences project performance. Most of the previous studies have focused on the dimensions of environment and economy due to the clearly expressed quantitative indicators, as compared to the social dimension, which is more subjective in nature. Therefore, there is a lack of understanding on what Social Sustainability (SS) actually means, since there are different perceptions and motivations on SS by different stakeholders, at different phases of the construction project life cycle. Additionally, the strong focus of past SS studies on the construction stage of project has left other phases to be side-lined. Therefore, this is would be one of the few studies that considers the attributes of SS for the entire construction project life cycle. The objectives of this paper are to identify the attributes of SS in construction, and to relate the social attributes to the different phases in construction project life cycle. This paper has conducted meticulous systematic review, with 45 studies that have been critically assessed on SS in construction. The articles have been analysed with a particular focus on the definition of SS, research methods used, the central themes covered and the evolution of the debate including theories and the main findings. Finally, the outcome of this study would be an integrated framework that displays the relationship between SS attributes with the different phases in construction project life cycle. The framework would benefit all construction stakeholders towards understanding the attributes of SS that may further influence their decision making on the social aspects of their projects.

Keywords: Attributes, social sustainability, systematic review

INTRODUCTION

Sustainable construction has been recognized as a main priority by most countries. Sustainability in construction is a process of compliance to the three main pillars of sustainability, which are environmental, economy and social practices that influences project performance. As a regional society, the community is a place of people's social life belonging in a certain geographical area. As a social space to meet the needs of residents, it is also a place for community capacity building. Thus, to realize the healthy and orderly development of a city, the initial step is to conduct community sustainable construction. Achieving sustainability is becoming increasingly critical for measuring the overall success of projects. Given the complexity of construction projects, the successful management of sustainability related targets requires joint

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efforts from the major stakeholders involved, including project clients, contractors, suppliers, and the general public.

The economy and the environmental issues in regard to construction activities have been the household term and have always been the focus of community development. However, with the improvement in living standards, people's requirements for residential areas have been continuously improving, as non-materialistic lifestyle may also improve well-being to some extent. Therefore, from the social perspective, social sustainability (SS) is an important part of urban sustainable development. However, developers often provide little attention, with minimal holistic exploration on the aspects of SS since it does not have direct impact on them (Bamgbade, Kamaruddeen, and Nawi, 2017; Sierra, Yepes, García-Segura, and Pellicer, 2018; Sierra, Yepes, and Pellicer, 2017). While significant literature is available on economic and environmental impacts; little has been done to investigate the social attributes and social impacts of construction projects. Furthermore, decisions on economic and environmental impacts have been easier to be determined, as compared to social impacts, where difficulties were encountered in formulating measurable SS criteria (Nakamba, Chan, and Sharmina, 2017). The developers have practiced SS in their housing development, but the understanding and application differs for each project. This situation causes confusion among stakeholders due to the non-standardization of the elements. This is partly due to the lack of consensus on SS indicators and their relative importance in different projects. SS directly relates to how people are affected by a project and therefore, may be perceived as a highly subjective concept. However, excluding the social dimension in an infrastructure development will have detrimental effect in short- and long-term period that determines results of the entire project life cycle.

Therefore, this study attempts to identify the attributes of SS and to relate the social attributes to different phases of construction project life cycle. This study has been conducted through systematic review and is guided by the following research questions; i) RQ1: What are the social sustainability attributes found in construction practices? ii) RQ2: How does the attributes of social sustainability relate to construction project life cycle? In order to address these questions, this study has identified the SS attributes in construction and further designated the SS attributes over the project life cycle in construction.

METHODOLOGY

The study has adopted a secondary study from systematic review of published literatures on social sustainability (SS) in construction or project. This method seeks to explore the attributes of SS in construction, due to the limited past studies found on this subject. The gap in knowledge would require a proper background study in order to appropriately position new research activities in regard to SS in construction. Systematic review (SR) is an important scientific research approach in identifying, evaluating, interpreting and summarising all available research on a subject matter. SR allows researchers to examine the strength of the published evidences and has been argued to be one of the most efficient method for identifying and evaluating literatures. The general workflow of the SR process is illustrated in Figure 1.

