APPLICABILITY OF SOCIO-ECONOMIC FACTORS IN SUSTAINABLE CONSTRUCTION FOR SRI LANKAN CONTEXT

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ABSTRACT

"Sustainability" has emerged as a vibrant field of research and innovation over last few decades. The concept is based on three basic factors; environment, social and economic, namely the Triple Bottom Line. Frequently, the environmental aspect, despite the social and economic aspects, is given a major emphasis in the global arena of sustainable construction. The World Green Building Council (WGBC), being the leading institute in sustainability, has initiated the first step towards assessing the socio economic factors in the field of sustainable construction, which are being neglected in rating green buildings due to its immeasurability as a tool, by developing a framework for assessing the concerns addressed in the Triple Bottom Line. The WGBC criteria presented in seven sections hold concepts developed by the expert panel representing 14 countries, for assessing the social and economic factors. Since the concepts are in contrast with Sri Lankan context, they seek readjustment in order to match Sri Lankan context. Research agenda hascommenced with a comprehensive literature survey, followed by expert interviews and a questionnaire survey. The process of developing the theoretical framework to determine the appropriate weightages between each rating has proceeded using the indicators and benchmarks of the available frameworks. Adjusted criteria of the social and economic factors would be able to improve the applicability of GreenSL to assess the green buildings in Sri Lanka. Developed framework through the evaluation process in the research would be capable of assessing the Sri Lankan sustainable constructions in a more appropriate manner, with proper compositional integration of socio-economic and environment factors. A comprehensive assessment of sustainable construction could be achieved through the developedtheoretical framework that is fitted in to the Sri Lankan context with due consideration on aspects addressed in Triple Bottom Line; economic, social and environment.

Keywords: *Construction Delays; Delay Analysis Techniques (DAT); Utility Factors.*

1. THE CONCEPT OF SUSTAINABILITY

The concept of Sustainability evolved in comparison and contrast with resource availability, defined by various authors in different disciplines since its inception. Roper & Beard, (2006) describe sustainability on a basis of duo facts: having the awareness of the fragility of living things, their ecosystems and the resources on which they depend; and about seeking to implement technical and economic efficiency with a soul and a conscience. Ott, 2003, (cited in Smith, 2011) asserts in his work that sustainability is referred to a system, in which the economy is a subsystem of human society; meantime, holistically being a subsystem of the biosphere, and a gain in one sector may result in a loss in another sector.

According to the literature by (Chabowski *et al.*, 2011), sustainability accounts a direct relationship with corporate social responsibility (CSR), cause-related marketing, corporate citizenship, enviropreneurial marketing, and corporate environmentalism (cited in Mysen, 2012). Filho(2000) points out the misconceptions in the concept of sustainability in terms of its scope being too broad, non-availability of a specific institution to deal with it, demanding substantial resources which do not stand in myriads or justifiable, and lacking the scientific base as proved by his sample survey.

The direct relationship sustainability demonstrates with resources, which is scarce in nature and requires precise use so as not to compromise future use, has increased the conceptual validity over

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time, and has resulted in rapid development of the concept though it comprises both merits and demerits. Sustainability is the major influential concept towards mankind, guiding the human activities ensuring the resource availability for upcoming generations. Two basic approaches are discussed in sustainability, "top down" and "inside out". Top down approach emphasizes on management, measurement and control while inside out emphasizes on change and innovation (Henriques & Richeardson, 2004).

2. THE CONCEPT OF TRIPLE BOTTOM LINE

According to (Jamali, 2006) the Triple Bottom Line concept was put forth to the center concern with the rise of the need of sustainability improvements in organizations. The Earth Summit of Rio in 1992, gave rise to the concept of sustainability and accordingly the concept of Triple Bottom Line came in to light in relevance with sustainability. Triple bottom line simply adhere to three basic terms, environment, social and economic; in other words planet, people and profits (Swanson & Zhang, 2012) which express direct impacts on sustainability. Aforesaid three areas are also integrated, accounting the contributory dimensions of sustainability as a concept itself.

