The Illusion of Participation: Are Participatory Indicators Truly Effective in Neigborhood Sustainability Assessment Tools

Abstract

Neighborhood Sustainability Assessment Tools (NSATs) are well-established pathways to attain urban sustainability; however, this comes with its own set of scrutiny particularly with regards to the environmental bias of NSATs towards sustainability. However, more socially driven gaps that exist are generally mentioned but never fully investigated. For instance, gaps have been identified that question the effectiveness of NSATs in considering the opinion of the general public in the urban development project; and such participatory indicators that promote inclusive decision making is a key element of sustainability. Thus, this study investigates 15 NSATs to determine the competency of participatory indicators and criteria in effectively allowing relevant stakeholders to make accurate and impactful decisions in design, planning, and construction of urban spaces. The key method used was Arnstein's hierarchical ladder approach, which determines how genuine participatory exercises are through ranking. The second approach, Rowe and Frewer acceptance and process criteria, was used to determine the quality of the decision-making exercise. The results showed the misconceptions that exist within participatory indicators and criteria by drawing out ambiguities that circumvent these inclusivity claims. Some of the gaps detected were the elective nature of most participatory indicators, the low points allocated to these indicators and vagueness and open-ended nature of the instructions and execution of inclusive decision-making. Furthermore, results showed varying quality in how decisions are made. The study proceeded to provide recommendations to improve participatory indicators and mitigate the loopholes observed. These recommendations include, mandating specific participatory indicators, increasing the weights of participatory indicators, providing specific procedures on how to effectively participate within the NSAT manual and utilizing third party participatory tools such as the IAP2 framework to ensure high-level quality participatory procedures are executed.

***Keywords**:* Neighborhood sustainability assessment tools (NSATs); Participatory Indicators; Sustainable Development Goals (SDGs); Sustainability; Participation.

1. Introduction

1.1 Background and motivation of study

The concept of 'sustainability' has led to numerous definitions worldwide with different meanings under various contexts (Berardi, 2013; World Commission on Environment and Development, 1987)(WCED). One of the recurring aspects of most definition involves the idea of meeting the needs of people, but what are the people's needs? Bearing in mind that these needs change over time, making them context-specific and transient (Sharifi and Murayama, 2013). According to Agenda 21, one of the fundamental prerequisites for the achievement of sustainable urban development is 'Broad public participation in decision-making' – particularly, decisions that affect where the participants live and work. Therefore, traditional rights must be recognized, and local communities must have decisive voices about the use of resource in their locality (WCED, 1987, p.115-116). This also leads to the triple bottom line approach in design, where sustainability is attained when social, economic, and environmental targets are attained simultaneously (Ayotunde Dawodu et al., 2017; Li and de Jong, 2017; Mao et al., 2019). Furthermore, in more recent frameworks such as the sustainable development goals (SDG), citizen's participation is a key theory under sustainability, as it is highlighted under the 5Ps (people, planet, peace, prosperity, and partnership) (Cheshmehzangi and Dawodu, 2018).

Furthermore, one of the 17 goals under the SDG agenda is focused on achieving sustainable communities and neighborhoods with a key target indicator (11.3.2) noted to be that '*Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically*'. This translates into an inclusive process where local residents can provide relevant and context-specific information to aid in the development of well-paying jobs, good schools, facilities, clean air, and water resources, and the beautification of places they live, work and play. Based on Agenda 21 established in 1987 and SDG initiatives established in 2015, inclusive participatory methods of planning that include top officials, experts, and the relevant local stakeholders are recommended (Roy and Pramanick, 2019; Wang et al., 2020). The relevant stakeholders recommended includes potential building unit owners and users such that all age, gender, ethnic and income groups are all involved. Such inclusivity welcomes contributions from all members of the community including the misinformed, uneducated, disabled, elderly and other groups that may be regarded as disadvantaged or not ideally included during major decision making. Hence, considering the opinions and needs of these relevant stakeholders has become a key process in the design and planning procedures for developers in order to achieve urban sustainability for neighborhood projects (Berardi, 2013; Braulio-Gonzalo et al., 2015; Joss, 2015).

In recognition of this, third party certification programs that determine and label the sustainability of neighborhoods and communities have emerged to become a true embodiment of these participatory procedures. These tools, named neighborhood sustainability assessment tools (NSATs) assign credits to a list of sustainable development considerations in the urban environment such as energy, transport, waste management, and water use. Hence, NSATs provide prescribed, solution-driven instructions through headline sustainability indicators (HSI) which comprises of a series of related assessment criterions known as sustainability indicators (SI) (Cappuyns, 2016).

However, there are still some challenges and gaps associated with NSATs. One of the main challenges acknowledged has been stakeholder engagement in the development and implementation processes (Sharifi and Murayama, 2013). Consequently, a motivation for this study is to investigate the effectiveness of the participatory indicators in contributing to the assessment process utilized by NSATs for achieving urban sustainability. Numerous studies have argued for the overly top-down approach in creating assessment tools such as Building Research Establishment Environmental Assessment Method (BREEAM) Communities, and Leadership in Energy and Environmental Design (LEED-ND) Neighborhood Development (Boyle et al., 2018; Dawodu et al., 2019; Komeily and Srinivasan, 2015; Sharifi and Murayama, 2014a). This indicates a growing concern about the inclusive approach used for the selection of HSI, criteria and weighting system. Yet, questions regarding the effectiveness of these participatory indicators within these assessment tools have been rarely investigated. Studies by Berardi, (2013), Boyle and Michell, (2017) and Horgan and Dimitrijević, (2019) have indicated that participatory based HSI and criteria may be ineffectual and have little or no effect in involving the relevant stakeholders in the participation process. Boyle et al. (2018) in a case study analysis of False Creek development, which utilized LEED-ND to implement smart linkages of roads and good access to public transit scheme, noted that individual preferences of people in the community were not considered but rather assumed. This was based partly on the assumptions made by the NSAT (LEED-ND) and the developers who implemented the project. The result of these assumptions showed that the percentage of False Creek's population that uses a personal vehicle to commute to work is virtually the same as for Vancouver as a whole. As a result, the fuel used by the community and overall city's transport sector remained the same, rather than the expected reduction from the utilization of LEED-ND. The result of this study implies that if the decision was more inclusive in nature, perhaps citizens would have highlighted reasons why smart linkages and transit schemes might not be as effective. Boyle et al. (2018) further explains that the low uptake of the sustainability initiative was based on the behavioral characteristics within the community.

Thus, the need to investigate the development of assessment tools in an integrated, inclusive and participatory manner and to determine if these assessment tools consider participatory indicators in a capacity that supports stakeholders' ability to influence urban developmental decisions. In effect, thorough investigation is required to determine and understand effective participatory indicators and if their role in NSATs is impactful. The term 'impactful' is emphasized because even though participatory indicators may be present in NSATs, they may serve as a form of greenwashing where process of participation are optional and lead more to educating the participants of decisions predetermined by experts as opposed to an active exchange of knowledge and collaboration. Hence, the illusion of participation, where the participants can contribute but their suggestions and opinions are not considered or applied into the urban development plan.

Thus, this study aims to determine the following:

1. How well do NSATs consider participatory indicators in their development process?
2. How competent are the participatory indicators and criteria developed under the various NSATs in effectively allowing relevant stakeholders to make impactful decisions on the design, planning, and construction of their urban space?
3. What trends and gaps exist within the participatory indicators of various NSATs?

4. What recommendations on participatory indicators can be provided to enhance the future development of new tools or enhancement of existing ones?

2. Literature Review

2.1 Emergence and NSATS and its participatory gaps

NSATs evolved from environmental building assessment tools. These tools were established two decades ago based on the environmental motivations highlighted in the Brundtland report. They were initially focused on buildings with tools such as BREEAM New Construction and LEED New construction being developed and were labelled building sustainability assessment tools. An evolutionary extension came about in the last decade, due to the widening scope of sustainability from environmental to social and economic, creating BREEAM-Communities and LEED-ND (Villanueva and Horan, 2018). As such, the inability of building assessment tools to address abstract and community-based elements such as connectivity and transport infrastructure and urban form as well as principles like the Urban Heat Island Effect (UHIE), led invariably to the development of NSATs (Sharifi and Murayama, 2014b). Consequently, the popularity of mesoscale point-based initiatives has maintained a steady upward trajectory globally.

In addition to NSATs ability to foster sustainable interaction between buildings and their infrastructure, through the integration of social, environmental and economic dimensions, NSATs also allow for third-party evaluation against several pre-defined sustainability criteria. This provides guidance for planning projects and allows organizations to define and use sustainability targets early in the planning process, thereby highlighting all sustainability issues that would otherwise risk being overlooked (Wangel et al., 2016). Property owners can use the certificate for marketing and procurement. The certification system also provides a common language for communication between stakeholder groups and promotes a joint understanding of projects and their intended outcomes. Also, the utilization of HSI and criteria leads to better decisions and more effective actions by simplifying, clarifying, and making aggregated information available to stakeholders (Komeily and Srinivasan, 2015; Villanueva and Horan, 2018). These indicators also help in implementing physical and social science knowledge into the decision-making processes, as well as in setting targets, and measuring and calibrating progress toward such targets (Hák et al., 2016).

