

## QUALITY CERTIFICATION SYSTEM OF OFFICE BUILDINGS IN BRAZIL

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### ABSTRACT

It is notorious how widely ranged are the classifications used at the real estate market to indicate the quality of office buildings. To support any decision related to office building product it is convenient to have one and only information regarding the quality of these buildings. This quality certification system stratify the office buildings market in a discerning, impartial and single way at the Brazilian sphere. The buildings submitted to this certification system are classified considering the conditions of some attributes. Each evaluated building gets two classifications: one national and another regional, both represented by letters. The national classification has the extension “Br” to be distinguished from the regional classification. The national classification takes into account only physical attributes of the construction, without regards to its location. The regional classification considers building physical attributes and its location in a specific office market area. On both classifications the building management is not evaluated. The quality of the appraised office building is represented by these two classifications in a certificate issued by Real Estate Research Group of Polytechnic School of the University of São Paulo (Núcleo de Real Estate da Escola Politécnica da USP). The procedures followed to elaborate this certification system were: library researches, interviews with participants of the office buildings market in Brazil, visits to edifications of this real estate market division, observations in the office buildings market and initial arbitrations, followed by validation and gauging tests and adjustments. The arbitrations were applied to elaborate some components of this certification system. The prevalent opinions in the specialized environment were used in important arbitrations. The Delphi process combined with Describing Statistic practices were applied to find out these opinions. This research intends to improve the quality of the information produced about office buildings in Brazil. Its guidelines may be used to develop similar researches in other divisions of the real estate market in Brazil or in foreign countries, and also in this same market section but abroad.

Keywords: buildings classification; office buildings; quality certification system.

## 1 INTRODUCTION

The subject of this paper is the quality certification system of office buildings in Brazil, developed by the Real Estate Research Group of Polytechnic School of the University of São Paulo (NRE/POLI/USP).

A Brazilian office building, when submitted to this certification system has the conditions of its attributes analyzed from user's point of view. This evaluation of the attributes is shown through scores conferred to them. The result of this scoring is harmonized in a certain classification scale, defining a hierarchic classification for the building. The insertion of the building in the certification system according to a certain category is consolidated by a classification committee and a certificate is issued defining this insertion.

Each analyzed building receives two classifications: a national and a regional one. The national classification, which evaluation score receives the suffix "Br", covers only physical attributes of the construction, without regards to its location. The regional classification considers building physical attributes and its location within a specific office market area. In none of the classifications the building management is evaluated.

The classification system, which is presented in the next chapter, is a subsystem of the certification one. Among the components of the classification system, the attributes matrix and the classification scale were initially arbitrated and, afterwards, validated and gauged.

In the specific case of the attributes matrix, the detection of prevalent opinions in specialized environment was the initial step for its arbitration. The Delphi<sup>1</sup> process, combined with Describing Statistics practices, was used to detect these opinions.

The necessary adjustments for the validation and gauging of the attributes matrix and of the classification scale resulted from tests realized using office buildings already consolidated in this section of the Brazilian real estate market.

The concept of office building only as the physical structure of support is surpassed. It was substituted by the concept of office building as the adequate environment to the development of businesses and their integrating part. According to this approach, it is necessary that these buildings follow the evolutions of technology, construction materials, architecture concepts and working organizational structures, as well as the moving of the business centers within the urban range, so that they may assist its occupants in the best way. This new concept of office building evidences the quality perishability of this kind of buildings, as well as its variety of offers to the market. So, the office buildings market has a stratified format, and this stratification is dynamic during time.

Referring to the quality of the product office building, one characterizes the adherence of this product to a reference. According to Rocha Lima (1993), this reference comprehends a set of attributes of the product and the desired conditions of this set of attributes, according to what is identified as a market prevalent opinion. The quality

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<sup>1</sup> The Delphi technique may be considered as a strategy to treat questions which use the generation of ideas. Its main aim is to "obtain the most reliable consensus of opinion of a group of experts (...) by a series of intensive questionnaires interspersed with controlled opinion feedback" (DALKEY; HELMER, 1963, p.458 apud ROWE; WRIGHT, 1999, p.354).

reference, in this certification system, was established according to the perception of the building user, the person that is going to experience this product. Therefore, this is the point of view through which the office buildings market is organized in a hierarchic way, resulting in the stratification of this national market.