Environmental dimension addresses organizational impacts on living and non-living natural creatures including land, air, water and eco systems. It adheres to the compliance with the government regulations and same time the initiatives on energy efficiency or recycling. Social dimension addresses the impacts of organization towards the society which it operates, emphasizing basically on public health, community issues, publiccontroversies, skills and education, social justice etc. Economical dimension refers to the financial strength or activities of the organization in the market. This will run through issues of competitiveness, job and market creation and long-term profitability (Jamali, 2006).

3. RELATIONSHIP OF TBL WITH THE CONSTRUCTION INDUSTRY

The mutual relationship between the Triple Bottom Line and the construction industry can be primarily defined as sustainable construction. This implies the need of complying built environment with the basic rules of Sustainability in terms of Environmental, Social and Economic. Dickie and Howard (cited in Pitt, Tucker, Reily & Longden, 2009) claimed sustainable construction as to what is built today should be capable of accommodating future, same time, being influential to meet the need of future generations. The importance of Sustainable construction is surged with the presence of managerial tools and methodologies to improve the performance of the construction industry (Persley & Meade, 2010).

Sustainable construction has enlighten thetriple-bottom line in consideration of following objectives according to Department of the Environment, Transport and the Regions, London (DETR) (cited in Persley & Meade, 2010):

- More profitable and more competitive;
- Enhancing and protecting environment;
- Treating the stakeholders in fruitful manner;
- Provide built environment which is with satisfaction, well-being and value to customers and users; and
- Minimizing the impact on the consumption of energy and natural resources.

Few barriers are identified in the adoption of sustainable measures to the construction industry, such as; negligence of sustainable measures by the stakeholders, restrictions for sustainability measures by regulatory bodies, minimization of particular site advantages with the use of sustainable measures and inability of using sustainable measures locally due to lack of knowledge, expertise and technology etc. (Williams & Dair, 2006)

4. RELATIVE IMPORTANCE OF SOCIAL AND ECONOMIC FACTORS IN CONSTRUCTION

The current trend of construction ratings had been emphasizing on the environment aspect, with less or no due consideration on social and economic aspects. The well-established rating tools with regard to the environment aspect have created a sound basis in terms of environmental protection and resource efficiency, making forth a limited space for assessing social and economic factors – which do account as significant parameters directly involved in sustainability agenda (Akadiri and Olomolaiye, 2012).

The leading rating systems of green buildings like Leadership in Energy and Environmental Design (LEED), Building Research Establishment's Environmental Assessment Method (BREEAM), Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) have considered relevancy, measurability, applicability and availability as influential factors of energy efficiency and environmental concerns (Fowler & Rauch, 2006), in which the immeasurable, mostly qualitative aspects of socio-economic component remain unconsidered. At the stage of commencement of ratings, the measurement is said to be the dollar value.

The present day practices of developing future scenarios in sustainable development dealing with successful environmental sustainable strategies, the social and economic dimensions are being neglected. There should be either equal footings for the all three contributory factors of sustainable frameworks; environment, social and economic, or there should be a proper trade-off between aforesaid tri-factors. Established standard rating systems are said to be failed in the basis of application efforts in to different categories of society (Omann & Spangenberg, 2002)

5. REVIEW OF SOCIAL AND ECONOMIC FACTORS IN AVAILABLE RATING SYSTEMS

The concerns on social and economic factors in available rating systems are noticeably low in comparison with environmental aspect. LEED and BREEAM rating systems concern on indoor environmental quality which relates with the productivity of employees with healthy working life (Persley& Meade, 2010).

BREEAM is known as the worlds' first commercially available and mostly used assessment criteria and LEED is regarded as the worlds' mostly established rating system strictly limited to environmental assessment methods with less or no consideration on socio-economic aspects, in which environmental protection and resource efficiency become the centerpiece in agenda.(Akadiri and Olomolaiye, 2012).

