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## **SOCIAL SUSTAINABILITY IN CONSTRUCTION – AN EXPLORATIVE STUDY**

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### **Abstract**

The construction industry has massive impacts on the society, environmentally, economically and socially. Sustainability has been an important issue being considered by both industry and academia. However, existing sustainability studies in construction are largely related to the environmental and economic aspects. Social sustainability seems missing from the research radar. A qualitative approach is adopted in this study to explore the social sustainability issues in the construction sector. Particular focuses are placed on the attitudes of industry professionals on social impacts of construction activities and the measurement of social performance of construction projects. The results show that there is a reasonable level of willingness from industry practitioners to take these issues into consideration in their projects. This study also highlighted 26 criteria to measure social sustainability in construction context. These criteria form a basis for the evaluation of social sustainability performance for construction related enterprises. Limitations of this study are also discussed.

### **Keywords**

Social sustainability, social performance, social criteria and construction projects

## **INTRODUCTION**

Social sustainability issues have drawn attention from both professionals and academia in industrial contexts such as manufacturing (Hutchins & Sutherland 2008; Labuschagne et al. 2005). It is generally recognized that social sustainability issues need to be taken into consideration during the design, planning and production. It is well recognized that the construction activities have significant impacts on the environment, economy and society (Lützkendorf and Lorenz 2006). Positively, the construction industry produces a variety of buildings to satisfy different requirements, contributes towards the national GDP and provides a large amount of employment opportunities. However, the depletion of natural resources and degradation of environment has triggered an increasing level of public scrutiny on construction activities. The last decades have witnessed the strong efforts been made from both the industry and academic to target the sustainability issues in the construction industry. However, these efforts are largely environmentally oriented such as waste management, greenhouse gas emission reduction, energy efficiency and water

conservation. Impacts of construction activities which affect the surrounding society include traffic congestion and delays, disruption of economic activities, excessive generation of pollution and pollutants, damage to sensitive ecosystems, and damage to existing structures and infrastructure systems (Gilchrist & Allouche 2005, p.90). According to Abowitz and Toole (2010), construction is a social process. Therefore, the social aspects of sustainability need to be paid attention to as well. This is contrasted by the fact there are limited number of studies focusing on social sustainability issues in construction context.

This research aims to investigate the attitudes of industry professionals towards the social sustainability. Particular emphasis is placed on the identification of the criteria to measure the social sustainability performance of construction projects. The results of an extensive literature review are reported in the next section. This is followed by a detailed explanation of research methodology. Then the data are analyzed and results discussed. Finally, the paper concludes with major finding and some research limitations.

## **LITERATURE REVIEW**

There are many definitions of sustainability and sustainable development. The most commonly cited definition of sustainable development is: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987). There are three components to sustainability, i.e. economic, social and environmental, which is often referred to as the triple bottom line approach. In order for sustainable development to be effectively attained, all these three aspects need to be addressed appropriately (Edum-Fotwe and Price, 2009).

McKenzie (2004, p.120) defined social sustainability as “a life-enhancing condition within communities, and a process within communities that can achieve that condition”. In a broad sense, social sustainability reflects the philosophy future generations have at least the same if not more access to social resources than the current generation. All people in a community should have a decent quality of life, such as equity, security, health and access to basic needs (Partridge 2005; Chiu 2003).

According to Gates and Lee (2005), social sustainability is made up of three components, i.e. basic needs, individual or human capacity and social or community capacity. Littig & Griebler (2005) added that social sustainability aims to satisfy human needs and to fulfill social justice, human dignity and engagement. Equity is a critical component of social sustainability (Colantonio 2008, Littig & Griebler 2005). Marafa (2002) highlighted the social impacts as the social and cultural consequences to the society in various aspects from both short-term and long-term perspectives.

The last decade witnessed the significant increase of the importance of the social dimension of sustainable development (Labuschagne and Brent 2006). As a result, there is a growing level of interest from both public and private in corporate social responsibility (Dias-Sardinha and Reijnders 2005).