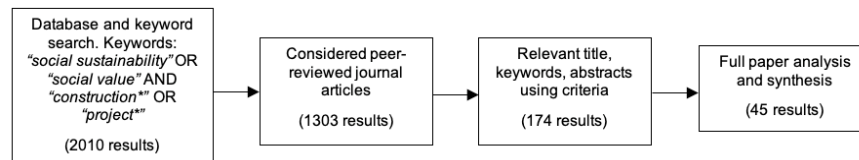


Figure 1: Systematic review process

Systematic review (SR)

Gupta *et al.*, (2018) have suggested a five-step process of conducting SR, which are: (i) development of research questions (ii) identification of relevant published studies (iii) evaluation of related and quality studies (iv) summarization of evidence; and (v) interpretation of the findings.

In this study, the first step was the formulation of research questions to guide the review. This was followed by literature search in the Scopus database in order to identify articles to be included in the review. Scopus database was chosen because it is the most effective search engine with the largest online database of peer-reviewed publications. The search results can also be sorted by number of citations, as compared to Google Scholar, ScienceDirect and PubMed, as explained by Tober (2011). The common practice in SR studies is to limit the findings to peer-reviewed articles published in English, due to language communality. The findings were also not confined to any year ranges.

In carrying out searches for the articles in Scopus, the keywords of “social sustainability” OR “social value” AND “construction*” OR “project*” were used to identify materials in their titles, abstracts, or keywords. The asterisk (“*”) was used at the end of the search keyword to cover a broad range of results. From the search conducted between 1st December 2018 to 5th January 2019, in total, 2010 hits have resulted from the initial search that contained any one instance of the phrase “social sustainability” or “construction*” or “project*”. These results consist of various sources such as research articles, conference proceedings, books and trade publications. However, as the focus of this review was on peer-reviewed journal articles, all other sources were omitted from the search. A total of 1303 peer-reviewed journal articles were found in the second step of review (“identification of relevant published studies”) that were potential to be included in this review.

Since the review is focused on SS in construction/project, there was a need to select only the related content. Therefore, from the earlier results (1303), the search process was done again with the keyword “social sustainability in construction”. As a result, 174 articles that contain the keywords “social sustainability in construction” AND “social sustainability in project” were found within the results of 1303 peer-reviewed journal articles.

The third step of the review (“evaluation of the related and quality studies”) involves screening and sorting of the identified articles, which involved actual reading of the articles’ abstracts in order to ensure the relevance with the research questions. This review has adopted several inclusion and exclusion criteria to narrow down the selection of literatures. The decisions regarding inclusion and exclusion remain relatively subjective and should be made by more than one reviewer. Therefore, four authors of this paper have examined the titles, keywords, abstracts and overall contents of the 174 articles. The articles with title and abstract beyond the scope of the review were removed. After the full texts were checked and reviewed by the authors, with the aim of identifying the attributes of SS for the entire construction

project life cycle, a final count of 45 articles published in 24 journals were selected as the findings from the SR. The 45 articles have been selected based on the emphasis on SS in construction or project.

A frequency analysis has been conducted to analyse the articles according to the distribution of papers across journals, time of publication and research methods. In line with the two research questions (RQ1 and RQ2) set out in this study, a qualitative analysis of the papers has been done, focusing on the following areas; i) definitions of SS in construction / project; ii) main topics/themes; and iii) the evolution of debate including research setting, theoretical frameworks and major findings. This study has adopted manual data extraction for the content analysis, as this study does not involve large set of data and hence, does not necessitate the use of computer assisted qualitative data analysis software. In addition, manual coding enables familiarization with the data, subsequently allows critical processes of analyses and interpretation by the researchers (Basit, 2003).