The intrinsic subjectivity to the quality vector treated in this certification system justifies its restriction to the Brazilian market. The role of an office building, according to the user's point of view, is intimately related to cultural, political, climatic, technological, economical and legal aspects among others, which are specific to each country. It would be impossible, for example, to approach in the same way the climatic aspects in Brazil and in Sweden or the political matters in Brazil and in Russia.

This certification system does not include all the attributes of regulations related to office buildings in Brazil and neither limits itself to these regulations: the attributes considered in the quality reference used in the analysis are those considered important by the users of these buildings in order to develop their tasks adequately.

### **1.1 Importance of the quality certification system of office buildings in Brazil**

The current concept of office buildings evidences the quality perishability of this kind of buildings. For example, an office building considered prestigious by the time of its launching to the market, may not be so after a certain time, for being old fashioned according to the perception of construction (material used, architectural design, segmentation of space, and so on) and/or for not being technologically updated (insufficient telecommunication structure and data processing, lack of central air-conditioning system, lack of building automation, and so on) and/or for being in a downgrading urban region.

Another important evidence of the current concept of office buildings is the large number of these buildings with different quality, since not all the users are willing to pay the value derived from high technology and privileged location. The real estate market builds, then, office buildings with various qualities to serve the different potential users.

The quality perishability of office buildings and their diversification offered to the market result in the stratified format of the office buildings market, a stratification that is dynamic during time.

Nevertheless, it is crucial for the decisions process that the quality of each office building is clearly specified, through its hierarchic classification, and that this information is the same to all those involved or affected by the question on subject. Nowadays, one observes the opposite behavior in the real estate market: the classifications used to refer to the quality of the office buildings result from casual and particular judgments of companies or individuals involved with the building being verified. The lack of criteria to be followed for issuing these classifications predominates and when these criteria exist, besides being superficial and poor, they are specific for each company that acts in the marketplace. So the resulting classification is a matter of the interest of its issuer according to the building (interest in praising it or in diminishing it). "Class has been in the eye of the beholder" and "it is not unusual, for example, for a building's owner and an outside party to assign different class ratings to the same property" (COWELL; SAX, S.; SAX, T., 2002).

The great diversity of classifications used in the real estate market to refer to the quality of the office buildings is evident, as shown on the following table. Variations occur in the definitions on: nomenclature of the classes and their limits; and which aspects to consider for the classification and how to do it.

TABLE 1.1 - CLASSIFICATIONS USED BY SIGNIFICATIVE COMPANIES / ASSOCIATIONS INVOLVED IN THE OFFICE BUILDINGS MARKET.

Company / Association		Bolsa de Imóveis do Estado de São Paulo	BOMA International	Brazil Realty	CB Richard Ellis	Colliers International	Cushman & Wakefield Semco	Jones Lang LaSalle	Tishman Speyer Método
Classification used	Brazilian market	AA, A, B, C	not applied	AAA, AA, A, B, C	A, B, C	A+, A, B, C	A, B, C	AA, A, B, C	A, B, C
	Internacional market	not applied	A, B, C	not applied	A, B, C	A, B, C and A+, A, B, C	A, B, C	A, B, C	not applied

*Acting of the considered companies in the office buildings market:*

**Bolsa de Imóveis do Estado de São Paulo:** incorporation, construction management and real estate evaluation.

**Brazil Realty:** planning, development, administration and incorporation.

**CB Richard Ellis:** real estate consulting, asset management, commercialization, market survey, occupants serving, management services (projects, construction, property and facilities management).

**Colliers International:** real estate investments consulting, real estate commercialization, market research.

**Cushman & Wakefield Semco:** real estate investments consulting, property management, real estate commercialization.

**Jones Lang LaSalle:** consulting and evaluation, management (projects, construction, property and facilities), occupants representation, commercialization, research, real estate investments consulting.