According to Kaatz et al. (2006), sustainable construction is creating and maintaining a healthy built environment by incorporating ecological principles. Construction projects have significant impacts on surrounding environments, particularly in highly congested urban areas (Gilchrist and Allouche 2005). In essence, the sustainability in

construction context is to improve human beings' lives by means of achieving economic and social goals without cost to the environment (Said 2010). The construction industry has taken on a greater significance in contributing to the quality of life of the community (Myers 2005). Yang et al. (2010) pointed out social responsibility is most important for stakeholder management in construction projects. More attention is required to the social performance during the feasibility study of construction projects (Shen et al. 2010).

There are four pillars of sustainable construction, i.e. social, economic, biophysical and technical, providing a set of overarching, process oriented principles (Hill and Bowen 1997). The social 'pillar' of sustainable construction is based on the notion of equity or social justice (Hill and Bowen 1997). A number of criteria have been suggested in previous studies for the social sustainability (see table 1). As shown in table 1, health and safety issues have been a common concern of social sustainability in construction projects. A construction project poses health and safety risks to not only the project participants on site but also surrounding community or public (Shen et al. 2007). As a result, safety design and security design are essential (Hutchins & Sutherland 2008). Similarly, training and education opportunities should be provided to employees for their professional development (Labuschagne & Brent 2006). Other common criteria of social sustainability include economic contribution, equity, employment opportunities, infrastructure provision, protection of cultural heritage and quality of life (see table 1). To achieve social sustainability in construction projects, it is imperative to engage stakeholders in the decision making process (Labuschagne & Brent 2006; Shen et al. 2007).

Table 1: Criteria of Social Sustainability in Construction

	Yu & Lo (2005)	Hill & Bowen (1997)	Labuschagne & Brent (2006)	Edum-Fotwe & Price (2009)	Gilchrist & Allouche (2004)	Hutchins & Sutherland (2008)	Shen et al. (2007)
Traffic	√				√		
Quality of life		√			√	√	
Ecological impacts	√				√		√
Health and safety		√	√	√	√	√	√
Training and education		√	√	√		√	
Security			√	√		√	√
Cultural diversity		√					
Economic contribution	√		√		√		
Equity		√	√			√	
Employment			√	√			√
Cultural heritage			√	√			√
Infrastructure provision			√				√
Macro social performance			√				

Nonetheless, Social sustainability has been described as the “*weakest pillar of sustainable development*” (Labuschagne & Brent 2006) which is concluded to be due to the lack of analytical and theoretical underpinning. There appears to be a lack of

guidelines for considering and measuring social sustainability criteria in the construction industry.

This study adapted the conceptual model from Labuschagne & Brent (2006) to examine the social sustainability issues in the construction industry (see Fig.1). The issues associated with social sustainability are broadly related to internal stakeholders, external stakeholders and macro level issues.

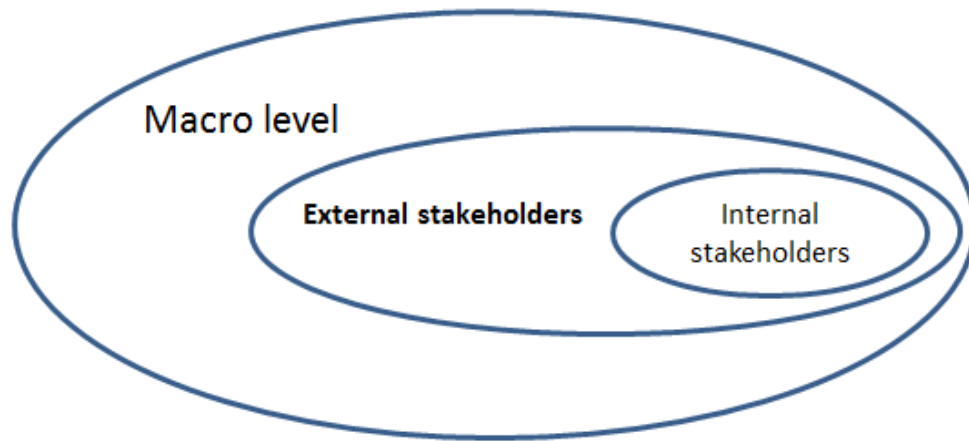


Figure 1: Concept model of this study, adapted from Labuschagne & Brent (2006)