Despite the advantages of NSATs, initial research on earlier developed tools has illustrated several shortcomings such as an overly top-down approach in indicator selection, a recurring bias in favor of issues related to environmental sustainability in urban design, with fewer criteria related to social and economic dimensions of sustainability (Berardi, 2013; Sharifi and Murayama, 2013). Furthermore, many models show a strong bias on sustainability in the community itself, while the relationship between the community and its global hinterland is often disregarded (A. Dawodu et al., 2017). Another key factor is the weighting systems used in most NSATs to provide a quantifiable gauge for specific indicators, thereby, relaying the importance of the indicator in question to the developer and its effects on the urban environment. This is also followed by prerequisite or mandatory indicators, which enforce the selection of non-negotiable indicators important to that region. The inclusion of prerequisites and even weighted credits all together is quite debatable as this motivates the ideology of choosing where developers pick HSIs that have higher point but require less effort, instead of the most ideal sustainable option (Garde,

2009). This is a typical illustration that experts primarily determines how the points and significance of HSIs are allocated. NSATs have been known to lack an integrated participatory approach in their development due to majority of the tools developed solely from an expert perspective (Dawodu et al., 2019). This gap is a precursor to this study. Dawodu et al. (2019) explains that NSATs promote engagement and participation of relevant stakeholders within certain HSIs, yet the tools are not developed in such a manner. This aspect of participation has been well established but no study has investigated how participatory are the participatory indicators within various NSATs, what level of importance is placed on them, and why do they seem to be overlooked?

Participatory principles play a key role in achieving urban sustainability and it can be suggested that neighborhoods developed under the NSAT framework cannot be deemed sustainable if the opinions of all relevant local stakeholders, as previously defined, have not been taken into consideration. Yet, it is currently possible to certify neighborhoods using NSATs while ignoring HSIs that are focused on participation, such as LEED ND's community outreach and involvement benchmark. Unlike LEED-ND, Community participation in BREEAM-Communities is required to certify the master planning process as a compulsory consultation component is incorporated to ensure the "needs, ideas and knowledge" of communities are taken into account during the detailed planning stage (BRE, 2012; Oliver & Pearl, 2018) (Building Research Establishment, 2012). However, whilst HSI of consultation is considered, it does not necessarily guarantee effective participation as defined in Cheshmehzangi and Dawodu (2018) which state that '*it is a systematic process and cannot be achieved efficiently in an ad hoc manner and participatory methods or typologies need to be planned from outset in order to realize the full benefits of this approach*'. Two important ideologies which are important for effective participation was highlighted from this study, 'Hierarchy and quality'. Hierarchy refers to the avoidance of manipulative tendencies and the promotion of more consultative and partnered-based approaches to decision making while quality refers to the activities within the participatory exercises that improve the impact of the engagement process.

It is worth noting that while the selection of such participatory indicators is mandatory, it is not necessary to adhere to all the criteria within the HSIs due to the point-based procedure (Dawodu et al., 2019). For instance, under the BREEAM consultation HSI, it is mandatory to address the following: (1) "*Members of the local community and appropriate stakeholders have been identified for consultation*" and (2) "*A consultation plan is in place and the local authority has been consulted about the plan and consultation should take place early enough in the process for the community and stakeholders to influence key decisions*" (Building Research Establishment, 2012). However, under the same HSI, an additional point can be given if '*An independently facilitated community consultation method will be used to engage the community on specific aspects of the design'*. Yet, this important criterion which would impact participatory decision making is made optional. The discretionary nature of important SIs under this mandatory HSI raises further questions on exclusions and oversights within the participatory indicator model.

Additionally, several parameters are considered critical to effective participation such as 'early participation' to provide stakeholders with adequate time for their decisions to impact the planning and development process and allowing full involvement of citizens (Luyet et al., 2012; Reed, 2008). Another,

important element mentioned is the 'rule of power' by Dawodu et al. (2019), but also called 'influence' by Reed (2008). They both argue that effective participation is linked to how influential the stakeholders' opinions are. This means that ideally stakeholders' opinions must have a significant impact on how a region is developed. The fact that urban areas have complex interactions and are plagued with multiple challenges portrays merit in giving power to such diverse stakeholders based on the belief that the local residents hold generational knowledge and context-specific solutions that can enhance the sustainability of urban development (Cheshmehzangi and Dawodu, 2018).

Two major gaps have emerged from this review. The first gap is the quality behind the process of participation and the second is the possibility of omitting participatory indicators altogether due to the optional nature of such indicators in NSATs. Hence, how we determine the quality and impactful inclusion of the participation process, such that when participatory indicators are indeed selected, would it be executed in a manner that allows early involvement of citizens? would stakeholders have significant power in making decisions or is this predominantly down to the developers and experts? Further explanation of various approaches to inspect the effectiveness of participatory indicators in NSATs is given in the next section.

2.2 Hierarchy and Quality of Decisions Making

In order to determine the quality of participatory techniques, it is important to review the various typologies that influence the current participation model. The first typology differentiates between the degrees of participation. This was described by Arnstein in 1969 and focused on grades of participation and how the degree of influence of the citizens within a locale influences community-level development. The ladder of Arnstein describes a hierarchy of stakeholder development from a non-participatory or passive dissemination of information (called manipulation) to active engagement called citizens control (Arnstein, 1969). Over time, studies have progressed, and other alternative terms and interpretations have emerged. For instance, Biggs (1989) referred to levels of engagement as contractual, consultative, collaborative and collegiate attributes. This was later simplified by Farrington (1998) as consultative, and functional participation process which enhances projects through local knowledge exchange, labour and empowerment of citizens.

Unlike the models developed by Arnstein (1969) which placed citizen control on top of the pyramid, Lawrence (2006) argued that empowerment should lead to the transformation of actors' involvement. Participation interpretation also differs in terms of hierarchy; while most literature explicitly adhere to the 'ladder of participation', various hierarchy classifications do exist. An alternative classification is that different levels of engagement are appropriate for different projects depending on the work objectives and capacity of stakeholders to influence outcomes (Richards et al., 2004; Tippett et al., 2007). This can be observed in Davidson wheel of participation, which suggests that there is a level of appropriate participation that a community can achieve based on its current state (e.g. education, resource availability, technology) and in some cases, the delegated power or citizen control are unachievable (Davidson, 1998). Thus, Davidson's wheel of participation (1998) suggests appropriate participation with clear objectives without necessarily climbing the ladder but rather focused on the context of the situation.

However, approaches such as Arnstein's ladder of participation (1969) are the cornerstone of what ensures that rules of sustainable urban development from a people participatory perspective are adhered to (Fraser et al., 2006; Lin and Simmons, 2017). In other words, these techniques highlight if proper participation has taken place and determines what the efficacy of such participation.

Another important typology is the classification of participation as a normative and pragmatic approach. The normative approach suggests that people have democratic rights to participate in sustainable and environmental decision-making. Alternatively, a pragmatic approach is focused on high-quality decisions as opposed to seeking approval from all stakeholders. Studies by Beierle (2002) and Rowe and Frewer (2000) show that utilising pragmatic and democratic approach actually improves the decisions. They further argue against the notion that citizens are ill-suited to make important sustainable environmental decisions, particularly if respondents are empowered with the right tools and capacity to make decisions and give feedback (Beierle, 2002, Cohen et al., 2015).

Further studies by Reed (2008) proceed to classify participatory activities into four typologies, these are participation based on levels; participation based on nature of participant and communication flow; participation based on theoretical preference (pragmatic vs consensus approach); and participation based on objectives to be attained. This study focuses on theoretical preference. Furthermore, suggestions have been made for combining both, i.e. reaching out to as many stakeholders as possible via different means (consensus) and enabling them to make pragmatic and informed decisions by educating them (Cappuyns, 2016; Reed, 2008). Rowe and Frewer (2000), executed this combination quite well, as their study investigated the parameters that would be needed to ensure that citizens could participate and make the most informed decision (Rowe and Frewer, 2000). This also involved determining how information could be obtained, such as through questionnaires, interviews, citizen jury, etc. (see table 1). The first half of Table 1 (called the acceptance criteria) considers what parameters would be needed to ensure quality in terms of democratic and impactful participation is achieved via the different participatory mechanisms. The second half of Table 2 provides parameters for improving the quality of the process of participation. Likewise, Dawodu et al. (2019) gave similar results in their study where 10 rules for early selection of sustainability indicators via an integrated participatory approach was recommended (see Table 2).

The resultant reasoning is that Arnstein's approach (1969) differentiates between the futile modes of participation in comparison to the actual purpose of participation. Whilst this approach is effective for determining the level of participation needed, Rowe and Frewer (2000) and Dawodu et al. (2019) elaborate that more steps are required to optimize the quality of decision making. This includes ensuring early and informed decisions based on transparency, accuracy, feedback channels that allow citizens to influence their urban situation democratically and pragmatically.

In order to investigate the efficacy of participatory indicators in NSATs, the pioneering principles used to develop modern strategies for participation will be used as tools to measure the effectiveness of the NSATs. Also, theme-based and indicator-based analyses will be used to investigate the weighting of participatory HSIs and their significance to the overall development of assessment tools.