RESULTS AND FINDINGS

Frequency analysis

The frequency analysis provides descriptive results of the 45 articles that were related to SS in construction / project. Table 1 provides the overview on the sources of publication across different journals. This result shows that the highest number of SS in construction was found in three journals: 1) Sustainability Switzerland; 2) Journal of Construction Engineering and Management; and 3) Journal of Cleaner Production and can be regarded as core journals in the field. The top three journals contributed to 42.2 per cent of total publications with 19 of the 45 papers. The next four journals (Number 4 to 7) produced 9 of 45 papers (20 per cent). The remaining 17 journals with the least number of papers (with one paper each) contributed 17 of 45 papers (37.8 per cent).

It was also found that 77.8% of the materials were published between 2015 and 2019 from top three countries, namely, the United States (9 articles), China (9 articles), and Australia (7 articles). The three leading authors in this field were found to be Pellicer, E. (6 articles), Sierra, L.A. (4 articles) and Yepes, V (4 articles). SS has received attention, mainly in the field of construction projects, operations management and risks.

The spread of papers across the years has shown a growing trend in the articles published since 2012, with steeper increase occurring from year 2014 onwards. The distribution of publications can be divided into three sub-periods. During the first sub-period year (2012 to 2014), 10 articles were found; 15 articles were published in the second sub-period year (2015 to 2017); and in the third sub-period year (2018 to 2019), 20 articles were found. However, only 8 articles were found in year 2019 (on SS in construction), as the search for this SR was done in December 2018 to early January 2019.

Research methods applied in the reviewed papers

The consideration on methodological approaches also enables further examination of the articles. Table 2 summarises the research methods used in the reviewed papers. The research methods applied in relation to SS in construction extended from empirical papers to literature reviews, as well as conceptual and theoretical papers. Importantly, not all papers have focused on one method, as they have covered both qualitative research methods and mathematical modelling tools. In such cases, these

papers are considered as utilising mixed-method approach. As Table 2 shows, papers based on literature review and case study covers almost half of the articles reviewed (44.6%).

Table 1: Distribution of articles per journal

| No | Name of journal | Frequency |
|-------|--|-----------|
| 1 | Sustainability Switzerland | 7 |
| 2 | Journal of Construction Engineering and Management | 6 |
| 3 | Journal of Cleaner Production | 6 |
| 4 | Journal of Management in Engineering | 3 |
| 5 | Journal of Architectural Engineering | 2 |
| 6 | Journal of Urban Planning and Development | 2 |
| 7 | Facilities | 2 |
| 8 | 17 journals (with 1 relevant paper each) | 17 |
| Total | | 45 |

There has been a rapid increase in literature review papers and a gradual rise in the number of empirical research papers that uses qualitative (e.g. case studies and interviews) and quantitative (e.g. surveys) methods. In line with a field that is emerging in importance, the number of papers seeking to develop theory has also grown (13.3%). In terms of empirical studies, case study research, surveys and interviews contribute over 50 per cent of the reviewed papers. Experiments and mathematical modelling were found in 4.4 per cent of the articles.

Table 2: Distribution of research methods in the reviewed papers

| Research interval | 2012 – 2014 | 2015 – 2017 | 2018 - 2019 | Total no. of papers | Percentage (%) |
|------------------------|-------------|-------------|-------------|---------------------|----------------|
| Literature review | 4 | 1 | 3 | 8 | 17.8 |
| Case study | 1 | 8 | 3 | 12 | 26.8 |
| Survey | 1 | 2 | 3 | 6 | 13.3 |
| Theory/concept | 1 | 2 | 3 | 6 | 13.3 |
| Mathematical modelling | 0 | 0 | 1 | 1 | 2.2 |
| Interviews | 2 | 1 | 3 | 6 | 13.3 |
| Mixed methods | 0 | 1 | 4 | 5 | 11.1 |
| Experiment | 1 | 0 | 0 | 1 | 2.2 |

Social Sustainability in Construction

While scholars studying project life cycle in construction have shown an increasing interest in researching social issues, only few studies have properly defined social sustainability (SS), which have been defined from a number of perspectives, as shown in Table 3. Generally, SS in construction is defined as key parameters or series of processes to improve the health, safety, and well-being of the current and future generations. These definitions point to the idea that SS is related to the management of practices, capabilities, stakeholders and resources to address human potential and welfare, both within and outside the communities of construction.