## RESEARCH METHODOLOGY

In order to explore the social sustainability issues within the construction industry, semi-structured interviews were conducted with selected industry professionals. This explorative approach is considered most appropriate considering there are a limited number of studies on social sustainability issues in construction context.

Snowball sampling is employed in this study to identify industry professionals that are appropriate to be interviewed. To be eligible for the interview, the potential interviewee must have (1) the knowledge or expertise on social sustainability in construction; and (2) extensive experience in the construction industry. There are a total of 16 industry professionals who participated into the interviews. Their profiles are shown in Table 2.

According to Bryde and Volm (2009), semi-structured interview is appropriate for exploring respondents' perceptions and opinions about complex issues where opportunities are provided for further information or clarifications. The comparatively loosely structured instrument is helpful to merge the interviewees' opinions (Dainty et al. 2005). Each interview took approximately one hour. Prior to the interview, each informant was asked to confirm once again that they have the social sustainability related experience. Main interview questions include: (1) what is your current understanding of social sustainability? (2) what are major social sustainability issues associated with construction projects? And (3) what criteria can be used to measure social sustainability in construction context? All interviews were noted and transcribed. This is followed by the open coding process in order to highlight the categories or emerging themes (Strauss & Corbin 1990). Once the category structure

is established, the frequency of each subcategory is counted for analysis and interpretation purpose. The raw data and coding results were sent to an independent researcher with basic knowledge on social sustainability in construction for cross-checking. There were extensive discussions between the research team and this independent researcher and adjustments of coding results were made if necessary. During interviews, informants were encouraged to supplement their company or project documents to their comments.

Table 2: Profile of Interviewees

Interviewee	Organization	Experience	Interviewee	Organization	Experience
A	Head contractor	20	I	Subcontractor	23
B	Head contractor	21	J	Head contractor	17
C	Subcontractor	30	K	Client	22
D	Head contractor	25	L	Head contractor	21
E	Client	18	M	Town planner	20
F	Client	18	N	Head contractor	19
G	Subcontractor	20	O	Engineer	21
H	Engineer	20	P	Subcontractor	23

## DATA ANALYSIS

A total of 26 criteria of social sustainability were identified during interviews. They are presented in Table 3. These indicators are grouped into three categories, i.e. internal stakeholders, external stakeholders and macro level according to the coding results in consultation with the conceptual model (see Fig. 1).

### Stakeholders – Internal

Internal stakeholders refer to those people directly working for a respective company in the construction industry. The social importance of the welfare of employees extends to the wider community. Improving the welfare of an employee at work, will in turn improve their personal lives, which will positively impact on their family and friends, and as such the wider community.

Within this category, 10 criteria were identified, relating to occupational health and safety, education, job security and equal opportunities. Occupational health and safety (OH&S) is the major concern of interviewees on social sustainability issues within the construction context. This is generally consistent with findings of existing studies (cf. Hill and Bowen 1997; Edum-Fotwe and Price 2009). Indeed, OH&S is highlighted as one of critical issues of corporate social responsibility within the construction and real estate sector (GRI 2011).

