

# Social aspect implementation in sustainable construction

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**Abstract.** The concept of sustainable development integrates social, economic and environmental dimensions. There are various models that have been developed to monitor and ensure the sustainability concept are adapted in the construction process applicably. However, most sustainability studies that discussed in construction projects are more focus on environmental aspects rather than economics aspects and social aspects. Meanwhile, only a few studies are discussed on social aspects. Therefore, this study tries to investigate the perception of industry on the implementation. This study is conducted to identify the level of agreement to the implementation of social aspects in sustainable construction and the barriers faced. The social factors (accessibility, health, safety, human rights, education, equity, occupancy design requirement, culture, integrity and stakeholder's involvement) and the barriers (government enforcement, awareness, knowledge and experience, skills, involvement and cost factors) have been identified through literature review. The methodology used was quantitative methods through the formulation of questionnaires distributed to respondents with experience and experts in sustainable construction industry such as Green Manager (Architect, Engineer, and Quantity Surveyor), Town and Regional Planner and academician. The findings obtained through the mean score analysis have found that, the highest three (3) social factors on the agreement of the implementation of social aspects in sustainable construction which are the factors of occupancy design requirement, education and factor of involvement. Whereas the highest three barriers to the implementation were weaknesses of government enforcement, cost factors and stakeholder engagement in sustainable construction. However, there is no association between the numbers of years of respondent's experience with the selection of social factors measured by using gamma test. Thus, it can be concluded that not all aspects agreed by the respondents will influence the actual execution that they will perform in the actual situation on site.

## 1. Introduction

The concept of sustainable development is the basis of system theory which states that social, economic and environmental dimensions are interconnected and in general it refers to an achievement in sustainability equilibrium (Almahmoud & Doloi, 2015; Murphy, 2012). Based on the report of 'Our Common Future' through the publication of the 1987 Brundtland Report states that the sustainability is a development to ensure that it meets the current demands without affecting future generations' ability to meet their own needs (WCED, 1987). Since the world's sustainability agendas are rising by the end of the 20th century, the Malaysian government has taken measures to implement the principle of sustainable development into National Policy Plans (Papargyropoulou et al., 2012). Currently,



Malaysia is committed to the Sustainable Development Goals (SDGs) by integrating them into the 11th Malaysia Plan for implementation in the first phase by having 6 major strategic thrusts where the social aspect is the most targeted aspect (Department of Statistics Malaysia, 2017). The construction sector is a potential sector to be one of the major catalysts in achieving SDGs (Zainul Abidin, 2010).

### *1.1. Problem statement*

Many studies were discussing on sustainable development in the construction project which only focus especially on the environment aspects, compared to the economic aspects, meanwhile, a few studies only discussed on the social aspects without balancing all three dimensions in a sustainability (Abdel-Raheem & Ramsbottom, 2016; Zainul Abidin, 2010). Although there are several projects that apply these three dimensions to their projects, however, a clear agreement on the dimensions of social dimensions leading to social sustainability is less prominent in the construction industry. Thus, Missimer et al., (2010) has examined the existing sustainability framework that is closely related to social dimensions and has found the outcome that this social dimension is less stable and not parallel with the operating framework for the dimensions of the environment and the economy aspects.

According to sustainability principles, the three pillars need to be address accordingly in order for the concept to be successfully adopted. However, with the current trends of focusing on environmental aspect such as energy efficiency, biodiversity, and etc, it is important to have a good study on how a holistic aspect of sustainability can be adopted in construction industry.

### *1.2. Research objectives*

There are two objectives in this research that are to identify the level of agreement to the implementation of social aspect in sustainable construction and to identify the barriers to the implementation of social aspect in sustainable construction.

## **2. Literature review**

The literature review for this study were analysed through various journal articles that related to construction and sustainability. A brief introduction of the sustainable construction concept were defined and this study focused on extracting the social aspects highlighted from previous studies.