The underlying question about what the social goals for SS are, can be used as a starting point when aiming to approach SS. SS must be understood in its context and be reinterpreted due to occasion. Olsson, Galaz, and Boonstra (2014) argued that SS

is not something that can be translated into a sentence but should be seen as a conception that provides direction.

Table 3: Exemplary definitions of social sustainability in construction

| No | Authors | Definition |
|----|--------------------------------|---|
| 1 | (Olakitan Atanda, 2019) | “as an aspect that contributes to the enlightening and sustaining the human welfare” |
| 2 | (Doloi, 2018) | “function of set of key parameters such as interest, impacts, understanding, and satisfaction perceived by the wider community on various project issues” |
| 3 | (Valdes-Vasquez & Klotz, 2013) | “a series of processes for improving the health, safety, and well-being of current and future generations” |
| 4 | (Toole & Carpenter, 2013) | “policies and institutions that have the overall effect of integrating diverse groups and cultural practices in a just and equitable fashion” |
| 5 | (Almahmoud & Doloi, 2015) | “measure of ability of people work together for common purposes in groups and organizations” |

Doloi (2018) confirms the non-existence of general or determined definition of SS, as it is viewed as dynamic, dependent on situation and could change over time. However, Olsson *et al.*, (2014) expresses a general content as an endeavour to mount the concept of SS.

Social Sustainability Framework

The literature on social sustainability (SS) that refers to construction projects emphasizes that stakeholder consideration is one of the most important social criteria that should be considered. However, one of the limitations observed in the current debate on SS in construction is the heavy focus on the construction stage of project, because of the newly emerging social procurement policy (Raiden, Loosemore, King, and Gorse, 2019). One way to evaluate SS in construction projects is to identify and measure the SS criteria. The following research studies have tried to identify the SS criteria in construction projects.

Sierra *et al.*, (2016) identified 36 SS criteria assessed at each stage of the Chilean public infrastructure project life cycle, using a series of three-round Delphi method with 24 Chilean experts. They concluded that the most relevant criteria, considering life cycle stages, were stakeholder participation (design and demolition stages), external local population (design stage), internal human resources (construction and demolition stages), macrosocial action of socioenvironmental activities (construction stage), and macrosocial action of socioeconomic activities (operation stage). Table 4 shows the SS attributes collected from the systematic review (SR).

From the SR, there were overlapping SS attributes between the different authors. Therefore, the overlapping attributes with similar meanings have been synced into a representative attribute. Figure 2 has been established to portray the influence of SS attributes over the project life cycle in construction. It is worth highlighting that not all stages in the construction project life cycle contribute equally to the attributes of SS. In fact, it was found that activities conducted during the planning stage significantly affects most of the criteria for Stakeholder Engagement, which is consistent with Sierra *et al.*, (2016) and Valdes-Vasquez and Klotz (2013).

Expectations of the owner, designer, and public at the initial phase of a project is important in order to get the desired output from construction. Therefore, the involvement of buyers and surrounding communities is crucial. The needs and

requirements of the community should be at the core of planning for construction projects and should not be compromised (Almahmoud and Doloi, 2015).

Table 4: Social sustainability attributes

| No | Types of project | Social sustainability attributes | Example of references |
|----|--|--|--|
| 1. | Building / housing | Life cycle assessment, stakeholder-based assessment, society, worker, occupants, local community, cultural value, satisfaction, safety and health labour practices, human rights, indoor climate, accessibility to living opportunities, depreciation rate, working hours, community education, building quality, socioeconomic growth | (Lang & Yang, 2019; Liu & Qian, 2019; Stender & Walter, 2019; Surbeck & Hilger, 2014; Wang, Zhang, & Lu, 2018) |
| 2. | Construction (general) | Cultural heritage, employment, health and safety, training, effects on users, comfort, professional ethics, accessibility, usability, aesthetic degradation, responding to the needs of specific groups, improved quality of daily life, effective public participation, social flexibility, government support and market orientation, company age, staff strength, human rights, regulation. | (Almahmoud & Doloi, 2015; Bamgbade et al., 2017; Montalbán-Domingo et al., 2019; Valdes-Vasquez & Klotz, 2013) |
| 3. | Infrastructure projects (Road, highway, railway) | Stakeholder engagement, impact, communication, satisfaction network, liveability health & comfort, social justice, public opinion, fair and equitable, respecting human safety, security and health, cultural heritage. | (Doloi, 2012, 2018; Sierra et al., 2017) |
| 4. | Other projects (Renewal Projects, Offshore wind power farms, Sanitation Organizations) | Stakeholder engagement, sense of community, cultural heritage, health and safety, local preference / social value, professional ethics, public participation training, social capital, emotion experience, life satisfaction, cleanliness, convenience, financial contribution, pollution, modernity knowledge, costs. | (Montalbán-Domingo et al., 2019; Toole & Carpenter, 2013; Yildiz et al., 2019; Zou et al., 2018) |