The interview results highlighted most common criteria of sustainability from a health and safety perspective. All interviewees unanimously agreed that it is a very important requirement for workers to be provided with necessary protection for the work under the conditions an employee is to carrying it out. This could include such provisions as personal protective gear, including hard hat, high visibility clothing, safety glasses and sunscreen. However they differed over whose responsibility this should fall under. Some perceived this responsibility falls to the employer, as they

have a duty of care to their employees. Others commented that this is a personal responsibility of all employees to provide the necessary equipment for their job. Interviewee B stated that “You are expected to rock up at a job with the equipment to do the job, and personal protective equipment is a part of what you need to do your job.” Interviewee C disagreed by stating that ultimately, the employee must be responsible for using personal protective equipment correctly. Many interviewees mentioned that they are expected to provide their own personal protective equipment when they are working.

Safety provisions in the work place, such as safety barriers, signage and communication of hazards is rated highest in importance by interviewees. Safety in the work place, especially on construction sites seems to be of great importance to interviewees. The organization in charge of the work area/site should take this responsibility, according to interviewees. Interviewee K explained that “every site is unique” and the most appropriate person to know about the conditions of a particular site is the person/people in charge of, and organising, each site. According to interviewee L, some construction site operators have already taken on board this responsibility. Interviewee D explained that the company he works for goes above the minimum legal requirements when it comes to safety in the work place. This includes providing full height barriers while working on multi storey construction. Interviewee E highlighted that he has worked on several construction sites where dictated safety requirements were above what is required by legislation. These include having to wear safety glass, safety gloves, long sleeve shirts and sun hats at all times while on the site. If these rules weren’t adhered to workers are made to leave the site.

According to the interviewees, fresh drinking water is a necessity and should be accessible to employees all the time. All interviewees agreed that it is the responsibility of the company which is in charge of the place of work to provide the access to fresh drinking water. Interviewee A made the observation that the level of responsibility to be taken on by the employer should be proportionate to the location of the work place. His example stems from his experience working at a project site which is in a remote area. The company in charge provided fresh drinking water on work sites at all times because of the remoteness of the location, and water would not otherwise be easily accessible to the individual.

Interestingly, induction to work areas and ongoing OH&S trainings are perceived as a criterion of social sustainability by interviewees. However this had not been nominated by as many interviewees as the need for personal protective equipment or physical safety provisions as “a lot of site inductions go overboard”. Interviewee D commented that workers need site specific information at induction, rather than general safety revision. The site manager is nominated by interviewees to be responsible for conducting these trainings.

Adequate breaks and reasonable working hours is perceived as very important by interviewees as a critical criterion of social sustainability. The benefits include: reduced stress and fatigue related injuries, positive work-life balance, improving the wellbeing of workers. Interviewee E emphasized that it is the employer’s responsibility to foster a culture of appropriate working hours. Interviewee G supported this by pointing out that an employer shouldn’t pressure employees to work unreasonable hours, as employees can be “bullied” by employers for fear of losing their job.

Having opportunities to continuous professional development is of high importance from interviewees' perspective (cf. Hutchins and Sutherland 2008). Interviewee M explained that training employees was of highest important as the more trained and educated people are the more valuable they are to a business. Interviewee L, with experience in working in rural locations, explained the need to train employees as there are often skills shortages in these areas.

Half of the interviewees commented that the job security within the company is another criterion of social sustainability identified during interviews as it affects employee's wellbeing (cf. Gowdy 2007). Interviewee B considered perceived job security as beneficial because it would reduce stress and as such improve the employee's quality of life. Interviewee J supported this view by stating that if the employee does not have job security they will be focusing their efforts on looking for jobs, not on the task at hand. However, interviewee P expressed that job security should be based on performance of the employee, as he thought it "works both ways" as employees must be hard working and reliable. This opinion was mirrored by several other interviewees.

Equity in workplace is perceived as fairly important by interviewees (cf. Hill and Bowen 1997). Interviewee G voiced his concerns that the "correct understanding of equity" is not always reached. He raised the concern that sometimes people were hired simply because they were of a minority group, which he believes is not appropriate. However interviewee F, who works in areas with a high indigenous population, considers diversity in the workplace to be very important, and necessary to understand local issues. He stated that it is of benefit to a company to have indigenous people working with them in order to improve understanding of community issues in the local area.