Table 1: Acceptance and Process Criteria for Participatory Activities

	Referenda	Public Hearings	Public Opinion Survey	Negotiated Rule Making	Consensus Conference	Citizen Jury/Panel	Citizen Advisory Committee	Focus Groups
Acceptance Criteria								
Representativeness of participants	High	Low	Generally high	Low	Moderate (limited by small samples)	Moderate (limited by small samples)	Moderate low	Moderate (limited by small sample)
Independence of true participants	High	Generally Low	High	Moderate	High	High	Moderate (often in relation to sponsors	High
Early Involvement	Variable	Variable	Potentially high	Variable	Potential high	Potential High	Variable but may be high	Potentially high
Influence on final policy	High	Moderate	Indirect and difficult to determine	High	Variable but not guaranteed	Variable but not guaranteed	Variable but not guaranteed	Liable to be indirect
Transparency of process to the public	High	Moderate	Moderate	Low	High	Moderate	Variable but often low	Low
Process Criteria								
Resources accessibility	Low	Low-moderate	Low	High	High	High	Variable	Low
Task definition	High	Generally high	Low	High	Generally high	Generally high	Variable but may be high	Variable but may ne high
Structured decision making	Low	Low	Low	Moderate	Moderate (influence of facilitator)	Potentially high	Variable (influence of facilitator)	Low
Cost-effectiveness	Variable/ low	Low	Potentially high	Potential high	Moderate to high	Moderate to high	Variable	Potentially high

Table 2. The 10 Rules of Participation

Rules of participation
a. Rule of Control – participants must have actionable power to influence decisions. **b.** Rule of boundaries – the limitations and non-negotiables of the project should be mentioned from the onset. **c.** Rule of stake – the relevant stakeholders should be identified in a fair and equal representation, from the onset. **d.** Rule of goals – from the onset of the projects, a consensus agreement on the aims, objectives and goals for the project need to be achieved. if not, early negotiation and trade-offs is paramount to moving forward. **e.** Rule of theory - From the outset, it should be determined if a participatory method is about quality or acceptability of the decision, or combination of both. **f.** Rule of execution - Identifying what method(s) best suits participation practice, such as focus groups, interviews, questionnaires, advisory panels, etc. **g.** Rule of resources – external resources (training, use of specialised equipment etc.) should be permitted or made available to aid participants decision making

h. Rule of verification and feedback – scientific selection of HSI needs to be validated by local knowledge and vice-versa. The resulting information can then be transparent for all members of community to see.

3. Methodology

3.1 Overview and Selection of NSATs

The first stage of the research involves the collation of NSATs that exist globally. Thus, this study collated and analysed 15 NSATs (see Table 3). It should be noted that more than 15 NSATs exist globally. For instance, 20 have been listed in a recent study (Tam et al., 2018). However, not all NSATs could be used in this study due to the commercial nature of some of the tools, thus not allowing total access (Kaur and Garg, 2019). However, 75% of these tools have been analysed in this work. The second step reviews each NSATs to determine the participatory HSIs that exist within each tool; i.e. NSATs that possess participatory HSIs, which consider stakeholder and people planning initiatives during the pre-construction (design and planning), construction, and post-construction phase (if available). This study focuses solely on participatory indicators, as the aim is to determine how effective these types of HSIs are in considering the opinions of local stakeholders within the community. After reviewing the manuals of the NSATs (see Table 3), Table 4 breaks down the participatory indicators that are present or missing within the 15 assessment tools (see Table 3). In addition, Table 4 provides information on the number of participatory indicators. Further information on other criteria and points are explained in section 3.2.

Table 3. Neighbourhood Sustainability Assessment Tools and Region of Development

Tool	Acronym	Country	Developer	Reference
Building Environmental Assessment Method Plus Neighborhood	BEAM Plus Neighborhood	Hong Kong	Hong Kong Green Building Councils	https://www.beamsociety.org.hk/en_beam_plus_neighbourhood_assessment.php
Building for Ecologically Responsive Design Excellence – Clustered Residential Development	BERDE NC – Residential Development	Philippines	Philippine Green Building Council (PHILGBC)	https://www.berdeonline.org/
Building Research Establishment Environmental Assessment Method - Communities	BREEAM Communities	UK	BRE Global Ltd	http://www.BREEAM.com/
Comprehensive Assessment System for Building Environmental Efficiency for Urban Development	CASBEE-UD	Japan	JSBC (Japan Sustainable Building Consortium), Institute for Building Environment and Energy Conservation (IBEC)	http://www.ibec.or.jp/CASBEE/english/overviewE.htm

Earth community craft	ECC	US	Earth Craft, Greater Atlanta Home Builders Association, Southface	https://earthcraft.org/earthcraft-professionals/programs/earthcraft-communities/
Enviro-Development Master planned community	Enviro-Development	Australia	Urban development institute of Australia	http://envirodevelopment.com.au/
Enterprise green communities	EGC	US	Enterprise Community Partners, Inc.	https://www.enterprisecommunity.org/solutions-and-innovation/green-communities
Global Sustainability Assessment System	GSAS District	Qatar	Gulf Organization for Research and Development	http://www.gord.qa/gord-trust
Green Building Index Township	GBI Township	Malaysia	Green building index Sdn Bhd	https://new.greenbuildingindex.org/
Green Mark for Districts	GM	Singapore	Building and Construction Authority	https://www.bca.gov.sg/green_mark/
Green star Communities	Green star	Australia	Green Building Council of Australia	https://new.gbca.org.au/green-star/rating-system/communities/
Indian Green building Council - Township	IGBC Green Township	India	Indian Green Building Council	https://igbc.in/igbc/
Leadership in Energy and Environmental Design - Neighbourhood Development	LEED-ND	US	United States Green Building Council	http://www.usgbc.org/LEED
Sustainability Tool for Assessing and Rating communities	Star Community Rating System	US	Star Communities nonprofit organization	http://www.starcommunities.org/
The Pearl Community		United Arab Emirates	Abu Dhabi Urban Planning Council Beacon pathway	https://www.upc.gov.ae/en/-/media/files/upc/media/prdm/prrs_v1.ashx

Table 4. Neighbourhood Sustainability Assessment Tools and their Participatory Indicators

NSATS	**Participatory Headline sustainability Indicators (HSIs)**
BEAM Plus Neighborhood	Community Engagement
BERDE	Stakeholder Consultation
BREEAM-Communities	Consultation Plan
	Consultation and Engagement
	Design Review
	Community management of facilities
CASBEE UD	None
ECC	Community Charrette)
	Ongoing Community Engagement
	Community Participation
EnviroDevelopment	Ongoing Community Engagement, Governance and Activation
	Essential Action of communities

Enterprise Green Communities	Goal Setting
GSAS	None
GBI Township	Community Thrust
	Governance
Green Mark	Stakeholder Engagement, Feedback and Evaluation
Green star Communities	Engagement
	Community Development
	Community Participation and Governance
Green Townships (IGBC)	None
LEED ND	Community Outreach and Involvement
STAR Community Rating System	None
PCRS	Integrated Development Strategy

3.2 Method of investigating the significance participatory indicators

The main aim of this study is to investigate and determine the trends and competencies of participatory indicators incorporated in various NSATs. This is carried out by deciding whether the indicators for participatory decision making in sustainable urban development processes are fulfilling the participatory principles covered by Brundtland report Agenda 21 and SDGs. In other words, are all residents inclusively, effectively and actively part of the decision making process? Furthermore, this study will explore the gaps and/or shortcomings in NSATs participatory indicators (if any) and proffer mitigation approaches for its optimization in order to improve the general impact of participatory processes. Thus, to analyse the efficacy of participatory indicators in NSATs, three key systematic processes were involved:

1) **Hierarchical categorization of participation:** An extensive literature review of participatory practices was conducted, and the need for categorization of participatory activities in a hierarchical manner was discussed by Arnstein (1969). Arnstein (1969) and Davidson (1998) conducted pioneering studies on categorization of participatory activities and are still popular approaches in participatory decision making research at present (Dawodu et al., 2019; Holmes and Potvin, 2014; Krabina, 2016; Li and de Jong, 2017). However, Davidson (1998) does not provide a clear distinction of the preferred participatory approach which hinders its applicability for making comparisons in this study. Hence, Arnstein's Ladder (1969) was chosen as the method for analysis.

   Arnstein's procedure (1969) establishes the critical difference between ineffective participation and effective participation where distinctive impact is made by all local stakeholders, including those participants that might be considered less influential. Essentially, the chosen method provides the hierarchal classification and level at which relevant stakeholders within a participatory HSI can actually be involved in the planning and development process. Table 5 illustrates Arnstein's (1969) hierarchal participatory categorization and provides a brief explanation of each hierarchy.

   The utilization of Arnstein's (1969) theoretical model makes it relatively easy to visualize the effectiveness of the participatory process because each hierarchy depicts specific characteristics

of the participatory process. Hence, each of the 20 HSI identified in Table 4 were reviewed and placed within each classification/hierarchy specified by Arnstein's Hierarchal Ladder of Participation. This review involves the identification of the criteria and instruction under each participatory HSI in NSATs to determine if it meets the description given in each rung of the ladder. The boxes indicating the hierarchy are highlighted or ticked to signify that the participation approach of a specific NSAT falls within a specified range of category due to non-specificity of the NSAT manuals on criteria selection and level of participation. This is further discussed in the result and discussion section.