**TishmanSpeyer Método:** conception, development and administration of real estate projects.

*Considered association:*

**BOMA (Building Owners and Managers Association) International:** international association, centered in the USA, whose informations are used in the office buildings market, and also in the Brazilian market. Besides being a trustful source of information, it represents and promotes the interests of the studied market.

*Source: interviews with several agents of this market and library researches, highlighting the followings: Building Owners and Managers Association (BOMA) International (2002); Databolsa (2002); Market Monitor (2000); Marketbeat Series – América do Sul (2001); Perfil Imobiliário (2001) and Relatório de Mercado Imobiliário Corporativo 2002 – Brasil (2002).*

Still concerning decisions taking, the convenience of offering to the market the reference indexes separately produced for each extract of office buildings is intuitive: sale price, rent price, vacancy rate, absorption rate, and so on. The approach of the office buildings market as a single block brings about not very precise and not enough information for taking decisions with confidence.

The quality certification system of office buildings aims at solving the exposed points that, in short, are:

[i] - stratification of the office buildings market in a discerning, impartial and single way at the national sphere and

[ii] - periodical updating of the hierarchic classification which indicates the office buildings quality due to this quality perishability.

By making this quality certification system of office buildings in Brazil available to the market, one seeks, ultimately, to improve the quality of the information concerning the Brazilian office buildings. Therefore, this trustful information will directly benefit:

[i] – entrepreneurs / investors / incorporators: for example, to make decisions about the launching of a certain real estate business and about the desired level of return rate;

[ii] - - users: for example, to compare sale and/or rent prices;

[iii] - architects / projectors: to define the patterns for each project;

[iv] - regulating agencies: for example, the CVM (Comissão de Valores Mobiliários – a securities commission) to approve or not the submitted project, which depends on office building securities;

[v] - sources of information on the Brazilian office buildings market: in order to present reference indexes of this market closer to reality, that means, separately for each building class (sale price, rent price, vacancy rate, absorption rate, and so on).

## 2 DESCRIPTION OF THE QUALITY CERTIFICATION SYSTEM OF OFFICE BUILDINGS IN BRAZIL

The certification system on subject is composed of:

[i] - **classification system**: classifies Brazilian office buildings, from user's point of view, due to certain attributes conditions detected for the analyzed building;

[ii] - **issuing of a certificate**, by Real Estate Research Group of Polytechnic School of the University of São Paulo (NRE / POLI / USP): defines the insertion of the analyzed building in the classification system, according to a certain category / class;

[iii] - **routine to verify the validity of this certificate**, and

[iv] - **mechanisms to update the classification system**.

These two last components of the certification system refer to the important aspect of the quality perishability of the office buildings, as referred in the chapter "1.INTRODUCTION" in this paper.

The classification system, as one of the subsystems of this certification system, is composed of:

[i.1] - **attributes matrix**: leads the analysis of the quality of the office building and produces a score to this building;

[i.2] - **classification scale**: the framing of this building score in the classification scale generates a hierarchic building category / class; and

[i.3] - **classification committee**: issues opinion on the insertion of the evaluated building in the classification system according to certain category. This committee is necessary to supply credibility to classification system, as detailed latter in this chapter.

The following figure explains the structure of this certification system:

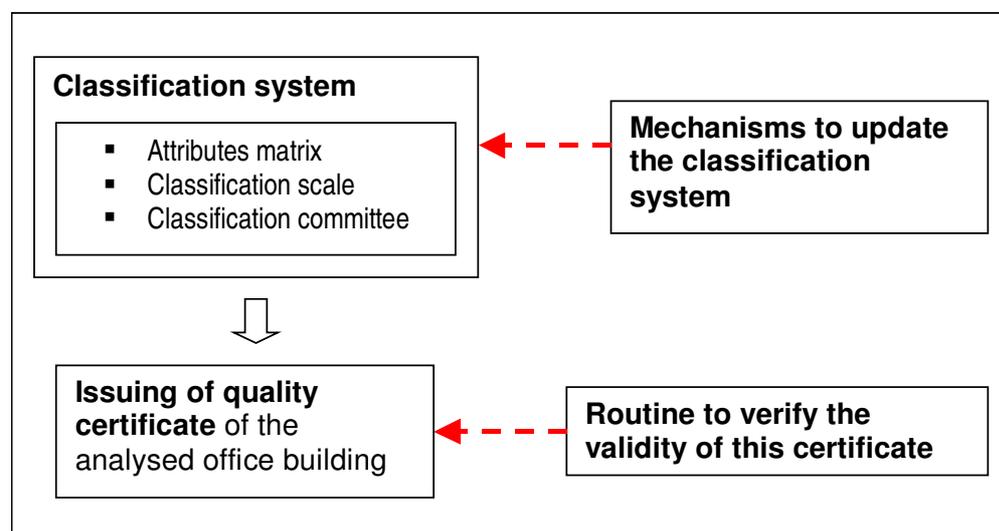


FIGURE 2.1 - QUALITY CERTIFICATION SYSTEM OF OFFICE BUILDINGS IN BRAZIL.

Each component is equally essential for the operating of the whole certification as detailed in this chapter.

## **2.1 Classification system**

This subsystem of the certification system is composed of attributes matrix, classification scale and classification committee, which were shortly introduced in the beginning of this chapter and are now detailed. It is responsible for the consolidation of the category / class in which the analyzed office building is inserted, and represents its quality, according to its user's point of view. There are procedures and rules to be followed for the consolidation of the classification of the analyzed building, as presented in the subitem "Classification Process".

### **2.1.1 Attributes matrix**

The attributes matrix leads the analysis of the quality of the building, according to the focus defined in this certification system. As important as the structure of the attributes matrix, is the manner in which it must be filled during the analysis of an office building. In spite of the fact that the structure of the attributes matrix is rigid and also considers all the necessary algorithms to produce the final scores of the building, its incorrect filling leads to distorted results.

#### **2.1.1.1 Structure of the attributes matrix**

The structure of the attributes matrix can be understood through the following figure. Here all the systems / groups of attributes considered in the matrix are presented. Nevertheless, the attributes that compose each of these groups /systems are not listed, and only the attributes quantity in each group/system is indicated. This simplification is enough for understanding the matrix.

This certification system does not intend to establish a primer to office building projects in Brazil, it means, a certain project shall not be defined based on the attributes matrix. That is the reason for this matrix not been totally presented.

Building name:  
Address:  
Date of visit:

Particularity (R, VD, VE)	Attribute	Relative importance factor	Building score (0 to 10)	Scored and weighted attribute
	<b>EFFICIENCY OF THE PROJECT</b>			
	attribute 1			
	attribute 2			
	:			
	attribute 29			
	<b>DIFFERENTIALS OF THE PROJECT</b>			
	31 attributes			
	<b>AIR CONDITIONING / VENTILATION SYSTEM</b>			
	32 attributes			
	<b>GAS SYSTEM</b>			
	5 attributes			
	<b>ELECTRICAL SYSTEM</b>			
	31 attributes			
	<b>PLUMBING SYSTEM</b>			
	17 attributes			
	<b>LIGHTING SYSTEM</b>			
	12 attributes			
	<b>FIRE DETECTION AND FIGHTING SYSTEM</b>			
	23 attributes			
	<b>TELECOMMUNICATION / INFORMATION SYSTEM</b>			
	18 attributes			
	<b>PROPERTY SECURITY</b>			
	19 attributes			
	<b>BUILDING MANAGEMENT AND CONTROL SYSTEM</b>			
	22 attributes			
	<b>PARKING</b>			
	16 attributes			
	<b>ELEVATORS</b>			
	25 attributes			
	<b>TOILETS</b>			
	11 attributes			
	<b>ACOUSTIC TREATMENT</b>			
	7 attributes			
	<b>FACADE</b>			
	19 attributes			
	<b>LOBBY</b>			
	5 attributes			
	<b>LOCATION</b>			
	23 attributes			
	<b>FINAL SCORE</b>			
			<b>NATIONAL:</b>	
			<b>REGIONAL:</b>	

FIGURE 2.2 – GROUPS / SYSTEMS COMPONENTS OF THE ATTRIBUTES MATRIX AND NUMBER OF ATTRIBUTES IN EACH GROUP / SYSTEM.