### **Stakeholders – External**

One critical aspect of social sustainability is to minimize impacts and disturbance to community (El-Diraby and Wang 2005). Protection of the community during the construction and demolition stages of a construction project is perceived as extremely important by interviewees. An area of this criterion which the respondents found to be significantly important was the need to keep the public out of work sites through the implementation of adequate fencing. Interviewee P stated that it is "critical to keep the public out" of construction sites because they may not be aware of the safety risks on construction sites. Interviewee F added that it is very important to keep the public out of sites to prevent possible legal action, such as suing, if a member of the public were to hurt themselves on a construction site.

Proper traffic management is required to ensure safety of road users. This includes reduced speed limits around changed traffic conditions and directional information to direct traffic appropriately to eliminate confusion and accidents. Community safety should also provide for pedestrian safety including providing alternate walkways when footpaths are blocked off. Control of dust pollution and noise pollution, as well as safe disposal of hazardous materials (such as asbestos) must also be considered for the health and safety of community.

Interviewees overwhelmingly agreed that it is the responsibility of the contractor in charge of the site to ensure the protection of the community throughout the construction phase of a project. The interviewees considered this responsibility to



includes erecting fencing, managing security, providing means for the disposal of hazardous materials, managing changed traffic conditions, providing covered walkways for pedestrians, arranging times and locations for materials to be delivered to site and providing safe storage for materials on site.

Responsible development, with the needs of future in mind is perceived extremely important by interviewees. As a result, the level of community satisfaction will be increased. Three criteria were nominated by interviewees, i.e. designing for transport needs, ensure adequate infrastructure for future needs and design for security. Designing for transport needs includes considerations such as allowing for widening of roads for bus stops if the project will be part of a bus route and ensuring sufficient car parking in new developments. Indeed, the negative impact of construction activities on local traffic forms a major component of social costs of construction projects (Yu and Lo 2005). Interviewee C mentioned the potential cost saving, as building these requirements into the design of a project will reduce costs, compared to trying to add them later. However interviewee F and H foresee problems with implementing this as, although it will be beneficial to do this in the long term, the developer may not see any financial gain from this. They believe that this will deter developers.

Ensuring adequate infrastructure needs for the future means designing with an awareness of the future development of the area, and the increased demand on the infrastructure. This includes roads, and services such as gas, water, electricity and sewerage. As interviewee B stated “society keeps on evolving and we must be prepared”. Interviewee E stated the importance of considering all infrastructure work that needs to be implemented at the inception of a project. He explained that when building new roads, all pipes, such as water pipes, should be laid at the same time as the road works, not after. It is cheaper in the long run as it saves time (for digging up the road) and resources (for repairing the road). It also saves the community from the inconvenience of road works. He referred to a project he is currently working on involving the upgrade of a road. Whilst the road is being upgraded electrical wires and water pipes will be laid while the trenches are dug.

Designing for security is another aspect of responsible development for social sustainability (Edum-Fotwe and Price 2009). It refers to the security of the finished project. It includes designing the end product to be well lit, and design to minimize hiding places which might provide opportunity for mugging or theft. Many interviewees perceive this sub criterion not as important as other aspects of responsible development. Interviewee D commented that it was unreasonable to expect these requirements to be designed into a building. However, interviewee C and H emphasised that designing for security had merit, as it will improve safety. They also stated that it would be easiest to implement these features in the design phase of a project. Interviewee J added that designers should be “mindful” of the security implications of their designs.