Table 5. Arnstein Hierarchal Ladder of Participation

Degree of Citizen power	8	Citizen control	People are simply demanding that degree of power (or control) which guarantees that participants or residents can govern a program or an institution, be in full charge of policy and managerial aspects, and be able to negotiate the conditions under which "outsiders" may change them.
	7	Delegated power	Negotiations between citizens and public officials can also result in citizens achieving dominant decision- making authority over a particular plan or program
	6	Partnership	Partnership that enables them to negotiate and engage in trade-offs with traditional powerholders. At the topmost rungs
Degree of Tokenism	5	Placation	Placation, is simply a higher level tokenism because the ground rules allow have-nots to advise, but retain for the powerholders the continued right to decide
	4	Consultation	Allows the have- nots to hear and to have a voice: When they are proffered by power- holders as the total extent of participation, citizens may indeed hear and be heard. But under these conditions they lack the power to insure that their views will be heeded by the powerful, When participation is restricted to these levels, there is no follow through, no "muscle," hence no assurance of changing the status quo. The most frequent methods used for consulting people are attitude surveys, neighborhood meetings, and public hearings
	3	Informing	Informing citizens of their rights, responsibilities, and options can be the most important first step toward legitimate citizen participation. However, too frequently the emphasis is placed on a one-way flow of information -from officials to citizens-with no channel provided for feedback and no power for negotiation
Non Participation	2	Therapy	Their real objective is not to enable people to participate in planning or conducting programs, but to enable powerholders to "cure" the participants

	1	Manipulation	In the name of citizen participation, people are placed on rubberstamp advisory committees, advisory boards etc., for the express purpose of "educating" them or engineering their support. Their real objective is not to enable people to participate in planning or conducting programs, but to enable powerholders to "educate" the participants

2) **Determination of Participatory Quality** - Aside from the categorization of participation in terms of hierarchy, the quality of the decision making process is an important factor. The study by Rowe and Frewer (2000) suggested the need to ensure that participation in decision making is done in a fair, logical, educated, and inclusive manner that enhances the effectiveness of the results. Essentially, their research focused on the quality of the decision and how the systematic involvement of local actors can yield impactful results, i.e. how do people participate and does the process facilitate good decision-making. Thus, Rowe & Frewer (2000) categorized participation into two phases - the process phase and acceptance criteria phase (see Table 6). The process criterion refers to the effective construction and implementation of a procedure while the acceptance criteria are focused on the potential stakeholder acceptance of a procedure. These two criteria are important because even if a procedure is effectively executed but perceived by the public to be unfair or undemocratic, then the procedure may fail in alleviating public concerns and ultimately lead to non-compliance to the decision by the inhabitants. Conversely, if a procedure and its recommendations are accepted by the public but the decision is attained in an ineffective manner, then its implementation could prove objectively damaging for the relevant stakeholders. Thus the 20 participatory indicators are reviewed against these criteria to determine the quality of decision making via the acceptance and process criteria in order to ensure an effective and accepted decision is attained. This is further detailed in the result and discussion section.

Table 6. Overview of acceptance and process criteria in quality decision making

Acceptance criteria	
Representativeness of participants	The public participants should comprise a broadly representative sample of the population of the affected public
Independence of true participants	The participation process should be conducted in an independent, unbiased way
Early Involvement	The public should be involved as early as possible in the process as soon as value judgments become salient
Influence on final policy	The output of the procedure should have a genuine impact on planning and development procedure

Transparency of process to the public	The process should be transparent so that the public can see what is going on and how decisions are being made
Process criteria	
Resources accessibility	Public participants should have access to the appropriate resources to enable them to successfully fulfill their brief
Task definition	The nature and scope of the participation task should be clearly defined
Structured decision making	The participation exercise should use/provide appropriate mechanisms for structuring and displaying the decision-making process
Cost-effectiveness	The procedure should in some sense be cost-effective

3) **Credit-based comparison -** This has been executed for the 20 participatory HSIs identified. This is shown in Fig. 2 (See appendix 1 and 2 for break down with weighting). In NSATs, each HSI has associated points attached to them signifying their importance in terms of attaining sustainability. To compare the importance, trends, and impact of participatory HSIs in NSATs, their points and weighting are normalized and compared against one another. Fig. 2 illustrates the results of this type of analysis and Appendix 1 and 2 provide the breakdown of the points allocation of the 20 HIS investigated. NSATs possess mandatory, prerequisite, and optional indicators (HSIs). Mandatory indicators are non-negotiable HSIs that need to be considered in order for the project to be eligible for a sustainability ranking award. Within the mandatory indicators, some optional prerequisite criteria are sometimes present which must be fulfilled in order to achieve the full points under the HSI. Not adhering to mandatory indicators may cause project ineligibility, thereby withholding sustainability award or under the prerequisite case, the HSI chosen would simply not be eligible to receive points under the specific theme or category.

   To further aid the explanation of the methodological approach, Fig. 1 provides a chart of the methodological process on how the viability of the participatory HSI of NSATs was assessed.

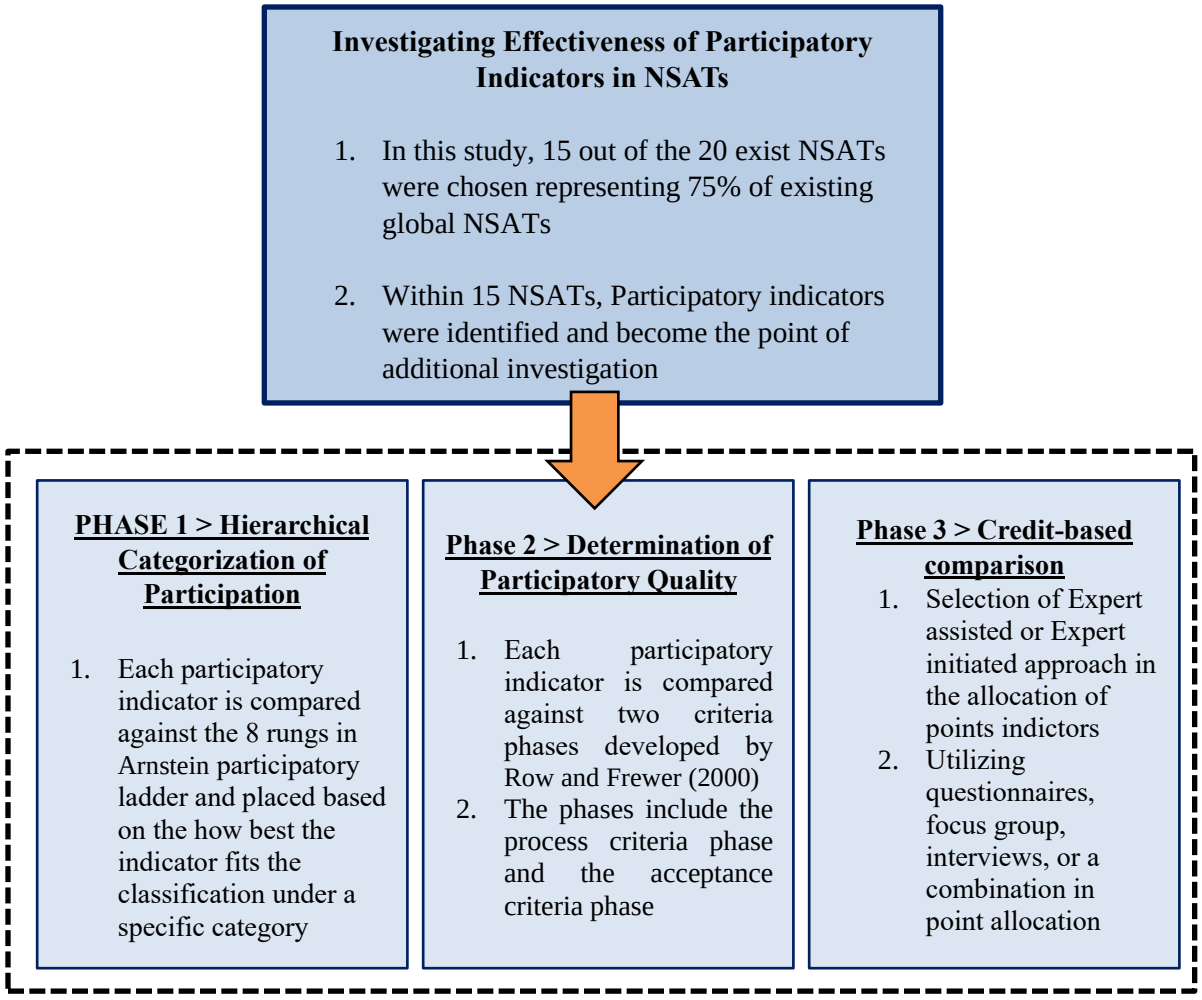

Figure 1. Methodological Approach to Investigating Effectiveness of Participatory Indicators in NSATS

The following section provides the results of the methodological approach listed in phase 1 -3 of Fig. 1.

4. Results and Discussion

4. 1 Performance of NSATs in the Hierarchical Categorization of Participation

After the analysis of 15 NSATs, 11 of those tools were found to have participatory elements. The participatory HSIs and criteria assessed in this study are those related to the planning, design and post-construction of a neighborhood or community as shown in Table 4. By utilizing Arnstein's approach, it was observed that most tools were categorized under 'consultation' as a minimum standard. This is attributed to the fact that the criterion for elements of participation in most NSAT manuals encourages seeking the opinions of the public but does not specify if the recommendations and suggestions must be adopted. An example can be depicted with the HSI called 'stakeholder consultation' in Berde (The Philippines) where the primary mechanism for participation is through focus group discussions (FGD) for developers to obtain information on key developmental issues and needs from the community members. This consultation process involves the identification of members of the local community and appropriate stakeholders;

identification of functionality, development quality and impact (including aesthetics) on the inherent community of the development and the local community; detection of user satisfaction/productivity issues, management and operational implications; and maintenance resources/burdens. The categorization of these parameters under Arnstein's approach reveals that the details of the project requirements will be provided by the general public along with other stakeholders. However, the requirement of the HSI criteria is vague on whether the information must be utilized in the developmental project with only a section within the HSI that states '*implement article that incorporates results from the FGD*'. Consequently, it does not state precisely if the recommendations must be implemented and guidelines on acceptable rationale for not adopting them. For instance, is there a justifiable reason for ignoring recommendations or observation given by the citizens? Hence this level of communication falls under the banner of consultation. A similar observation is made with LEED-ND regarding the HSI of 'community outreach and involvement', under which community charrette is held. Under this HSI, the criteria to be satisfied is the *'advertisement and hosting of at least one open community meeting other than an official public hearing or recurring citizen advisory meeting, to generate comments on the preliminary project design concept'*. Beyond this, there is no statement guaranteeing that information provided from this meeting will be implemented. Thus, these are marked yellow under 'consultation' in Table 7.