The columns “Attribute” and “Relative importance factor” are fixed independently of the building being analyzed. The filling of these columns was initially arbitrated. The detection of prevalent opinions in the specialized environment, through the application of the Delphi process, was the initial step for this arbitration. This arbitration was also based on interviews with building systems specialists and with Brazilian office buildings market participants, and on the behavior perception of this market by

NRE / POLI / USP. The answering of the columns “Attribute” and “Relative importance factor” was validated and gauged through successive tests interspersed with eventual adjustments. For these tests office buildings already consolidated in the Brazilian real estate market were used.

The column “Attribute” has, listed as a text, all the physical attributes and the ones related to the location of an office building that, under the focus of its user shall be evaluated for its classification. Attributes related to the building administration are not considered in the matrix. Thus, the classification system does not evaluate the management of office buildings, which is very volatile and, if considered, could change the classification of the building on a period of time shorter than the validity of its quality certificate.

In the matrix, these attributes are organized in groups or systems identified by a title in capital letters at the top of each group / system. The order in which the groups / systems are listed has the purpose of performing the building analysis in the most fluid way, and has no relation with the importance of the group / system inside the attributes matrix. The same justification is valid for the ordering of the attributes inside each group / system.

The column “Relative importance factor” is filled with numbers that represent:

[i] – beside each attribute, the importance of the attribute in relation to the other attributes considered in the group / system, in the sense of classifying the product office building according to its quality, from its user’s point of view. This concept becomes clearer through an example extracted from figure 2.2: if aiming at classifying an office building as to its quality, “attribute 2” of the group “EFFICIENCY OF THE PROJECT” is more important than “attribute 1”, so “attribute 2” presents a higher value for its relative importance factor than the other one;

[ii] – beside each group or system, the adjustment of the importance of the group / system in relation to the other groups / systems considered in the matrix, intending to classify the product office building as to its quality, from its user’s point of view. This weight attributed to each group / system multiplies the resulting average score for the group / system<sup>2</sup>. So, the importance of each group / system aiming at classifying the building is correctly weighted, independently of the number of attributes which compose it and of the relative importance factor of these attributes.

The column “Building score” is filled only when a certain office building is evaluated. This filling obeys the criteria that shall be detailed, since they are of high importance in the classification system. That is why it is treated separately in the subitem “2.1.1.2 Office buildings scoring proceedings”. In this same subitem the column “Particularity” is explained: there are initials to indicate restrictions or ties for the applicability of certain attributes.

The column “Scored and weighted attribute”, beside each attribute, is filled with the result of the multiplication of the relative importance factor of the attribute which is the same independently from the building, by the score reached by this attribute in the

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<sup>2</sup> The average score for the group / system results from the division of the total sum of the scored and weighted attributes of the group / system (see following explanation) by the number of attributes that compose it and that were scored.

specific case of the building being analyzed, this last one resulting from the judgment of the relator of the classification committee.

The column “Scored and weighted attribute”, beside each group / system, is filled with the mark of the group / system scored (through its attributes) and weighted (through its relative importance factor). Computation of this mark follow these steps:

1<sup>st</sup> step) computation of the score of the group / system: total sum of the scored (particular judgment) and weighted (relative importance factor) attributes of the group / system;

2<sup>nd</sup> step) computation of the average score for the group / system: the score of the group / system is divided by the number of attributes which compose it and which are scored<sup>3</sup>;

3<sup>rd</sup> step) computation of the group / system scored and weighted mark: the average score for the group / system is multiplied by its relative importance factor.

The building final score is the total sum of the scored and weighted marks of the groups/systems.