Provision for access to areas surrounding construction is another criterion of social sustainability, though not receiving a lot of votes. It related to the issue of access to premises surrounding a construction site. Shop owners next to a construction site may be disadvantaged if construction fencing, vehicles and other items introduced by the construction site obscure the shop or shop entrance. This could cause decreased sales, which adversely affects the proprietor. Opinion was split as to the importance of this

criterion. Several interviewees considered it to be very important to provide access and signage to surrounding properties. The reasons for this were to maintain positive relations with community, and also to not disadvantage trades of surrounding areas. Several other interviewees did not consider this to be important. They explained that “people know where the shops are if they need to go there” and “construction work has to be done and people need to be understanding of this.”

The concept of designing to allow for local employment opportunities takes into account the skill set and resources of the local population. Interviewee B gave an example: “If a project is occurring in a remote location the local workers may not have access to tilt up construction. Should the construction be designed using a simple block work technique, which local labor can do, or should the skills and equipment needed for tilt up construction be imported to the area to undertake to construction?” He perceives designing to allow for local employment opportunities is important as it will positively affect the community by bringing money and work into it. Interviewee F added that “while outsourcing may be cheaper, local families need the work, and that should be more important than construction savings”. Interviewee H and P disagreed by stating that quality is the most critical component of construction works. It does not matter whether labor is from the local area or not.

Preservation of significant sites is another criterion of social sustainability (cf. Labuschagne & Brent 2006; Edum-Fotwe & Price 2009). Interviewee M rated this criterion as very high important as “once these sites are gone they cannot be replaced” and “we lose a living piece of our history that we cannot get back”. Interviewee F stated that respect must be paid to the sacred Aboriginal sites. Interviewee H discussed a project which he is currently working on which exemplifies efforts to preserve significant sites. He is currently working on a project for a remote Aboriginal community. Efforts are made to design ways to supply the community with basic needs such as water and electricity with least disruption and change to the land and local community. This interviewee considers this as a challenge, but “it is necessary to get these facilities to the community without upsetting their beliefs and values.” For instance, they could not use solar power, as the solar panels would have a visual impact on their land. By contrast, interviewee N considers preserving sites to be unimportant as he views it as a hindrance to construction. Interviewee C viewed preserving heritage buildings is “negative as it prevents development”. However it is agreed by all interviewees that significant sites which are a tourist attraction should be saved.

According to interviewees, design to compliment the character of the area is fairly important. Interviewee O emphasised that if a project does not compliment the character of an area it will look out of place, and the developer may experience community backlash. Interviewee A supported this by stating that a project that compliments the character of an area definitely looks better.

Open communication amongst all stakeholders is of the utmost importance to improve social sustainability. As interviewee H noted, “if everyone is on the same page, the job will run smoothly” and problems can be sorted out quickly. Interviewee K mentioned that subcontractors can foresee problems in their area of expertise, and if they were consulted these issues could be fixed before they escalated. Strikingly, a majority of interviewees rated the need for tools such as workshops and other such training sessions they had attended in the past to improve stakeholder communication

as unimportant and useless. However, interviewee P commented that workshops or forums at the beginning of a project would be a good idea in order to work towards realizing everyone's objectives. Interviewee H discussed the merits of weekly site meetings on a construction site which involved all workers on the site. According to his experience, a lot of issues have been resolved through having everyone come together to discuss the progress of the project. This is in line with Labuschagne and Brent's (2006) findings that it is imperative to engage stakeholders in implementing social sustainability in construction projects.

### Macro Level

According to Labuschagne and Brent (2006), a critical aspect of social sustainability performance evaluation is to monitor the social-economics performance and social-environmental performance of the project, i.e. at the macro level. Interviewees perceived it is very important to forecast the economic, environmental and social impacts of a project on the community and monitor the actual impacts. Interviewee C commented that environmental issues are currently very topical at the moment, especially with the introduction of Green Star Ratings and energy efficiency requirements in the Building Code of Australia. Interviewee H brought up the proposed desalination plant to be built in a gulf area. He believes extensive research into the environmental impacts needs to take place, as the effects of pumping so much salt into the gulf may be far reaching and long lasting. Interviewee J added that the monitoring of actual impacts is equally important as the environmental and social management plan can be adjusted accordingly. Our findings are broadly consistent with Labuschagne & Brent's (2006) conceptual framework that the monitoring of social performance forms a significant proportion of social sustainability in construction projects. Interview results highlighted the importance of forecasting social performance as well, even not receiving as many nominations from interviewees as monitoring.