### *2.1. Definition of sustainable construction*

High performance, green buildings, smart buildings, energy-efficient buildings, high-performance buildings with automated control system and sustainable construction are often used alternately (Yılmaz & Bakış, 2015; Zainul Abidin, 2009). However, the term sustainable construction is the most comprehensive which has been used to discuss the issues of buildings within the context of the communities in terms of environmental, social and economic aspects.

Sustainable construction is the application of sustainable development principles to the building life cycle from the construction planning stage, including the process of extraction of raw materials to the production building materials and waste management until demolition of the buildings (Kh. M. & Omran, 2009; Yılmaz & Bakış, 2015). It is a holistic process aimed to maintain the harmony between nature and the construction site environment by establishing suitable human settlements, supporting economic equality and improving the quality of human life (Yılmaz & Bakış, 2015; Omardin et al., 2015).

### *2.2. Social concept in sustainable construction*

A literature review states that social sustainability is a various concept based on the contextual situations in which it is to be presented and be more difficult to understand (Wells, 2003; Murphy, 2012; Weingaertner & Moberg, 2014). Social sustainability encourages the concept of respect, awareness, diversity, vitality and responsibility for the workforce and society by ensuring the

community is healthy and safe from the dangers and threats during the project implementation phase (Abdel-Raheem & Ramsbottom, 2016). Zainul Abidin (2010) states that social is a concept that cares for the welfare of workers and future users that includes the aspects of human emotion, peace, satisfaction, safety and comfort, skills, health, knowledge and motivation, and focusing on rights and freedom that only relates to human life (Stephen, 2004; Yılmaz & Bakış, 2015).

### *2.3. Social sustainability factors in sustainable construction*

The factors for social sustainability are the benchmarks that gives an understanding of different users to a specific purpose by allowing them to understand the sustainability issues in a construction project. There are ten (10) factors of the social which have been identified to integrate into the project which are equity, health, human rights, education, occupancy's design requirement, security, culture, accessibility, stakeholder's participation.

*2.3.1. Equity.* The concept of equity in sustainable construction is a freedom of discrimination against gender issues, wage payment issues and hiring of local communities (Murphy, 2012). Furthermore, FIDIC (2004) states that poverty issues which related to the lack of recruitment of local communities in construction industry need to be regulated to prevent poverty in low-income groups (Yılmaz & Bakış, 2015). An equality in appointing firms and local companies in the engagement of a project should be fair (GreenRE, 2015).

*2.3.2. Health.* The provision of clean water supply, good sewerage system, health protection, the importance of medical and clean environment that are not polluted to access social networks into sustainable construction projects are the social elements that need to be applied into construction projects to meet social demands (United Nations, 2017; DOSH, 2017; Murphy, 2012; FIDIC, 2004). A health operation should be done as a measure of the hygiene quality at site (Almahmoud & Doloi, 2015) through the provision of health files that record all health-related activities at the construction site (DOSH, 2017).

*2.3.3. Human rights.* The measurements of these human rights are related to the worker's right for joining a work organization to secure a safe workplace and the wages paid in a timely and complete manner (Wells, 2003) and fairly (Yu et al., 2017). Based on FIDIC (2004), this factor refers to the formal or informal urban population changes affected by project construction and associated with the use of child labor in the project. The involvement of child labor should be avoided as it can cause social dissatisfaction from the public community and give a bad reputation for the government (Yu et al., 2017). According to the Department of Town and Country Planning & Social Impact Assessment Malaysia (2012), public involvement is important to understand the needs of the community regarding the impact of the project to be undertaken through a review of the impact of population placement on construction projects that will be carried out such as reviewing the opinions about the resettlement and the allocation of compensation to the populations involved should be provided.

*2.3.4. Education.* In the context of construction, the provision of education programs into the project as one of the scope of work should be done to increase the level of knowledge amongst the industrial workers involved in reducing the low rate of awareness amongst the industry (FIDIC, 2004) such as workers training development programs at the construction site on fire safety, clean and safe environment areas, use of personal safety equipment, integrity during work and ergonomics management at construction sites. Almahmoud & Doloi (2015) states that, in the factor of integration, it focuses on providing education and training to the industrial community as much as possible to support social activities in projects provided by project stakeholders.