BREEAM rating system make scores on building energy, transport, water, materials, land use and ecology, pollution, building management, occupant wellbeing and health in the assessment of the buildings (Swayer, Weilde & Brooks,2008). Although this system do account on social concerns, in a holistic view, the socio-economic factors are not properly trade-off as per the weights assigned in the sustainability frameworks. CASBEE, the Japanese rating system too showcases less concern on so called immeasurable social and economic factors; instead, their emphasis is on energy, water, land usage, materials and measurable indoor environmental aspects (Potbhare, Syal, Arif, Khalfan & Egbu, 2009).

According to the LEED 2009 for new constructions and major renovations project checklist, it is required to assess the facility under the sustainable sites (concerning the site facilities), water efficiency (usage of water), energy and atmosphere (concerning energy efficiency), material and resources (selection and usage of materials for construction), indoor environmental quality (health and wellbeing of the occupants within the built environment) and innovation and design process. Similar to most of the available rating systems, this too lacks due consideration on social and economic aspects.

6. THE FUTURE OF EVOLUTION OF THE SOCIO ECONOMIC CONCERNS IN SUSTAINABLE CONSTRUCTION

The International body for rating green buildings, World Green Building Council (World GBC) has realized the importance of considering the social and economic aspects in rating green buildings or sustainable constructions. This is identified as a major deficiency prevailing in the current practices of ratings.

WGBC initiated in introducing a new social and economic criterion as a new assessment tool for rating systems. The World GBC criteria for assessing the social and economic factors are presented in seven sections holding concepts developed by the expert panel representing 14 countries. Those seven sections comprise with;

- Employment creation
- Economic opportunity
- Training and skills development
- Community benefits
- Mixed income housing
- Equity and;
- Health and safety

Aforesaid framework provides a better guidance for assessing the sustainable construction precisely adhering to the Triple Bottom Line concept; integrating environment, social and economic factors.

7. CONSIDERATION OF SOCIAL AND ECONOMIC FACTORS WITH AVAILABLE ASSESSMENT CRITERIONS

This section would examine the consistency of the social and economic factors drafted by the World Green Building Council with the participation of international experts in sustainable constructions, in relation to a series of well-known existing assessment criterions; LEED, BREEAM, GREENSL and the South African rating system.

The rationale behind selecting specifically above criterions is that, LEED is regarded as the world's mostly established rating system, while BREEAM is considered as world's first commercially available and mostly used assessment criteria. Being the Sri Lankan rating system, GREENSL inevitably adds up to the account, and finally, the most important South African rating system was selected due being the proud pioneers and inculcators of indicating Social and Economic factors in to assessment of sustainable construction.

Table 1: Comparison of Social and Economic Factors with Existing Assessment Criterions

Factors Considering	**LEED** (USA)	**BREEAM** (United Kingdom)	**GREEN^{SL}** (Sri Lanka)	**Green Star SA** (South Africa)
Employment creation Create employment through design decisions and construction practices which include labour-intensive construction methodologies	✓	×	×	×
Economic Opportunity Growth and development enterprises through procurement of goods and services and enterprise development programmes	✓	✓	✓	✓
Training and Skills Development Training and skills development of employees in unskilled, semi-skilled, supervisory, technical and professional who are part of design and construction project	×	×	×	×
Community Benefit Provide community facilities responding to the current socio-economic needs and issues of identified communities	×	×	×	×
Mixed Income Housing Integrate mixed income housing with residential developments	×	×	×	×
Equity The project participants are embracing transformation and performing well in Broad Based Black Economic Empowerment	×	×	×	×
Health and Safety Health and safety practices, culture and understanding in the construction industry	✓	✓	✓	✓

8. DEMAND FOR LOCAL BENCHMARK WITH SELECTED SOCIAL AND ECONOMIC ASPECTS

Sri Lankan context of sustainable construction was enriched with a new chapter with the inception of new green building rating system in year 2011, GREEN^{SL}. This system would have similarities with existing well-established rating tools such as LEED, BREEAM, CASBEE, etc. but with more emphasis on particularly the local context and conditions in terms of assessment of buildings.