These calculations algorithm is already considered in the structure of the attribute matrix, which calculates faster the final score of the building and prevents mistakes resulting from the computation.

For each analyzed building two final scores are obtained representing the classifications:

[i] – regional: the scored and weighted marks of all groups / systems in the attributes matrix are summed up;

[ii] national: excluding the group “LOCATION”, the scored and weighted marks of all other groups / systems in the attributes matrix are summed up.

The final scores, that refer to the regional and national classification resulting from the attributes scoring in the matrix made by the relator of the classification committee, are due to his/her opinion on the analyzed building. The criteria to be followed for this attributes scoring are shown in the next subitem.

### **2.1.1.2 Office building scoring proceedings**

The column “Building score” is the only column of the attributes matrix which shall be filled when an office building is analyzed. The remainder of the attributes matrix is rigid and preestablished, independently from the building being evaluated.

The classification committee relator fills this column with scores, noted beside each attribute, due to the conditions detected for the attributes of the building being analyzed. This filling, of course, as every process which involves judgment, is not Cartesian, since it results from the opinion of the relator. Nevertheless, there are criteria to be followed for this fulfillment created in order to avoid deviations which are not resulting from the subjectivity intrinsic to the certification process.

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<sup>3</sup> There are some attributes of the matrix that sometimes are not scored. This depends on the characteristics of the building being analyzed, which is explained in the subitem “2.1.1.2 Office buildings scoring proceedings”. The non-scored attributes are not considered for the computation of the average score for the group.

The analyzed building attributes scoring is due to degree of adequacy to the highest construction standards corresponding to the market prevalent opinion (needs and anxieties of the office buildings user). The score may vary from perfect adequacy, when the highest mark is given to the attribute, to non-fitting to the standards that represent the prevalent market opinion, when the lowest mark is given to the attribute.

In front of each attribute listed on the column “Attribute” of the matrix, there is a brief nomination of possible construction standards for Brazilian office buildings. These nominations limit, and somehow equalize the judgment of the relators.

A gradation rule is used for this attributes scoring. The same gradation rule was established for all attributes. When only the presence or the absence of the attribute in the building is to be verified, only the two extreme scores of the rule, corresponding to YES or NO, are used. In other cases, the rule gradation varies discreetly between 0 or 10, and the score may take on any full value within this interval. The values 0 and 10 represent the minimum and the maximum possible scores, respectively, and value 5 represents the central value of the scale.

The office buildings have very different characteristics, even when comparing those shown in the same classification category. So, it would be ingenuous to imagine that the attributes matrix of this certification system would be fully and equally applicable to all Brazilian office buildings. So, in order to neither harm nor unfairly highlight the quality of the product being analyzed, the column “Particularity” was created in the attributes matrix.

Some attributes of the matrix have their evaluation restricted to certain characteristics of the building, while others have their analysis tied to one or more attributes, that may be considered or not in the matrix. In these cases, the column “Particularity” is filled with one or more initials indicating the particular tie or restriction, which are briefly explained beside the initials within the matrix.

Still concerning attributes scoring considered in the attributes matrix, it should be emphasized that during its analysis, the office building is taken as a product, and the attributes of this product should be evaluated as well, which has influence in its performance while adequate environment to possible activities development. So, it is evaluated: what is in the building, or what is assumed that will be, and in what detected conditions in comparison to reference standards. In this case is not the relation lessor/lessee that must be analyzed, and that is why the information about which agent provides the attribute does not interfere in the scoring. Therefore, the following criteria also must be followed to score the building:

[i] – it gets scored due to degree of adequacy to construction standards corresponding to market prevalent opinion: attributes provided to user by the building and attributes not provided to user by the building with quality standards imposed by the building;

[ii] – it gets minimum score (zero): attributes not provided to user by the building and which quality standards could be freely chosen by the space occupant, according to his/her criteria. The justification is that in this last case, we can not evaluate office building product performance due to occupant particular attitudes or free possibilities of mode of performance (case of vacant spaces).