*2.3.5. Occupancy's design requirement.* Based on FIDIC (2004), social sustainability factors for this housing are seen in terms of living conditions of end-users of the built-up floor area for each person

measured by proportion of occupants in one area with sufficient floor space for each person. In Malaysia, the National Housing Policy aims to provide adequate, comfortable, quality and affordable housing to enhance the sustainability of the people's lives (JPBD, 2013).

*2.3.6. Security.* Security is not only applied to construction site's workers but also applied to local communities that live near the construction site (Yu et al., 2017). In addition, Shen et al. (2007) also explains that, there are two types of security that need to be addressed during the construction project which are construction safety and public safety. To ensure the safety of individuals and groups, a control is required either by taking an action to ensure future security or by preparing an action plan that needs to be taken if such events occur at the site (Enshassi, Kochendoerfer, & Hadeel Al Ghoul, 2016). Hence, a safety record during construction should be provided to identify the number of accidents occurring at the site or zero accident (FIDIC, 2004).

*2.3.7. Culture.* The culture of a project is a protection of cultural heritage, which identifies and evaluates the effects of local culture and historical buildings. Building construction will also enhance the value of local culture and preserve historic buildings (FIDIC, 2004). Whereas, the emphasis aside from preserving the historical structure and characteristics of a building, the characteristics of local culture of communities in a particular area should be respected and existing community networks should be preserved (Yu et al., 2017; Almahmoud & Doloi, 2015; Chan & Lee, 2008). The need to consider the determination of this cultural factor towards a project will reduce the negative impact of the project development into cultural heritage.

*2.3.8. Integrity.* In the list of critical social factors stated by Banihashemi et al. (2017), the identification of compliance with anti-corruption regulations and laws during the decision-making process should be considered in order to prevent the occurrence of corruption issues during the construction stage. This is because, the nature of the construction industry which encourage various involvement of stakeholders from different backgrounds and interests (Somachandra & Sylva, 2018). The Sustainable Development Goal Report (SDGs) 2017 prepared by (United Nation, 2017) reports that, most of the construction firms around the world receive at least one bribe payment request when engaging in making payment transactions. Thus, this social sustainability looks at stakeholders' efforts in the construction project to monitor and report on any corruption that occur to reduce it (FIDIC, 2004).

*2.3.9. Accessibility.* Accessibility seems to be an important factor in enhancing social sustainability (Chan & Lee, 2008) which aims to measure accessibility performance into the project throughout its lifecycle involving three communities which are neighborhood community, end-user community and the industrial community (Almahmoud & Doloi, 2015). The industry community sees the accessibility associated with existing public facilities to get to the construction site every day. In addition, other measurements for these factors are as provision for an undisturbed and secure facility area and smooth traffic routes around the construction site for local communities nearby and workers at the site (Almahmoud & Doloi, 2015; Yu et al., 2017).

*2.3.10. Stakeholder's involvement.* In construction, this factor emphasizes the spread of engagement during the construction stage to obtain a labor spectrum which represents the various types of stakeholder's backgrounds in which the organization should deal along the construction process (Abdel-Raheem & Ramsbottom, 2016). According to Ng & Yap (2016), communication between the two parties, stakeholders of the project and local communities are needed in planning and decision-making such as townhall and focus group discussion. The involvement and acceptance of project stakeholders in construction planning is required as each party needs to have an effective approach to voice out the opinion from the corporate point of view to decision-makers in construction projects (Yu et al., 2017).

#### 2.4. Barriers to the implementation of social aspect in sustainable construction

2.4.1. *Government's Role in Law Enforcement.* The weakness of enforcement and monitoring of the law is one of the reasons the implementation of sustainable construction is at a low level. However, the burden in this context is not blame on the government alone but other parties such as developers, contractors, consultants, suppliers and even buyers as end-users have the influence on the implementation of this sustainability concept in the construction projects (Idris et al., 2015; Zainul Abidin, 2010). In addition, general rules, policies and guidelines that are not encouraging to sustainable development in the construction sector cause the project stakeholders not taking seriously consideration regarding the proper implementation of sustainable construction especially in social aspect (Idris et al., 2015).