Conversely, the criteria detailed in the participatory HSIs of some NSATs can be best categorized as between different hierarchies as the information from the NSAT can be interpreted across different hierarchy in the ladder due to the open-ended nature of the criteria. For example, under 'community engagement' in BEAM plus, key stakeholder meetings are guided by advice and feedback and comments, which are reviewed and follow-up actions are taken. However, the enforcement of these criteria remains questionable. For instance, the BEAM manual under community engagement asks for justification on how the community opinions were taken into account and a statement that provides justification for adopting or not adopting the recommendations is given. The possibility of the community recommendations not being implemented depicts the least engagement categorization as consultation under the Arnstein ladder. However, this tool could also be categorized as 'partnership' because 2 points are awarded for executing the community engagement plan and implementations that address feedbacks. Furthermore, based on the manual, a bonus point can be obtained if '*the master plan of the project is reviewed, and modified in response to the aspiration and comments given by the community*'. This essentially gives some level of power to the citizens, where negotiations and trade-offs can be made even though total power is not guaranteed. However, this HIS is mandatory and is still dependent on if the developers consider its credits worthwhile. Therefore, a key limitation in this tool and others with the similar setup is the voluntary nature of these participatory indicators.

The participatory HSI in the Green star tool, called 'engagement' has the highest considerations for quality of decisions, but remains quite open-ended in terms of the hierarchical activities. This HSI incorporates criteria for both stakeholder engagement strategy and strategy of implementation with an equal weighting of 3% and the completion of stakeholder engagement strategy is a pre-requisite for achieving points under the strategy of implementation. This HSI is a unique approach to neighborhood participation as it relies on the utilization of an approved stakeholder engagement framework for attaining credits. Specifically, it relies on the International Association for Public Participation (IAP2) framework for Australasia with strict adherence to the core value and spectrum of participation within the frameworks (IAP2 2020). While the IAP2 spectrum is to some extent similar to Arnstein's ladder, it also considers

parameters such as inform, consult, involve, collaborate, and empower the public. Their 7 core values focus on the commitments that need to be adhered to when utilizing the framework such as '*public participation includes the promise that the public's contribution will influence the decision*', and '*public participation seeks input from participants in designing how they participate*'. In comparison to Arnstein's ladder, a degree of flexibility is given to which level of participatory activity is utilized. In the Green star NSAT, a key requirement of the engagement HSI is that 'the strategy must contain a set of clear stakeholder engagement objectives that determine the level of engagement appropriate to the needs of the project'. This suggests that depending on the interest and level of understanding of the participants, it is possible to either strictly inform participants or allow them total citizen control. This is due to the ambiguity of the criteria which has no clarifications on what the appropriate minimum standards is. Thus, justifications for the approach is solely dependent on the level of engagement chosen by the developers. Hence, the spectrum of hierarchy of this tool has the highest and lowest range due to the wide variance in how IAP2 tool can be applied. Nonetheless, regardless of the level of participation achieved here, it would have gone through comprehensively strict quality assurance processes which validates its categorization.

Green star also considers community participation and governance under its participatory HSI with community facility management and community program management being criteria to consider. This is focused on communities taking leadership roles in maintaining their buildings and facilities, as well as developing community programs. Unlike 'engagement' which is implemented during the design phase for collecting recommendations, community participation and governance do not offer the detailed guidance. Nonetheless, this is identified as a form of citizen control on the ladder of participation as it involves demonstrating that *'project occupants are actively involved in the decision-making process for managing the community facility'*. This indicates that power lies with the citizens as they are in charge of the development of their community program. Furthermore, within the Green star participatory HSI called community development, there are five key criteria which are community development plan, community development officer, community group, community events and community information. The participatory activities under the community group are inexplicit with no guarantee that the opinions of the community group will be heeded as the criteria clause states '*community group to contribute to the implementation of the community development plan*.' Hence, this could be relegated to the non-participation or consultation category of Arnstein's ladder. The generic and broad-spectrum approach of phrasing criteria provides a loophole that may limit effective participation, particularly with discretion being left to developers, who may have profit-oriented agenda (Garde, 2009).

BREEAM-Communities is the only other assessment tool that allows for partnership level categorization, as evident in two out of its four participatory HSIs (see Table.7). The HSIs are called consultation and engagement and community management facilities. On the ladder of participation, the consultation plan and design review were assigned to consultation/placation. In the criteria for consultation plan, it is evident that advice can be given on several themes such as design quality, management, and maintenance, use of shared facilities and any other issues raised. However, there is no further clarification on the adoption of these advice. Similarly, criteria 2 and 3 of the design review states that '*the opinions gathered through consultation have been considered in the production of the design and access statement*' and '*feedback is given to those who participated in consultation and justification is given as to why responses were accepted or not*.' This implies that stakeholder recommendations can be ignored by developers with justifications. Nonetheless, citizens are involved in the consultation of key urban design principles such as the design of public realm, the layout of development, density and appearance of

development, and how security is addressed and designed for. The consultation and engagement HSI could have achieved partnership rather than the range given in Table 7 but additional credit is only allocated if '*Influence and/or alteration to the masterplan can be demonstrated as a result of the consultation processes*' which specifies the possibility that the community consultation may not inform the masterplan design. However, the criteria further states that '*where outcomes of the consultation have not influenced the design, the decision to not include them has been fully justified*'. The presence of this justifiable loophole that adversely influences the effectiveness of participation activities led to its placement between placation and partnership. Consequently, BREEAM-Communities gets this right with the fourth HSI - community management of facilities such that the consultation plan has to be adhered to in order to obtain points. However, in order to attain the maximum 3 points '*the local authority agrees to work in partnership with the Community Development Trust (CDT) or management company for the new community and the roles, responsibilities, and management structures are clearly defined*'. Whilst there is a clear intention for partnership in this category, the optional nature of this category results in two credits being achieved while the third criterion can be neglected, thereby limiting the participation to consultation.

Similarly, GBI also attains partnership status due to the criteria which states that *'Developer to establish active dialogue with existing community within the vicinity of the development. Developer must show active measures to address issues of existing community'.* This essentially instructs developers that citizen opinions must be adhered to, thereby allowing the potential for partnership. However, the criteria also states that an alternative option is '*Developer to provide evidence that active dialogue with purchasers on features on the sustainable practice of proposed development is maintained in the duration of the development and construction period leading to handing over*'. This allows the potential avoidance of community-based participation altogether in the community thrust HSI. Furthermore, GBI possesses two participatory planning categories. The second participatory HSI category in GBI is governance which aims to encourage community participation and maintenance of sustainable practices. However, this category falls short in the hierarchy because even though it emphasizes participation with requirements such as '*an active procedure which engages the community for public review and consultation for development projects*' or '*an active Local Agenda 21 program with participation from at least 50% of the resident associations*', these can be easily avoided. This is because in order to obtain the maximum points in the category, only six out of the eight suggested action needs to be achieved and the two previously quoted criteria are the only ones that meets the participation requirement. This allows important participatory procedure to be neglected. Furthermore, details regarding the main considerations in the participatory practice are unclear, leaving the execution of procedure largely up to the developers. This again allows for a situation like therapy and manipulation to occur.

ECC has three participatory HSIs which are all categorized as consultation because they encourage participation but do not go beyond soliciting discussions and decision-making power is not given to citizens. Other NSATs categorized into the non-participatory section include PCRS and EGC. The criteria for maximum point in PCRS includes '*methodology for ensuring appropriate stakeholders are involved, including construction team, commissioning agent, potential building owners, operators, and relevant regulatory authorities and permit agencies*'. While it is evident that participation will occur, there is no guarantee for partnership and higher-level engagement. Thus, it is categorized as the lower rung of the hierarchy ladder. Overall, a good participatory HSI criteria requires clear and accurate specifics on the roles of the participants and their level of power.

Table 7. Result of Hierarchical Categorization of the Participation HSI

			BERDE	Green mark	GBI		PCRS	BEAM plus	LEED ND	Enviro -Development
			Stakeholder Consultation	Stakeholder Engagement, Feedback and Evaluation	Community thrust	Governance	Integrated Development Strategy	Community Engagement	Community outreach & involvement	Essential Action of Communities
Degree of Citizen power	8	Citizen control								
	7	Delegated power								
	6	Partnership								
Degree of Tokenism	5	Placation								
	4	Consultation								
	3	Informing								
Non-Participation	2	Therapy								
	1	Manipulation								

			BREEAM-Communities				ECC			EGC	Green star		
			Consultation plan	Consultation & Engagement	Design review	Community management of facilities	Community participation	Community Charrette	Ongoing Community Engagement	Goal setting	Community Development	Engagement	Community participation and Operational Governance
Degree of Citizen power	8	Citizen control											
	7	Delegated power											
	6	Partnership											
Degree of Tokenism	5	Placation											
	4	Consultation											
	3	Informing											
Non-Participation	2	Therapy											
	1	Manipulation											

*yellow represents the process or acceptance criteria that has been considered by the participatory indicators of the NSATs under investigation.

