An assessment of the CASBEE sustainability certificate in the context of Brazilian urban projects

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ABSTRACT: In most studies, it has been taking into account the performance assessment of construction, without addressing or addressing insufficiently, the urban context in which it is inserted: the environment, the neighborhood, the city. As cause and consequence of this situation, many of the built environment promotion policies are directed solely to the construction, while larger scale projects are at the mercy of a few indicators, hampering the assessment work of funding agencies. These criteria have been defined by the various institutions that develop methods of environmental assessment, some of which granting certification to the enterprise. This paper aims to consider one of these methods, CASBEE method - *Comprehensive Assessment System for Building Environmental Efficiency*, administered by IBEC -*Institute for Building Environment and Energy Conservation*, based in Japan, the only one, so far, that assesses the scale of the city instead of the neighborhood/district scale. As a result, this paper presents the adjustments that must be made on some criteria of the method in question, so that it can be used in Brazilian context.

Keywords *Civil Construction, Urban Design, Urban Sustainability, Environmental Assessment Methods, CASBEE.*

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1. INTRODUCTION

1.1 Characterization of the problem

Taking as analysis the discussion of certain methodologies for classificatory environmental assessment and their related criteria, ways of adapting international certifications to the Brazilian scenario will be marked distinguishing their maladjustments and indicating proposals for how to improve them.

Thus, the knowledge of the study about urbanism begins to be seen and bring concern from the urban agglomeration of cities in the first industrial revolution with the garden cities movement. The shift to looking for work and livelihood caused the rural exodus, the main cause of the growth of cities. Therefore, the cities were the highlights of studies to advance the living conditions of its residents.

The urbanism is a very current theme, but not insignificant or irrelevant. It starts in 1867, with the creation of the neologism *urbanización* that means "action in the city" by French Ildefons Cerdà. In science, the cities were addressed through geography and sociology, with the basis of the study of the society and the earth; in urbanism and in architecture, brought information about the built environment and the comfort; in economics and management, with the idea of capital, the labor and organization.

In the view of those who study sustainability and its urban projects, it was the Brundtland Report (Our Common Future, 1987), which mentions sustainability as [1]"Development that satisfies present needs without compromising the ability of future generations to supply their own needs". Then, five years later, the United Nations - UN - draws up the Agenda 21 in the scope of the United Nations Conference on Environment and Development (UNCED), popularly known as ECO-92 (1992), a plan of goals for the nations seek better living conditions.

The sustainability of the city is clear in one of its proposals by Brazilian Agenda 21, as Bezerra and Fernandes (2000 apud NEGREIROS 2009):

> [2] To promote the production, review and implementation of directive plans and of edificial and urban legislation of municipal competence, namely, of usage and occupation laws, of division and subdivision of the urban area, of works and buildings codes, of postures and health codes, aiming the introduction, where normative and legal provisions to ensure the sustainability of cities are applicable.

In this context, society reacts to the other United Nations conferences on the environment confirming their importance, such as the Rio + 20, from which Bonduki (2012) mentions how superficial was treated the "sustainable cities" theme.

1.2 Objective

The objective of this paper is to analyze the environmental assessment method called CASBEE - Comprehensive Assessment System for Building Environmental Efficiency. The choice of this method is due to the fact that it presents some criteria that the authors

[1] Free translation of the original text.
[2] Free translation of the original text.

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consider to be adaptable to the context of the Brazilian urban projects. It is expected to contribute to building assessments to assist the government, the professionals from the sector of the built environment and funding agencies that promote, develop, finance and produce more sustainable urban projects.

1.2.1 Specific Objectives

Diagnosing the assessment procedures and practices of CASBEE method;

Scoring the best practice to adjust Brazilian standards;

Considering the regional economy in the various city systems;

Determining the aspect attached to the urban projects in CASBEE certificate.

2. DEVELOPMENT

2.1 Methodology and action strategy

The methodology used in this paper consists of revising the bibliography related to classificatory environmental assessment methods, based on those used for calculation of environmental performance built on an urban scale. Classificatory assessment methods are quantitative character assessment procedures, which give certification (NEGREIROS; Abiko, 2009).

The basis for the development of this paper was based on Bueno master's thesis (2010), in which the author addresses four certification standards directed to buildings motivated by the increasing of the production of social housing and its problematic related to the quality of the housing units built at low cost.

Essentially, the certifications that are of interest to the objective of the work are identified, by drawing a brief overview of the state of the art and technology. Next, the most relevant certifications to the assessment of urban scale are preferred and described, showing the reason for the choice and their degree of relevance to the study, systematizing them in order to build a proper analysis model.

In accordance with Bueno (2010): "Adequacy to the studied regulation", "applicability in the Brazilian context" and "regional flexibility" are defined as marking criteria. These criteria were adapted for the assessment of the urban environment, as explained below:

1. Adequacy to the studied regulation: the values required by the certifications shall be greater than or equal to the values of national standards.