2.4.2. *Knowledge and experience.* Even though youth generation have been exposed to sustainable development in their higher education levels, lack of experience in the actual construction industry has led to a problem in the context of the theory of dissemination to practical knowledge (Zainul Abidin, 2010). Banihashemi et al. (2017) noted that, the identification of knowledge factors in education has posed a major barrier to integrating sustainability into project management practices in the construction industry in developed countries. In addition, the lack of knowledge among professional groups, particularly Architects, Engineers and Quantity Surveyors, has found it difficult to initiate projects with respect to green projects in building design and financial and contract advising (Mohamad Bohari et al., 2016).

2.4.3. *Cost factor.* The barrier to the implementation of the social aspect in sustainable construction concept towards the construction industry in Malaysia was one of the consequences of financial constraints due to the need for higher capital at the start of the project which affected the increase in project cost (Syed Jamaludin et al., 2018; Zainul Abidin, 2010). The increase in cost will result in demotivation among developers and customers or end users of the building (Mohamad Bohari et al., 2016). Therefore, by granting incentives should be provided and implemented to increase the motivation among project stakeholders to explore towards green construction (Mohamad Bohari et al., 2016).

2.4.4. *Lack of awareness.* Awareness of all parties is important to ensure the successful implementation of social aspect in sustainable construction including among the society (Rumaizah, 2017). Zainul Abidin (2010) emphasizes that, the rate of action on implementing the social aspect depends on the consciousness and understanding caused by individual actions. An analysis was made by Idris et al. (2015) with respect to awareness, it is essential because without an awareness, there will be no demand in the change of sustainable construction system from traditional system.

2.4.5. *Lack of involvement.* This factor is a very critical to adapt into social sustainability as it requires commitment from all organizations involved in project construction (Syed Jamaludin et al., 2018). Through this involvement, individuals and groups can increase the inclusion of social cohesion into construction projects (Murphy, 2012). In addition, the involvement of stakeholders in a construction project has the potential to assist in achieving a balance between development proposals and the needs of social demands (Almahmoud & Doloi, 2015) also in the decision-making process (Ogunde et al., 2017).

2.4.6. *Training and skill.* Professional bodies also play a vital role in addressing these barriers by providing necessary skills training and development programs to the construction workers (Banihashemi et al., 2017). Hence, the lack of skills training developed by the developer or the

contractor itself will cause to the achievement towards the sustainable construction become unsuccessful (Idris et al., 2015).

**3. Research methodology**

This study is based on literature review and questionnaire to identify the level of agreement to the implementation of social aspects in sustainable construction and barriers to its implementation. The selection of social factors in sustainable construction and barriers to its implementation is based on the literature review that has been collected through journal articles, conference articles, books and others. Questionnaire has been conducted to the potential respondents who have knowledge and expertise in this sustainable construction process such as Green Manager (Architect, Engineer, Quantity Surveyor), Town and Regional Planners and Academicians. All these potential respondents have been contacted to get their views on the consensus on the implementation of social aspects in sustainable construction as well as their perceptions of the prevailing barriers. Survey method were chosen since the list of indicators have been extracted from the previous studies. Therefore, the respondent needs to choose their best preference based on their experience of the list given. They are also allowed to propose any new suggestion on the list of indicators. A likert scale of 7 was used because it is more appropriate and favored by the respondents. Thus, it has good validity and reliability criteria (Budiaji, 2013).

Prior to the actual study, pilot test was conducted to obtain a reliability level of questions that have been set up and distributed to 10 respondents. An Alpha Cronbach method has been used to derive the value where for objective 1 and objective 2 each have a value of 0.952 and 0.907 respectively which is under the category of ‘Excellent’. A total set of 275 questionnaires were sent via email and face-to-face to the respondents, however, only 38 questionnaires were received back. After data collection completed, the analysis of respondents' responses was analyzed by using descriptive statistical analysis method which is the mean value of the score and cross-tabulation by using gamma test for objective 1. Meanwhile, for objective 2, the data analysis used by descriptive statistical analysis method which is the mean value. Both objectives have been tested using the Statistical Packages for Social Science (SPSS). A final answer has been obtained to achieve both the stated objectives.