4.2 Determination of Participatory Quality

In this section, the process criteria and acceptance criteria utilized for effective participation by Rowe & Frewer (2000) was adopted for determining and categorizing the quality of the participatory activities embedded in this participatory HSIs.

The criteria of representativeness, which effectively ensures that some forms of stakeholder identification and analysis is executed to include as many relevant stakeholders as possible, was the most achieved criterion for most tools. The criterion of influence is very similar to partnership as it highlights the need for participation and the intentions of implementing suggestions of the citizens involved. Though, if such intentions are not met then reasonable justification should be given. Hence Green star, EGC, BEAM, LEED-ND, GBI, and BREEAM-Communities are all highlighted red to indicate the uncertainties behind the criteria of influence as decisions by the general public under these frameworks are not fully guaranteed but the intention of considering the opinions of stakeholders is present. This criterion is not highlighted red for BREEAM-Communities (Community management of facilities) because its HSI actually makes it clear that the power of decision-making lies with the citizens. This is depicted in Table 7 which classifies this HSI under citizen control. Additionally, early participation is a key parameter to inclusive decision making as it allows for input of trade-offs and negotiations early in the process thereby saving significant time and money on decisions that may have been adjusted (Fraser et al., 2006). It also improves trust and acceptability of results by illustrating a commitment to the general public that their opinions are important and prioritized in the decision making process (Li and de Jong, 2017; Rowe and Frewer, 2000). However, out of the 15 tools analyzed only BREEAM-Communities, ECC, BEAM, and Green star mention ensuring early participation when trying to execute the project.

In terms of the acceptance criteria, the highest performer was Green star (engagement) which covered all but one of the required criteria (marked in yellow). BREEAM-Communities and HK BEAM come in tied as they covered all the aspects except criterion of resource accessibility and cost-effectiveness (See Table 8). The lowest performers are ECC (community participation and ongoing community engagement), GBI (Governance) and PCRS because in these tools, the execution and parameters of the participatory activities are excluded, unclear and up to the discretion of the developer. Interestingly, ECC (community Charrettes) performs better than ECC (community participation and ongoing community engagement) by considering parameters such as early participation, transparency, and third-party conveners. The second lowest performers were EGC, BERDE, GM, and GBI (Community thrust). For instance, though EGC's participatory activities involves the execution of a community charrettes, there is no guidance on the execution of this activity beyond ensuring the right representation of citizens and the condition that the procedure should influence policy and planning. Therefore, while citizens can indeed impact on the goals and aims of these projects, due to the vague directives on the parameters/criteria, there is a high potential for manipulation of opinions, particularly when other quality-based criteria are not considered.

In addition, Although GBI 'governance' was categorized as consultation based on Arnstein's hierarchy, its activities are rated amongst the lowest quality with this framework because details of how consultation service will be executed in terms of process and acceptance requirement are not provided. Ideally, GBI 'governance' could have ideally been linked to the GBI 'community thrust' HSI which provides more detailed information on the aspects of the process and acceptance criteria, thus ensuring that users of the manual are aware of all the required processes for implementing effective participatory activities. Similar recommendation applies to ECC 'community charrettes', 'community participation' and 'ongoing

community engagement'. Alternatively, the creators of the NSATs should ensure that process and criteria based instructions are explicitly stated within every participatory HSI.

Another key observation was that NSATs such as ECC and GBI (Governance) did not consider transparency which is a key process when ensuring that the process of participation is fair and all decisions being made are open for scrutiny and investigation by the public. HSIs categorized as transparent indicate some form of feedback and communication exchange would be implemented and it also considered how feedback delivery is handled when suggestions by citizens are not adopted to determine the suitability of the justifications to ensure all involved stakeholders are informed.

The process criteria investigates the quality behind the participatory process by considering factors such as resource accessibility, task definition, structured decision making, cost-effectiveness. In terms of structured decision-making and task definitions, most tools addressed this well in their aims and objectives and how the credit is achieved in participatory HSIs. However, both PCRS and ECC omit indicating the mechanism for the procedure, potential outputs, participatory methods or exercise to be used. Interestingly, only Green star (engagement) addressed the resource accessibility criterion which is necessary to educate, train, or provide scientific tools for assisting the stakeholders in making informed and competent decisions (Boyle and Michell, 2017; Horgan and Dimitrijević, 2019). Frequently, developers may argue that citizens may not know enough about a specific field to give informed decisions in a way to circumvent inputs from the participatory process (Reed, 2008). However, Beierle (2002) argues that it is essential for developers to provide citizens with resources and the necessary time to arrive at competent decisions.

The highest ranked NSAT for the quality of its participatory activities is Green star (engagement) because it covers all criteria under the process and acceptance sections except cost-effectiveness. This is attributed to the best practice processes involved in utilizing third party participatory assessment tools (IAP2) that are built of research and industry standards. The three pillars of effective public participation in IAP2 include the spectrum of public participation, ethics core values, and IAP2 code of ethics, which covers most of the criteria assessed in this section. It was observed that none of the NSAT tool reviewed specifically addressed the financial aspect of the participatory process aside from Green star community development. Under this HSI, a key criterion is community information, which instructs that information should be free of charge and at least one free community event needs to be planned for every year. No other HSIs under NSATs refer to financial parameters specifically. BREEAM-Communities and HK BEAM come in second as they both address seven out of nine criteria. Furthermore, it was observed that though BERDE and Green star (community development) performed quite well in terms of its categorization and ability to give power to the citizens, their process criteria requires significant improvements and consideration of more parameters. However, further analysis is still needed in terms of the credit weighting and indicator analysis of the 15 NSATs.

Table 8. Result if Hierarchical Categorization of the Participation HSI

			BERDE	Green mark	GBI		PCRS	BEAM plus	LEED ND	Enviro - Development
			Stakeholder Consultation	Stakeholder Engagement, Feedback and Evaluation	Community thrust	Governance	Integrated Development Strategy	Community Engagement	Community outreach & involvement	Essential Action of Communities
Process Criteria	9	Criterion of cost-effectiveness:								
	8	Criterion of structured decision making:								
	7	Criterion of task definition:								
	6	Criterion of resource accessibility:								
Acceptance Criteria	5	Criterion of transparency:								
	4	Criterion of influence								
	3	Criterion of early involvement								
	2	Criterion of independence:								
	1	Criterion of representativeness:								

			BREEAM-Communities				ECC			EGC	Green star		
			Consultation plan	Consultation & Engagement	Design review	Community management of facilities	Community participation	Community Charrette	Ongoing Community Engagement	Goal setting	Community Development	Engagement	Community participation and Operational Governance
Process Criteria	9	Criterion of cost-effectiveness:											
	8	Criterion of structured decision making:											
	7	Criterion of task definition:											
	6	Criterion of resource accessibility:											
Acceptance Criteria	5	Criterion of transparency:											
	4	Criterion of influence											

	3	**Criterion of early involvement**											
	2	**Criterion of independence:**											
	1	**Criterion of representativeness:**											

*red is used to indicate the uncertainties behind the 'criteria of influence' as decisions by the stakeholder (general public) under these tools are not fully guaranteed but the intention of considering the opinions of stakeholders is still present.

4.3 Credit-based comparison of participatory HSI

The points allocated to participatory HSIs are analyzed in Figures 2 and 3. By considering the total number of points allocated to all HSIs (both mandatory and optional), Green star (engagement) has the highest number of points. Based on prior considerations, Green star (engagement) is the most holistic tool in terms of quality of participation and one of its participatory HSIs attained citizen control in the Arnstein's ladder. Figure 3 depicts the collation of points achievable from the participatory HSIs of each NSAT i.e. the points of multiple participatory HSIs under one tool are added together and Green star has the highest with 10.9% credit weighting and BREEAM-Communities come in second with 9.3%. It should also be noted that 2 out of the 4 HSI of BREEAM-Communities are mandatory and must be achieved by the development in order to achieve a BREEAM rating of a pass or above. In principle, this ensures that fundamental sustainability issues are not overlooked in pursuit of a particular rating. This is even more pertinent when the tasks required for effective participation are quite rigorous and require a substantial amount of resources and time as participatory activities can run till after the neighborhood project has been completed as seen in community maintenance and facilities.

Figure 3 also compares the total participatory points of each tool versus the highest point of a specific HSI within that tool (See the orange line). For example, LEED-ND participatory HSI has a score of 1.8% and the highest HSI in LEED-ND tool is 'Preferred location' which has a weighting of 9.1%. This depicts 'preferred location' as a more rewarding HSI for developers to focus on in comparison to participatory HSIs. This trend is observed in most of these tools as the points of the non-participatory indicators are about 2 or 3 times the weighting of the combination of all participatory based indicators within each tool. Another example is BREEAM-Communities, where four participatory HSIs contribute to 9.3% of the weighting, while one HSI called 'local economy' equates to 8.9%. For Green star, the sum of the weighted credit of 3 HSI is slightly higher than the highest weighted credit of 1 non-participatory HSI (See Fig. 3).