The filling of column “Building Score” of the attributes matrix by the classification committee relator, according to criteria here presented and due to his/her judgment on

building attributes conditions being analyzed, results in relator`s opinion on final scores (regional and national) of product being analyzed.

The other classification committee members do a critical analysis of scores given to attributes by relator, with the possibility of alteration. This is in detail in the subitem “2.1.4 Classification Process”.

Therefore, since the classification committee is composed of 5 (five) members, including relator, for each analyzed building it is possible to have 5 (five) different final scores for each classification type (regional and national).

The path taken within the classification system between this point, where it is possible to have 5 (five) final scores for each building classification type, till the consolidation of regional and national classification of the building, is explained in the next subitems that describe the remaining of the classification system.

### **2.1.2 Classification scale**

The framing of final building score in the classification scale generates opinion on category / class in compliance with how to insert the building in the classification system.

There are two classification scales, one being used to generate opinion on regional classification and the other on national classification, from here on denominated regional scale and national scale, respectively.

As far as category quantities, as well as definition of the same, both scales are exactly the same. This is detailed ahead.

However, numerically the scales are distinct. This is necessary because the final scoring regarding regional classification results in the adding of scores of all groups / systems scored and weighted considered in the attributes matrix, whereas final scoring concerning national classification is a result from adding part of these groups / systems scores. That is, it proceeds as if two matrices were applied in order to classify each building, and the matrix used to obtain regional classification was more extensive than the one used to generate national classification. So, for the same building, its final scoring concerning regional classification is necessarily higher or equal to its final score concerning national classification, which is evident, since regional classification considers a bigger number of groups / systems.

The classes contained in the classification scales have their extremes numerically defined. These extremes, analogically to attributes matrix, are secret and therefore not presented in this text, since it is not the objective of this certification system to establish primer to office building projects in Brazil.

Each classification scale is constituted by 7 (seven) categories, identified by: AAA, AA, A, BBB, BB, B and C. If final office building score is lower than class C inferior extreme, it means that the building does not fit in the classification scale, therefore, NRE / POLI / USP will not issue quality certificate to such building. This level for undermost classification scales class was created because would not be coherent to consider in the same category buildings that in spite of presenting inadequate quality, are classification susceptible, even though the worst of all, and buildings that for its despicable quality, are not classification susceptible.

Classes are originated from more or less measurements adherence taken in certain office buildings to this measurement desirable condition, defined as reference. This reference comprehends a set of building attributes and desirable condition of this attributes set, according to what is identified as market prevalent opinion concerning user`s needs and anxieties.

The definitions of classes are presented in each issued certificate. They are described in item “4. CLASSES DEFINED BY NRE / POLI / USP” of the office building quality certificate example, presented in the next chapter.

Analogically to edification final score, category suggestion in which to insert the building is particular to each classification committee member. That is because despite the fact that regional and national classification scales are unique, final scores to building can vary among this committee members. So, insertion of final scores to building in analysis in the regional and national classification scales can generate up to 5 (five) different opinions on regional classification and up to 5 (five) different opinions on national classification for the building.

Consolidation of office building regional and national classifications as per its quality happens in the classification committee meeting. In order to make this decision, this committee follows procedures here established. Such procedures, as well as the committee composition, are explained later in this chapter.

### **2.1.3 Classification committee**

Classification committee is composed of five professors and researchers of NRE / POLI / USP. To each office building analysis a classification committee member is appointed its relator, being all committee members capable of performing such assignment. The relator is the committee member who must visit the building to be certified and make report, expressing an opinion on the condition detected for attributes considered in the attributes matrix in case of the building under analysis.

A member of classification committee works as coordinator. He / she is indicated by general coordinator of NRE / POLI / USP. Committee coordinator designates relator of edification analysis to be done. Committee coordinator, exceptionally, has the arbitrary right to cancel the report of a certain relator completely, and designate new relator to restart classification process.

Classification committee meets to confront classifications suggested by each one of its members for the building under analysis, then issues opinion on the insertion of the building in question in the classification system according to certain category. For each building two opinions are issued, one referring to regional classification and the other to national classification. The difference between the two classifications is done through extension “Br” applied to national classification.