The mean score scale index is used to record the data obtained from the respondents based on the scale position to obtain a final answer (Table 1).

**Table 1.** Mean score scale index

<b>Levels of Agreement</b>	<b>Scale Index</b>
Strongly Disagree	1.00 – 1.85
Disagree	>1.85 – 2.70
Slightly Disagree	>2.70 – 3.55
Natural	>3.55 – 4.40
Slightly Agree	>4.40 – 5.25
Agree	>5.25 – 6.10
Strongly Agree	>6.10 – 7.00

**4. Result and discussion**

Table 2 below shows an analysis of the respondents' posts involved in the study.

**Table 2.** Analysis of respondents’ posts

Category	Position	Number	%	Total	%
Green Manager GBI @ GreenRE	Architect	9	23.70	20	52.60
	Civil and Structure Engineer	3	7.90		
	Mechanical Engineer	2	5.20		
	Facility Manager	2	5.20		
	Quantity Surveyor	2	5.20		
	Green Building Consultant	1	2.60		
	Lecturer	1	2.60		
Town and Regional Planning	Town and Regional Planning Officer	2	5.20	14	36.80
	Town and Regional Planning Assistant Officer	9	23.70		
	Technical Assistant	3	7.90		
Academician	Department of Town and Regional Planning	4	10.50	4	10.50
<b>TOTAL</b>				<b>38</b>	<b>100</b>

In overall, the highest respondent category was among the Green Manager (52.60%) with the highest percentage being from Architects (23.70), followed by Town and Regional Planners (36.80%) and lastly Academicians at 10.50%. Thus, data received indicates that this study has been successful in obtaining feedback from professionals who lead to reliable data based on their exposure in the wider construction industry.

Level of agreement to the implementation of social aspects in sustainable construction

Table 3 shows the result of mean value towards the level of agreement among respondents on the implementation of social aspects in sustainable construction.

**Table 3.** The mean score for the level of agreement of the implementation of social aspect

Item	Social Factor	Mean Score	Ranking
A	Accessibility	5.82	7
B	Health	5.92	6
C	Security	5.95	4
D	Human rights	5.12	10
<b>E</b>	<b>Education</b>	<b>6.10</b>	<b>2</b>
F	Equity	5.54	9
<b>G</b>	<b>Occupancy’s design requirement</b>	<b>6.17</b>	<b>1</b>
H	Culture	5.74	8
I	Integrity	5.93	5
<b>J</b>	<b>Stakeholder’s involvement</b>	<b>6.03</b>	<b>3</b>

Based on the table 3, the overall score for the level of agreement to the implementation of social aspects in sustainable construction is 5.73 where the mean score is under the ‘Agree’ of scale index in between the mean score > 5.25 to 6.10. The social factors in the top three are preceded by the factors of occupancy’s design requirement (6.17), the factor of education (6.10) and the stakeholder involvement factor (6.03) in a sustainable project. Whereas, the social sustainability factors in bottom three ranks are culture factor (5.74), equity factor (5.54) and human rights factor (5.12).

Occupancy’s design requirements are strongly agreed by respondents for a building construction. This is to comply with existing laws in Malaysia to ensure that the occupants of the building who will live in the building feel comfortable with the allocation of the floor space area which suitable for a person. This is in line with the social sustainability factor stated by FIDIC (2004) that floor area for each person must be sufficient to improve comfort, quality and sustainability (JPBD, 2013). In addition, there are some respondents who argue that minimum occupancy’s design requirements based on the Uniform Building By-Law 1984 are not suitable for practice at present due to changes in the lifestyle of the community by the changing of the modernity of life.

For education factor, it has the second highest mean score at 6.10 under the 'Strongly Agree' scale index. This factor is evidently proven that the provision of educational training to workers at the construction site as well as the involvement of consultants are required to ensure the delivery of sustainable construction knowledge is widely disseminated. This is also stated by Almahmoud & Doloi (2015) where in integration factor, the emphasis on the provision of education and training to a better industrial community is needed to support the social activities that take place in a construction project.