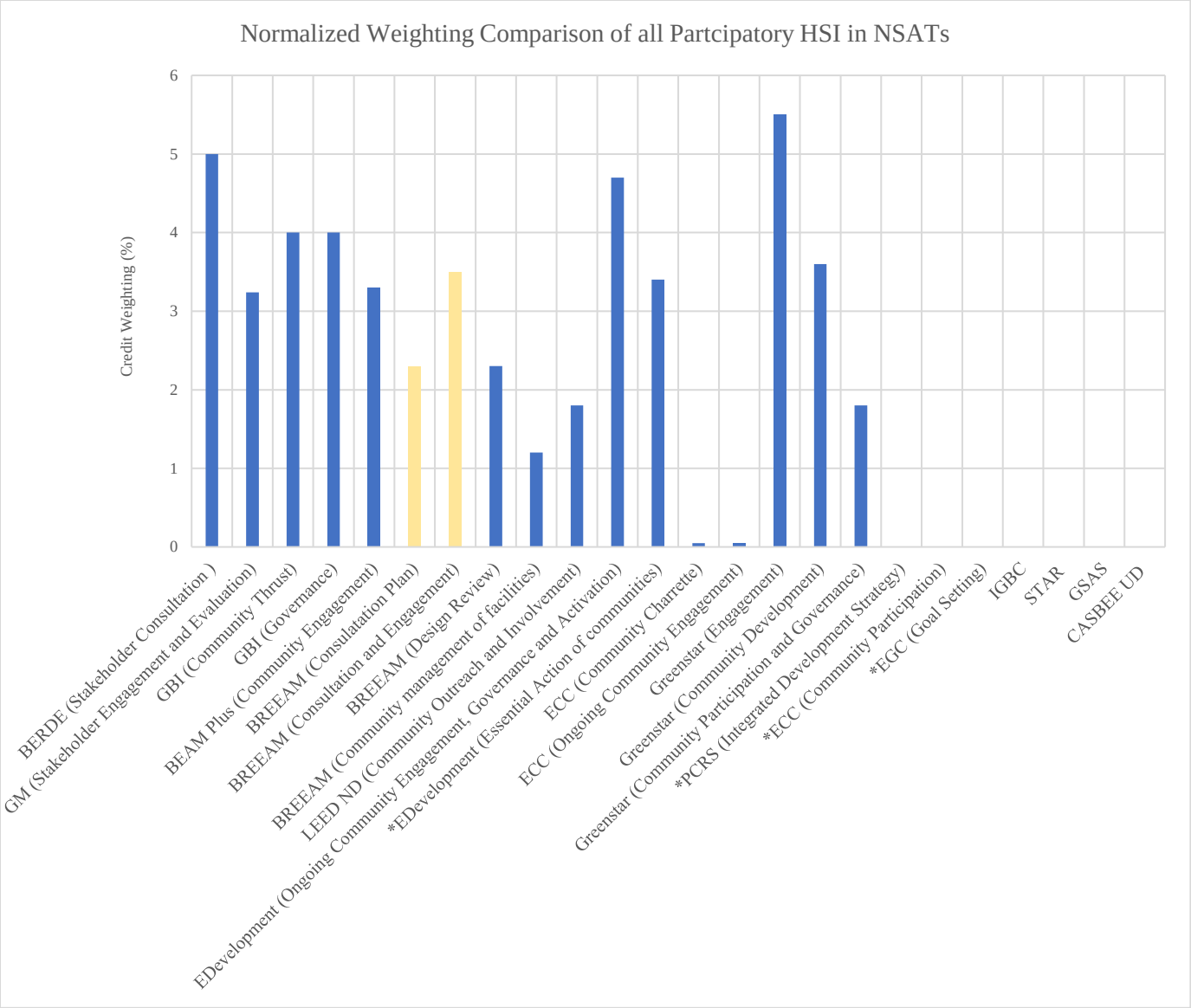

Fig. 2. Normalized weighting comparison of all participatory HSI in NSAT

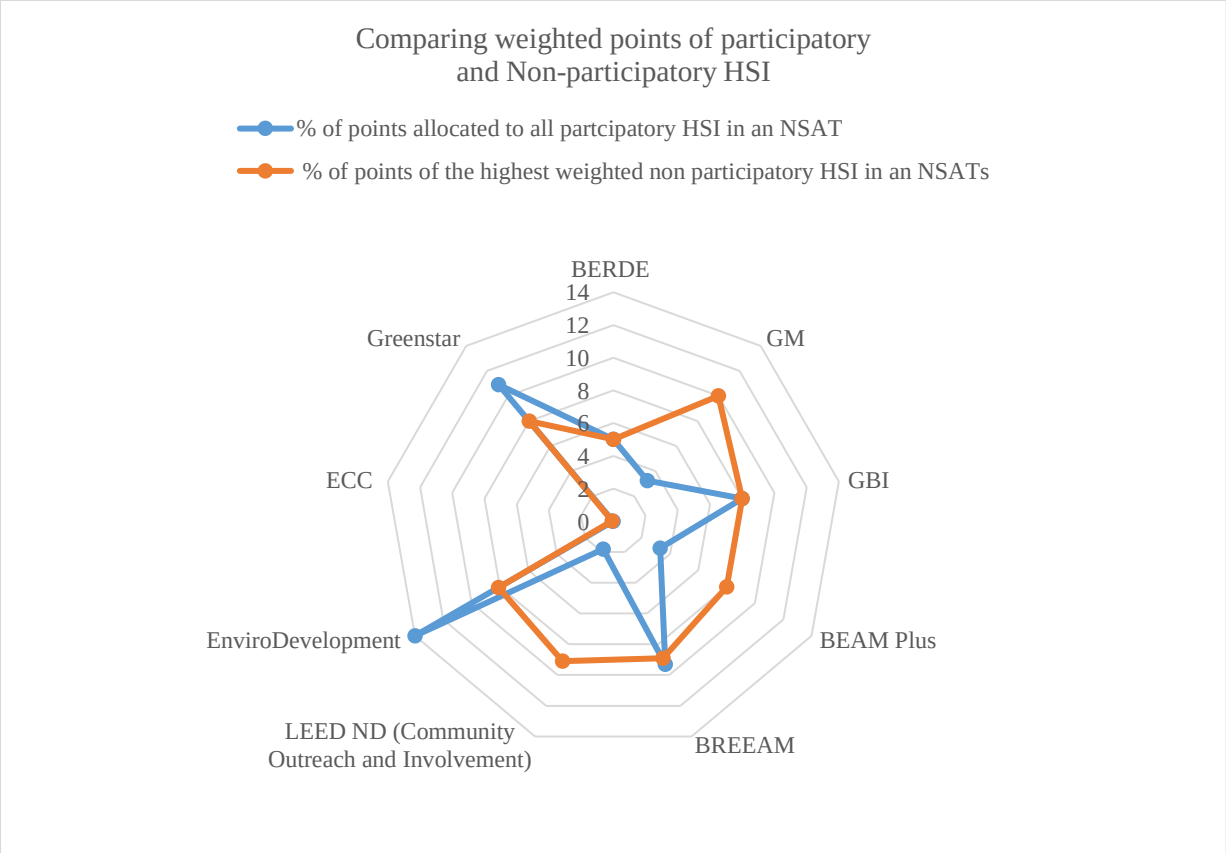

Fig. 3. Comparing weighted points of participatory and Non-participatory HSI

Overall, 20 participatory HSIs existed in the 11 NSATs that were analyzed. Figure 2 shows that some tools attempt to cover all criteria holistically under one HSI such as BERDE (stakeholder consultation) and BEAM (community engagement) by collating vast array of criterion while other tools like BREEAM-Communities and Green star split these criteria into several (3 – 4) HSIs. For instance, though consultation plans and consultation and engagement are addressed under BERDE's stakeholder consultation, the important consideration is how impactful the participatory HSIs are in comparison to other HSIs in the NSAT. For instance, only four tools (BREEAM-Communities, PCRS (Integrated Development Strategy), ECC (Community Participation) and EGC (Goal Setting)) have mandatory participatory HSIs. Still, there are no specific points associated with the HSIs of the 3 latter tools. Some participatory HSIs possess prerequisite HSIs such as BEAM (community engagement) and Green star (community development). The issue with prerequisite HSIs is that they lay emphasis on some aspects of participation and mostly make important aspects optional. For instance, BEAM community engagement possesses three criteria with one point each. The first criterion is 'community engagement plan and implementation' and this is a pre-requisite to the second criteria which is 'review of comment received and feedback on engagement'. Both of these criteria are then prerequisites to 'review of master plan'. However, the developers can easily address the community engagement aspect and ignore the other key aspects of participation such as the feedback mechanism and implementation of comments into master plan. This is one of the reasons why tools that should have a higher-ranking under the hierarchy categorization were ranged across non-participatory activities in the ladder. The issue with the optional criterion is that developers could neglect important processes that are key aspects the participation, thereby creating systems that can be circumvented or

manipulated by focusing on less tedious and expensive aspects of participation. This argument was made by Szibbo (2016) who noted that developers utilizing LEED-ND often avoided the affordable housing HSI due to the low credit weighting and the lack of mandatory criteria that ensured that a variety of stakeholders with the varying economic classes were catered for. Such studies have shown that the presence of these indicators in NSATs does not necessarily guarantee its selection, thereby sabotaging the key aspects of sustainable urban development (Garde, 2009; Szibbo, 2016). Furthermore, it is quite evident that not all NSATs fully follow the principles set out in Agenda 21 even though they claim otherwise. For example, the Indian (IGBC), Japanese (CASBEE UD), Middle Eastern (GSAS), and American (Star Community Rating) NSATs do not have a single participatory HSI which supports their claims of sustainability.