Table 3: Frequency of Social Sustainability Criteria Raised by Interviewees

	Frequency	Percentage
<i>Internal stakeholders</i>		
Access to personal protection	16	100.0%
Safety provisions in the workplace	16	100.0%
Adequate breaks and reasonable working hours	15	93.8%
Access to fresh drinking water	14	87.5%
Access to education and further training	12	75.0%
Fostering of an equitable and fair work place	11	68.8%
Inductions to work areas and ongoing OH&S trainings	10	62.5%
Perceived job security	8	50.0%
<i>External stakeholders</i>		
Protection of the community during construction/demolition periods of a project	16	100.0%
Traffic management	16	100.0%
Open communication amongst all stakeholders	15	93.8%
Ensure adequate infrastructure for future needs	14	87.5%
Design to compliment the character of the area	12	75.0%
Design for future transport needs	10	62.5%
Conflict resolution methods available throughout a project	10	62.5%
Provision for access to areas surrounding the construction	9	56.3%

Table 3: Frequency of Social Sustainability Criteria Raised by Interviewees (cont'd)

	Frequency	Percentage
<i>External stakeholders</i>		
Preservation of significant sites	8	50.0%
Design for security	7	43.8%
Design to allow for local employment opportunities	7	43.8%
Tools available for stakeholders to learn and encompass all stakeholder aims and objectives within a project	3	18.8%
<i>Macro-level</i>		
Monitoring of the actual project impact on the economy of the community	14	87.5%
Monitoring of the actual environmental impact on the community	14	87.5%
Monitoring of the actual social impact on the community	14	87.5%
Forecast economic impact of project on the community	12	75.0%
Forecast environmental impact of project on the community	12	75.0%
Forecast social impact of project on the community	12	75.0%

The responses from the interviews have largely been supportive of the criteria identified from the literature review. Interviewees, as a whole, indicated most of the criteria have merit, therefore should be considered to some degree. It is found the interviewees had an open mind, and positive reaction, to the ideals of social sustainability represented in this study.

Of the criteria respondents mentioned that are currently being implemented in the construction industry the overwhelming reason is legislative requirements. The criteria that are currently implemented to at least some extent are largely the occupational health and safety provisions for both internal and external populations. This supports literature review findings, which indicates that the major driving forces for implementation were legislative requirements as well as instigation by top management.

Interviewees, in general, considered the biggest barrier to improved social performance in the construction industry is the cost involved. It was their opinions that social performance does not yield monetary gains to the project owner. Further to financial barriers, interviewees consider that a current lack of education and awareness of social impacts is prohibiting social sustainability in the construction industry. There is a significant lack of knowledge in the industry of what social sustainability entails and how it can be implemented in the construction industry. Cultural shift is called to draw the industry's attention to the social sustainability matters.

## CONCLUSION

Social aspects of construction are largely overlooked even though sustainability has become a “must consider” factor in developments. This research employs a qualitative approach to explore the social sustainability of construction projects. A total of 26 criteria are identified through a series of semi-structured interviews. These criteria provide a useful reference to investigate social sustainability issues in the construction industry. Safety provisions in the workplace, access to personal protection, protection of the community during construction and demolition stages of construction projects are identified by interviewees as the most significant criteria for social sustainability

in the construction industry. Major barriers to achieve social sustainability include cost involved, lack of education and awareness and lack of knowledge. Limitation of this study owns to the small sample involved in this study which is explorative in nature. It is also beyond the scope of this research to prioritize the number of criteria of social sustainability from different stakeholders' perspectives. Future research opportunities exist to employ a quantitative approach to validate these criteria with a larger sample.

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