In addition, the third highest score is the factor of stakeholder’s participation. Some of respondents agreed that involvement of stakeholders from the industry and the local community surrounding the construction site is much needed in a construction project. They also suggested not only townhall need to be carried out but focus group discussion (FGD) should be undertaken prior to any construction project because the FGD is a two-way communication between the developer and the local community.

The human rights factor has the lowest mean score compared to other factors which is 5.12 (Slightly Agree). This is because most respondents especially Green Managers are not clear about the need for consideration of these factors in a sustainable construction.

For cross-tabulation test, based on the analysis of gamma test, it showed at 95% confidence level with a significant level of 5% (p - 0.05), the result of the analysis showed that all null hypotheses for each factor were not rejected, whereas alternative hypotheses were rejected. This shows that working experience of respondents did not influence the agreement of social factors for a sustainable project. Thus, it can be concluded that even though the respondents are mostly experienced person in sustainable projects, it does not influence their selection of agreement on the social aspects.

**Table 4.** Gamma test and cross-tabulation analysis

Social aspects	Hypothesis	P value	Gamma value	Result	Description
Accessibility	Years of experience influence the selection of accessibility	0.136	0.235	<i>Null hypothesis not rejected</i>	No association
Health	Years of experience influence the selection of health	0.530	0.099	<i>Null hypothesis not rejected</i>	No association
Safety	Years of experience influence the selection of safety	0.135	0.256	<i>Null hypothesis not rejected</i>	No association
Human’s right	Years of experience influence the selection of	0.673	-0.066	<i>Null hypothesis</i>	No association



	human’s right			not rejected	
Education	Years of experience influence the selection of education	0.948	-0.009	<i>Null hypothesis not rejected</i>	No association
Equity	Years of experience influence the selection of equity	0.683	-0.61	<i>Null hypothesis not rejected</i>	No association
Occupancy’s design requirement	Years of experience influence the selection of occupancy’s design requirement	0.946	-0.13	<i>Null hypothesis not rejected</i>	No association
Culture	Years of experience influence the selection of culture	0.412	-0.114	<i>Null hypothesis not rejected</i>	No association
Integrity	Years of experience influence the selection of integrity	0.198	0.203	<i>Null hypothesis not rejected</i>	No association
Stakheolder’s participation	Years of experience influence the selection of stakeholder’s participation	0.157	-0.216	<i>Null hypothesis not rejected</i>	No association

Barriers to the implementation of social aspect in sustainable

Table 5 shows the view of the respondents towards the barriers that may occur in the implementation of social aspects in sustainable construction.

**Table 5.** The mean score for the barriers of the implementation of social aspect in sustainable construction

Item	Type of Barriers	Mean Score	Ranking
<b>A</b>	<b>Weakness of government's role in law enforcement</b>	<b>4.89</b>	<b>1</b>
B	Lack of awareness in sustainable construction	4.47	5
C	Knowledges and experiences in sustainable construction	4.62	4
D	Training and skills in sustainable construction	4.46	6
<b>E</b>	<b>Lack of involvement in sustainable construction</b>	<b>4.74</b>	<b>3</b>
<b>F</b>	<b>Cost factor in sustainable construction</b>	<b>4.87</b>	<b>2</b>

Based on Table 5, the overall score for the types of barriers to the implementation of social aspects in sustainable construction is 4.67 and the mean score is under ‘Slightly Agree’ of scale index. This means that the respondents have a moderate level of agreement on some of the barriers which cause the implementation of this social aspect to be less focused on a sustainable construction. The highest mean score for the type of barriers is the weakness of government’s role in law enforcement (4.89), followed by cost factor (4.87) and the third highest being the lack of involvement from government, developer, industry and local community. On the other hand, the lowest mean score of the score is the lack of training and skills in respect of sustainable construction with a score of 4.62.