In terms of the number of indicators and participatory points associated with Indicators, Green star outshines other tools aside BREEAM-Communities. However, BREEAM-Communities commands a strong advantage due to the mandatory nature of the two participatory HSIs. However, participatory HSIs have much weaker points compared to non-participatory HSI.

4.4 Improvement suggestions for NSATs and their Participatory Indicators

Based on the discussion in sections 4.1 to 4.3, The strengths and weakness of NSATs and participatory indicators are summed up in Table 9. Furthermore, key recommendations to improve the development of future tools or enhance the performance of the current tool in terms of the participatory indicators are given in Table 10.

Table 9. summarized Strength and Weaknesses of Participatory indicators in NSATs

Strengths	Weaknesses
Tools such as BREEAM -Communities and GREEN STAR emerged as flagship performers and generally provided detailed approach on how to effectively participate with the adequate number of instructions. Green star provided third party participatory framework as a best practice method to enhance the processes of participation.	Vague statements on how participatory exercises should executed. Merger of important optional criteria under one participatory HSI. This merger may cause important criteria to be ignored. yet credit may still be awarded for meeting the first few steps of the criteria within the HIS.
The consideration of mostly consultation-based approach in the investigated NSATs ensures that situations such as therapy and manipulation are mitigated.	Consultation is the prevailing hierarchy which allows opinions of citizens to be heard but does not guarantee that their opinions will be acted upon thus creating a loophole.
	Optional Participatory HSI that have low credits with rigorous procedures would often be ignored.
	Limited mandatory Participatory indicators
	Inconsistencies in what procedures are considered to improve participatory results and how the process of participation is executed thereby varying quality of results and limiting reproducible successes. Cost effectiveness of how to execute participatory activities was only mentioned by Green star.

Table 10. Overview of Improvements Strategy for effective participation of NSATs

Areas of Improvement	Description of Improvement Strategies
General	The specific level or hierarchy of participation should be explicitly stated on all participatory HSI and associated criterion for NSAT. If a third-party participatory framework is not going to be utilized then at the very minimum the process and acceptance criteria covered by Rowe and Frewer, (2000) or similar frameworks should be explicitly stated and detailed in the criteria's of the Participatory HSI. NSATs with multiple participatory HSI if unable to provide full detail of the participatory process should link to at least one participatory HSI that has full details of process and criteria strategies. Participatory HSI that contain numerous criteria should be split into separate HSI for transparency and reduction false claims of completing credits
Weighting (Optional)	If for some reason HSI cannot be mandatory, then steps should be taken to make the participatory indictors more attractive for selection. I.e., increasing the points associated or making them prerequisite to other more context relevant HSI
Weighting (Mandatory)	All participatory related HSI related to the design, planning and post construction phase should be made mandatory
Hierarchy	As a bare minimum partnership level should be implemented in all associated participatory HSI involved design, planning and post construction
Quality	Utilize third party participatory framework such as IAP2 to ensure that process and acceptance criteria at a bare minimum can be achieved, where other more context specific requirements may be added. NSATs should endeavor to identify the standard cost for some of these activities and should provide advice on affordable methods to obtain citizen opinions.

5. Conclusion

This study has investigated the effectiveness of participatory indicators being implemented in NSATs. The results illustrate huge variation in quality and hierarchy of approaches adopted by different NSATs in the execution of participatory HSIs. While most of the studied tools show an illusion of facilitating participation, the investigation has provided key insight into its implications and provides suggestions on how effectiveness of participation can be improved. However, first and foremost, it clear that across the NSATS tools a significant level of consideration is given to participatory indicators, in terms of the number of indicators considered. However, the weighting of participatory indicators is still much less than their non-participatory counterparts. This led to further investigation on the effectiveness and quality behind the participatory indicators.

The results show that most tools operate under the consultation banner which does not necessarily guarantee that the suggestion and feedback from the public will be implemented. This creates a loophole that can be exploited by developers. Furthermore, the use of vague and indistinct terminologies in the participatory HSI criteria facilitates abstruseness in their execution and impacts the accurate categorization of these HSIs in this study. Existence of participatory issues such as manipulation and

therapy were present among several tools with unclear criteria requirements. Consequently, all NSATs are encouraged to implement an approach that attains the partnership level with all related participatory HSIs on the Arnstein's ladder.

Furthermore, instructions regarding the level of participation, process, and acceptance criteria should be clearly and specifically stated in the NSAT manuals to avoid the potential of misuse and misinterpretations by developers. Another noteworthy recommendation made from this study is that participatory HSIs should become mandatory and/or their credit weightings should be increased to avoid the preferential selection of more attractive and less rigorous non-participatory HSIs. These observations speak to the competency of the tools and suggests a version of labeling that would replace green washing in this context. It is participatory labeling. Essentially, a scenario that gives the illusion of participation.

In regard to the quality of decisions, the results indicated that the utilization of participatory frameworks such as IAP2, which Green star utilized is advantageous for improving the quality of participatory processes. In terms of tool performance, overall BREEAM-Communities were the best performing tool due to a high level of categorization and strong maintenance of high-quality processes (acceptance and process criteria) across four participatory HSIs. In terms of individual participatory HSI performance, Green star (Engagement) performed the best and in terms of hierarchy, Green star (community participation and operational governance) was the only citizens controlled participatory HSI. Green star was also the only tool to consider costs for these activities. The reality is that cost and time are big factors when utilizing participatory techniques effectively and may often conflict with the profit and time related targets of developers. Once again, it may be more adept to make mandatory or increase the weighting of more participatory based HSI.

Hence, while there is no NSAT that is perfect, Green star and BREEAM-Communities provide strong participatory elements that need to be considered by other tools under development. Essentially tools should strive for partnership ranking with the utilization of participatory frameworks such as IAP2 to ensure that process and acceptance criteria at a bare minimum can be achieved, where other more context specific requirements may be added. Also, this methods repeatable and comparable best practice participatory procedures.

Also, for future studies, investigating practical case studies, various economic and social backgrounds stakeholders and getting direct feedback on participatory processes may provide real-time data on more context-specific challenges and solutions that can be applied in further optimizing the performance of NSATs. Another possible solution to improving participatory practices could be through environmental and sustainability policy, thus future studies could also investigate how NSATs could help inform environmental policies in the context of inclusivity and participation when making decisions within the built environment.

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APPENDIX

Appendix 1: Point allocation data for 15 NSATs

Participatory HSI	**Categories**	**% of points allocated**	**Mandatory**
BERDE (Stakeholder Consultation)	BERDE (Stakeholder Consultation)	5	
Green Mark (Stakeholder Engagement, Feedback and Evaluation)	GM (Stakeholder Engagement, Feedback and Evaluation)	3.24	
GBI Township (Community Thrust)	GBI (Community Thrust)	4	
GBI Township (Governance)	GBI (Governance)	4	
BEAM Plus Neighborhood (Community Engagement)	BEAM Plus (Community Engagement)	3.3	
BREEAM Communities (Consultation Plan)	BREEAM (Consultation Plan)	2.3	yes
BREEAM Communities (Consultation and Engagement)	BREEAM (Consultation and Engagement)	3.5	yes
BREEAM Communities (Design Review)	BREEAM (Design Review)	2.3	
BREEAM Communities (Community management of facilities)	BREEAM (Community management of facilities)	1.2	
LEED ND (Community Outreach and Involvement)	LEED ND (Community Outreach and Involvement)	1.8	
EnviroDevelopment (Ongoing Community Engagement, Governance and Activation)	EnviroDevelopment (Ongoing Community Engagement, Governance and Activation)	4.7	

EnviroDevelopment (Essential Action of communities)	EDevelopment (Essential Action of communities)	3.4	
ECC (Community Charrette)	ECC (Community Charrette)	0.05	
ECC (Ongoing Community Engagement)	ECC (Ongoing Community Engagement)	0.045	
Greenstar Communities (Community Development)	Greenstar(Engagement)	5.5	
	Greenstar(Community Development)	3.6	
	Greenstar(Community Participation and Governance)	1.8	
*PCRS (Integrated Development Strategy)	*PCRS (Integrated Development Strategy)	0	yes
*ECC (Community Participation)	*ECC (Community Participation)	0	yes
Enterprise Green Communities (Goal Setting)	*EGC (Goal Setting)	0	yes
Green Townships (IGBC)	IGBC	0	
STAR Community Rating System	STAR	0	
GSAS	GSAS	0	
CASBEE UD	CASBEE UD	0	

Appendix 2: Point allocation data for 15 NSATs

Merged Consultation Categories	**% of points allocated to all participatory HSI in an NSAT**	**% of points of the highest weighted non participatory HSI in an NSATs**	
BERDE	5	5	Construction Waste Diversion
GM	3.24	10	Energy Efficiency for Infrastructure and Public Amenities/Site Planning and Building Orientation
GBI	8	8	Green Transport Masterplan
BEAM Plus	3.3	8	Pedestrian Oriented and Low Carbon Transport
BREEAM	9.3	8.9	Local Economy
LEED ND (Community Outreach and Involvement)	1.8	9.1	Preferred Location
Enviro-Development	14	4.7	Connected Communities
ECC	1.05	7.02	Mixed Use
Green star	10.9	8	Design Review