2. Applicability in the Brazilian context: the credits must be consistent with Brazil in cultural, geographic and economic terms, as well as the technical and applied practices.

3. Regional Flexibility: requirements must be flexible, adapting to regional contexts so different, present in a country of continental proportions like Brazil.

The criterion of "relevance to the determination of environmental performance" was not included due to unsuitability to the object of this dissertation. In the case studied, what is at stake is not only the environmental performance of certifications, but also a general analysis of sustainability, which the environment is a part, as well as the economy and society.

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The assessed criteria of CASBEE are succinctly explained throughout the paper and can be found best described in its own documentation.

For urban environment assessment, it has been adapted to urban environments nine assessment categories defined by Bueno (2010). They are listed below:

1. Design process and popular support: it assesses the practice of urban design.

2. Connections: it relates the question of the project's connections with its urban infrastructure systems.

3. Implementation: it refers to issues related to the land and the ground.

4. Resource consumption: it refers to the consumption of water, energy and materials.

5. Emissions: it refers to the emission of carbon dioxide and other greenhouse gases during construction, most important during operation.

6. Comfort: it addresses issues relating to thermal comfort, acoustic, luminal, ventilation, especially physical issues, but also landscape and psychological ones.

7. Services and integration: it includes all services systems such as trading, security, education, leisure and health. And yet forms of control of systems addressed in category Connections.

8. Economic aspects: it includes aspects related to the financial system and economic welfare.

9. Planning of the operation and urban management: the operation, main and broader point of an urban project, is assessed in this category.

The bibliographic search was made in books, articles, dissertations, theses, manuals, documentation published in academia, and internationally to capture ideas and successful experiences. Legislation and relevant resolutions. Journals of scientific and technical information, and available sources from the internet.

To understand the scale of the problem there were also made research on case studies turned to management and sustainability in construction. The documentary research was done in library collections, databases, environment, environmental plans and projects.

2.2 Analyses of CASBEE-City System

It was found a number of certifications, standards, codes and unique seals for the urban context, including two Brazilians, among which are mentioned: HQE (France), BREEAM (England), LEED Neigborhood Development (United States), Vanzolini AQUA (Brazil), CASBEE (Japan), SmartCODE - CNU, ISO 14000, ISO 9001, Seal Qualiverde (County of Rio de Janeiro).

The CASBEE is a Japanese seal that assesses buildings, and in 2008, according to its technical documentation (COMMITTEE FOR THE DEVELOPMENT OF AN ENVIRONMENTAL PERFORMANCE ASSESSMENT TOOLS FOR CITIES 2011), was chosen to serve the federal program "Eco Model city project" as a basic assessment tool due to its clarity, reliability, safety and utility.

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It is addressed the quantitative data assessment directly taken from Japanese federal agencies as Statiscs Bureau, Japan Sewage Works Association, and the National Police Agency. With holistic approach, it distinguishes criteria to be analyzed in the form of percentage rates spontaneously obtained in the Japanese landscape. The data are of such understandable nature that counts on historical series. This certification includes a chapter that deals with policy options and programs to be stipulated over the years for maintenance and confirmation of the achieved *benchmarks*.

The certification procedure in a simplified way is the calculation of a quotient. The numerator is defined as the quality of the city (Q), while the denominator is its environmental load (L). Both factors are calculated according to an average of the certification criteria. In each criterion, it is presented an indicator and a scale of five intervals where each interval is associated with a score of 1 to 5. Indicators are many, but simple and sometimes take the form of only one value, such as in "Policies and efforts to life in society", which assesses the amount of government programs that serve the population. At other times, take the form of percentage, for example, in "domestic waste recycling rate", which is the ratio of recycled waste and waste produced.

2.2.1 CASBEE - City to the Brazilian context

The CASBEE displays the complexity of the city analyzing in detail in several interconnected systems. Some of those much commented in Brazilian research had few inadequacies, such as Residence in "adequate quality of residence standard" and Natural growth rate in "rate of population growth due to births and deaths." While others, rarely discussed, but also necessary for the welfare of the residence and of the human being, had a higher number of inadequacies. These are presented below.

The calculation of the environmental load denominator (L), based on emissions of carbon dioxide and other greenhouse gases, is the main point of this analysis. It is from the relationship between the city's quality of life and its environmental liabilities that the certification generates the notes and ratings. However, the emission calculation method is based on the Japanese standard. Moreover, this calculation is calibrated for Japanese average related to the year 2005. This may cause distortions in the Brazilian case.

The effectiveness in public transport is a component of complex analysis in the Brazilian panorama, not only by the difficulty of adapting to the established standards, but also by the difficulty of subsidies on the subject. Usually city governments do not have studies in these areas, and few are those who have transportation master plans as well as this is a legal obligation only for large cities.