These obstacles will be a challenge to the implementation of social aspects which are less emphasize in a sustainable construction. Based on the respondents' answers, the weakness of government enforcement is a major barrier for its implementation especially insufficient emphasize on general policy on social aspects of sustainable construction. This is also supported by Idris et al., (2015) & Zainul Abidin (2010) stating that, the weakness of government's roles in law enforcement and monitoring of laws is one of the reasons for the implementation of sustainable construction is at a low level.

For the second highest of mean score is the cost factor of 4.87 (Slightly Agree). Majority of respondents believe that costs will be higher if the implementation of social aspects in construction is carried out such as capital costs and cost of facilities. The cost of the facility has the highest agreement from the respondents as the social aspect is more focused on the quality of human life that lies within the construction site or around the site. In addition, respondents noted that the facilities for workers at the construction site are not very important because the most important is the completion of the building. Because of that, the implementation of social aspects will be ignored to reduce the cost that will be incurred for getting the lower cost of construction.

Hence, the third highest mean score of this barrier is the lack of involvement from the government and the top management of developer with a score of 4.74. In addition, respondents among the Green Manager said that, those who have been appointed as green building consultants who provide services related to the elements of sustainability of this project do not have good cooperation with the developer or their clients. This is because of their appointment as a green consultant just to meet the requirements for the construction of green buildings that have been set by local authorities. Furthermore, the lack of communication between the industrial community and the local community is also a barrier to a project to fulfil the social aspect of sustainable construction.

The lowest mean score for the type of barriers is lack of training and skills in the social aspect with a score of 4.67. Although this barrier is under the 'Slightly Agree' index scale, some respondents disagree if this factor becomes an obstacle to the implementation of social aspect in sustainable construction. This is because, there are many development training programs on sustainable construction including the management of social aspects at the construction site organized by the body of the organization that cares for the importance of the construction industry in Malaysia such as CIDB as well as the training programs also provided by the developer and the contractor itself.

The respondents also noted other barriers to the implementation of social aspects that stated in the questionnaire such as hygiene factors in the construction site. The hygiene was not well maintained by the workers because of the attitude of the workers either construction workers or consultant while working on site. The social relations are not conducted properly and there is no clear notification from the developer and consultant to the contractor regarding the intention to implement a sustainable construction in the contract. That is why many contractors are not aware for the implementation of the sustainability in the project.

## **5. Conclusion**

In overall, this study explains the findings of the survey obtained from potential respondents to identify the level of agreement on the implementation of social aspects in the sustainable construction and the barriers have been faced to its implementation. The obtained results will give an awareness to the industry where the emphasis on social aspects in sustainable construction is less focused and practiced. The findings of the study have shown that the level of agreement obtained from the respondents is under the 'Agree' scale index. The respondents agreed that the requirements of occupancy's design requirement, education and stakeholder's participation were among the three

factors that had the highest mean score for its implementation at the construction site. However, through the cross-tabulation analysis by using gamma test, a different result from the mean score test was obtained. These differences show that although respondents agree on the implementation of social aspects in sustainable construction, however, these social factors have no association on their years of working experience as stakeholders in a sustainable construction as well as they are the individuals who are expertise in this social sustainability area. It shows that, the social aspects that need to be implemented in a sustainable construction are still fully unaware by the respondents.

Therefore, to ensure that the implementation of social aspects is in-line with the level of agreement, enforcement actions by the government should be taken place. Thus, each of the proposed construction which has the elements of sustainability of a building is compulsory to carry out social aspects at a minimum level. With the enforcement by the government, at least the minimum requirement needed for social factors shall be implemented.

Lastly, the barriers with the highest level of agreement from the respondents are the weakness of government's role in law enforcement, high cost factors and lack of involvement of stakeholders in sustainable construction. Emphasis on the barriers to the implementation of social aspects in sustainable construction needs to be considered. This is because, through the level of agreement for both objectives will require commitment to continue a development in a more sustainable way in the economic and environmental aspects to create a better life and increase a quality of life. Thus, a sustainable construction which balancing the three elements of sustainability can be achieved.

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