Similar to other rating systems, GREENSL, Sri Lankan Green Building assessment criteria which developed by Green Building Council of Sri Lanka do concern on major sections such as sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality and innovation and design process; in contrast GREENSL also comprises with the sections called management and social and cultural awareness which particularly deals with local conditions in assessing sustainable construction.(Green Building Council Sri Lanka, 2011). This section is further divided in to three sub sections; archeological sites and buildings, (as prerequisites) social wellbeing, and public health, safety and cultural identity. Although the initiation of considering the socio-economic factors is to be appreciated, only four points are allocated for the social and cultural awareness section which is meant to assess the social and economic aspects of the Triple Bottom Line concept. A balanced weightage between environmental, social and economic factors is required to achieve a comprehensive and sophisticated rating system for assessing the built environment.

Therefore, the adaptation of global criteria requires readjustments in order to suit the Sri Lankan conditions. Direct adaptation of Framework developed by the World Green Building Council, to the Sri Lankan context could encounter certain drawbacks; therefore, the need of a revised framework which is capable of rating Sri Lankan constructions in terms of sustainability is emphasized. Accordingly, in adapting the global criteria, local benchmarks much focused on local industry should be developed so as to harness the maximum potential benefits.

9. DISCUSSION

The paper, explores the concept of sustainability and the dual-factors essential in evaluating sustainable construction, yet not being paid due attention in comparison with mostly emphasized environment factor; social and economic. Apparently, requirement of further review on following three basic concepts has risen; weighting of factors in triple bottom line, tradeoff between consideration of social and economic factors in developing and developed countries, and the need of local benchmarking for sustainable constructions in terms of social and economic aspects, providing an analytical framework for discussion.

The very first concept, weighting of factors in the Triple Bottom Line, basically structures around the main three elements discussed in the TBL; Environment, Social and Economic which are generally applied in evaluating the sustainable construction. Thus, the major emphasis among three, tend to be on the environment aspect, rather than the remaining governing factors of social and economic. The quality of measurability and availability of qualified professionals for developing and assessing the built environment, in compliance with existing environmental parameters have resulted in an obvious negligence of social and economic factors in assessing sustainable construction in the construction industry. This gives rise to the need of paying increased attention on social and economic factors, triggering a proper composition between three factors in TBL, ultimately achieving a sound sustainability assessment. The weightings could be differed based on the location and the facility, yet, the importance of employing all three factors discussed in Triple Bottom Line; the basis of a comprehensive sustainability assessment should not be underestimated.

The second concept of discussion, trade off between consideration of social and economic factors in developing and developed countries lies on differentiating the utilization of three factors of TBL by developing countries and developed countries. Since the developed countries are capable of using advanced technologies and methodologies, the increased discharges to the environment which could be more harmful and threatening than discharges of less advanced technological users; the developing countries, the emphasis on environment factor in developed countries is justifiable. According to to the

current context social and economic concerns of developing countries should be severly improved to attain the level of improved life patterns of society, In contrast, the developing countries with a series of burning social and economic issues, relatively higher than the environmental issues present in developed countries, require more and more emphasis on social and economic aspects in order to reach a justifiable sustainability assessment. The debatable conclusion drawn is that the developed countries should adhere more towards environmental concerns while the developing countries should keep on emphasizing on social and economic considerations in sustainability assessment.

The final concept of discussion is the need of local benchmarking for sustainable constructions in terms of social and economic aspects. There could be loopholes like weather conditions, cultural context, economic level of the society, benchmarks and indices of sustainability parameters, etc in adapting the existing criterions of sustainability assessment to Sri Lankan context since Sri Lankan conditions are much different from the conditions of the countries which the criterions had been originated. This marks the need of preliminary review and the adjustments of existing criterions, so as to match Sri Lankan context and establishment of appropriate benchmarks in the fields of social and economic, to bridge the gap between international and local frameworks. The development of benchmarks should maintain a close relationship with each indicator in the social and economic categories which would then maximize the highest and best applicability and comprehensiveness of the assessment criterions.

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