A suitable predicate of the housing pattern is measured according to the area of the housing unit per capita, which, despite being an interesting reference, it is difficult to reach in Brazil, especially in cities with a broad range of urban area already consolidated and not showed a concern to accumulate this element in their municipal building approvals.

CONAMA resolution 03/1990, which determines the coefficients of substances in the air, have distinct standards of those stipulated by the seal. However, prosaically, they are even more restrictive. A question of subversion lies in the responsibility for air quality, since the noise level in Brazil is monitored directly in vehicles, not in residences.

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The analysis of how well suited a city is with analogy to natural disasters that can occur is compromised. The seal of a country as different as Japan is, compared to Brazil should be changed. There is no intention to use as a generic reference the areas of public facilities that can serve as shelters are still attached to the Japanese inclement weather, as the occurrence of earthquakes, as only the facilities that are certified are recorded. To be used in Brazil This identifier would need to be reviewed and trampled on regional inclement weather, such as drought or flooding events.

Culture services are analyzed with indexes without access in Brazil. It also occurs with the daycare service and the rate of population growth due to migration. The first related to the possibility to be assessed with the difference between the number of children up to four years enrolled in daycare services, would not properly consider the condition of the city. The second could be found with a survey by the Brazilian Museums System that contains such data, or even, particularly in each city museum. The reason for which there are instances of children who have family members who can take care of them. Finally, the rate of migration could only be analyzed with own tests subsidy and these elements are not assessed so segregated at the municipal level by statistical offices.

The last fact of unconformity, which will consist of explanation, is the number of policies for environmental improvement and biodiversity. This is an artifact of simple acquisition. The fear of its analysis, however, is that certain federal policies, not developed fully in a certain county, could be introduced and conceals the results. This set, in order to have regional flexibility, that this critical judgment would need to be adapted to house only municipal policies, or policies, which have some sort of self-analysis with respect to their local results.

It is permissible then congregate the non-conformities found in three types: - The first, most common, is related to the calibration of the indexes and the analogy standards. As this is a Japanese certification, it is to aim that is linked to the panorama of the country. The simple way to get these inadequacies would be through its adjustment to the Brazilian indexes. A second way of non-conformity is the lack of information required in Brazilian researches or agencies, whereas the third and last one is more of a concern than a mismatch. Certain indexes can be misinterpreted, even with the current effort in the manual to emphasize that types of buildings, areas or policies should be recorded.

3. CONCLUSÃO

The certificate analyzed, except for the fact of having a high concentration of unadjusted critical, considers various aspects attached to urban projects. Its treatment, consists of environmental conditions, labor relations or housing welfare, which are essential for a high note in CASBEE-City labor, and therefore to a "good city", established by the same foundation of sustainability: economic, social and environmental factors, certifying the quality of life. Therefore, it is evident the need to comply more jobs that point to analyze environmental assessment methods in order to collaborate with the construction of criticism that support the government, the professionals of the built environment sector and funding agencies that require, architect, finance and produce more sustainable urban projects.

There are several artifacts that are valued by services in the city. Fifteen of the forty-two criteria assesses, through indicators per capita, the availability of these systems. Two

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assessments can be done on these indexes. On the other hand, notes like these disguise the real effectiveness of the service given that central neighborhoods, with more choice, end up increasing the overall rate of the city even if peripheral areas with few facilities. However, this analysis does not value the "cut-neighborhood", but the city as a whole.

Although the per capita rates levied a lack of CASBEE-City, it is essential to verify that was implemented a policy that subsidizes the reduction of this misunderstanding, as already explained, at the "Efficiency of public transport." Therefore, people's access to services is guaranteed.

Certain regional economy considerations lead to many city systems. Then, one of the main systems of the city is the exchange and trade ones. The trade vitality of the city is mostly seen in the CASBEE-City through the indicator "Equivalent index of the number of people visiting the city" that, even before the measurement difficulty, is calculated, even if indirectly. The seriousness that is given to trade for the good life in the city is, therefore, ratified.

The citizen, as part of the city, should feel at ease, comfortable, nothing despite amortize its impacts. The criteria encompassed in Emissions and Comfort outline a scenario of quality of life that residents have at their disposal of the environmental perspective and, from a more general outline, also the quality of the environment. The sound attribute is a component that outlines this correctly: it can be used vehicles, as soon as the noise caused not intervene in the other city functions such as the reside one.

Different criteria tend to the welfare of citizens, even outside those categories, such as "adequate provision of parks and open spaces" that does not edify the city, but preserves the landscape quality and the friendliness of the way.

The disengagement and access to city services, a good trading system, the human welfare and the reduction of their impacts are assessed in CASBEE-City and confirm the operation of the city as a set of interconnected systems. Leisure, sewage, traffic, security, education, health, information technology, and politics are only a few systems assessed in the seal, but they are present in any city, promoting exchanges and improving the quality of life for their residents.

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