At the initiation phase, the project objectives are identified and therefore, requires employment and stakeholder engagement. A feasibility study is conducted to investigate whether each of the delivering option addresses project objectives and a final recommended solution would be determined. The major deliverables and participating work groups are identified, and the project team begins to take shape.

The next phase is the planning phase, where the project's solution is further developed and the necessary steps to meet the project's objectives are planned. Once the project team has identified the work, prepared the schedule, and estimated the costs, the three fundamental components of the planning processes are complete (user consideration). During the third phase, the execution phase, the project plan is in motion and work is performed (team formation). It is important to maintain control and communicate as needed during implementation. During the final closure phase, the emphasis is on releasing the final deliverables to the customer, handing over project documentation to the business, terminating supplier contracts, releasing project resources, and communicating the closure to all stakeholders (macro social performance).

CONCLUSIONS

This article contributes to the current gap in knowledge by identifying the SS attributes and categorizing the attributes based on the type of project; namely, building/housing, construction, infrastructure project and others. Subsequently, the attributes of SS were mapped along with the project life cycle in construction. Findings from the SR suggest numbers of redundant attributes or terms with similar meanings, which might cause confusion. This study has contributed in categorising

the SS attributes with similar or closely related elements to improve the understanding on SS itself, as well as a guidance for decision making among industry stakeholders.

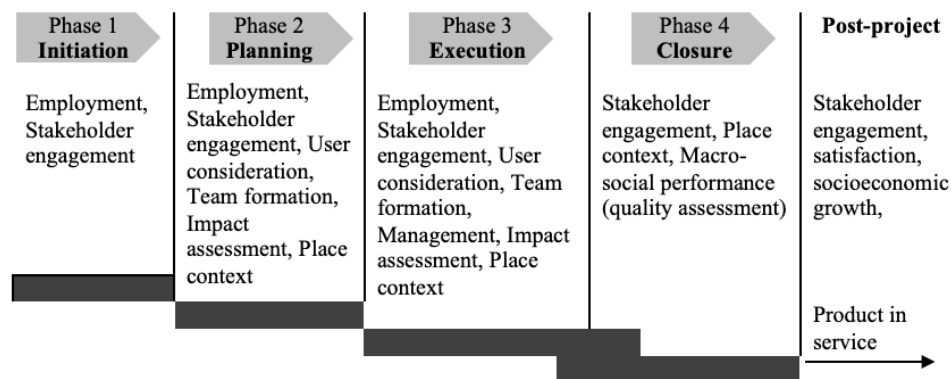


Figure 2: The framework of social sustainability attributes over construction project life cycle

The implication of this study aligns well with the movement towards adopting/ adapting the concept of SS in construction projects, by providing guidance in addressing SS principles at every stage of a project life cycle. It is worth highlighting that Stakeholder Engagement is a major SS attribute that plays a critical role in the practice of social sustainability across construction project lifecycle.

For the industry practitioner, this SS framework serves as an important scaffold for future discussion among organizations and institutions that aim to assess a truly sustainable construction project. The findings of this study may also help decision makers to achieve organizational core values, such as caring for employees and improving community relations. However, policies should be implemented to promote the use of social criteria and metrics in the award of projects and in the evaluation and monitoring of social performance in the construction industry.

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