Detailing what was introduced in the beginning of this chapter, this committee is necessary to supply credibility to classification system, since it guarantees that the hierarchic classification of the building (category) represents the opinion of certificate issuing institution (NRE / POLI / USP), and not the opinion of the person analyzing the building (relator and committee member). This way, according to next subitem presented, it was defined a classification process that must be strictly followed.

#### **2.1.4 Classification process**

The application routine of this certification system includes public steps and other secret ones. The classification process in itself is secret. It generates quality certificate of evaluated building, which is public and contains certification process overviews and class obtained for the building.

The classification process that is secret, includes:

[i] - analysis of the office building by relator belonging to classification committee: it is mandatory that relator visits the building in person;

[ii] - internal report (restrict disclosure to classification committee) with relator verification concerning visited office building: relator scores attributes of visited building due to detected condition of the same, following the criteria established to fulfill attributes matrix; relator highlights main positive and negative factors of the building under analysis;

[iii] - relator's opinion on regional and national classification of the office building: considering the score given by relator to building attributes, the algorithm contemplated in the attributes matrix structure produces both final scores for the product under analysis, which when framed in the classification scales, generates both categories suggested by relator for insertion of the building in the classification system, one referring to regional classification and the other to national classification;

[iv] classification committee meeting for final opinion issuing concerning regional and national categories in which to insert office building, or to request new building analysis by another relator. There are rules that conduct decision making by this committee. These rules are established in articles, which was denominated CLASSIFICATION COMMITTEE DECISION REGIMENT.

From the result of classification process application, the NRE / POLI / USP builds the quality certificate of analyzed office building.

#### **2.2 Quality certificate of the analyzed office building**

Office building quality certificate issued by NRE / POLI / USP defines the insertion of evaluated building in the classification system according to regional and national categories, originated from classification process application.

The certificate structure, which is public, includes:

[i] - certification process overview, which describes in a concise way the certification system fundamentals, the classification process and each category considered in classification system. Here aspects are clarified such as impartiality of certificate issuing institution and analysis comprehension, emphasizing that building management is not evaluated, and that Brazilian references are used to analyze office building performance from the user's point of view. It is also mentioned that certified classifications result from NRE / POLI / USP judgment with respect to product. This information is standard and independent of building under analysis;

[ii] - overview of obtained classification, that is the summary of detected condition for attributes set, which justifies the insertion of building in the national and regional

categories. Here the main factors of evaluated product, positive and negative, are highlighted, as well as the validity of certificate. This information is particular to each analyzed building.

An example of office building quality certificate is presented in chapter 3.

Certificate validity term is explained in the next subitem.

### **2.3 Routine to verify the validity of the issued certificate**

Recapturing what was already presented in chapter “1.INTRODUCTION”, office building is currently thought of as being adequate environment to business development and constituent part of the same, which requires these buildings to follow evolutions of technology, construction materials, architecture concepts and working organizational structures, as well as the moving of business centers within urban range, in order to better assist their occupants. This is the evidence of how perishable office building quality is.

So, there is a need to establish certificate validity term that expresses building perishable quality.

Validity term was established as 3 (three) years from certification date. This term coincides with defined term for classification system gauging, which is presented in the next subitem. In general, this term is necessary time for new standard knowledge (technological, constructive, architectonic, organizational, location) by the market added to necessary average time for idealization, conception and implementation of an office building set according to these new standards.

Once validity term is expired, office building must be submitted again to certification system for verification of its insertion in the classification system. The analysis routine is the same as the first certificate, and the new office building quality certificate is then issued by NRE / POLI / USP.

### **2.4 Mechanisms to update the classification system**

Classification system, subsystem of certification system, analogically to issued certificate for certain office building, is also perishable.

However, the procedures for its updating are not so simple as those described for certification validity verification, which is nothing more than reapplication of classification process to analyzed building.

Due to complexity involved in order to update classification system, it's divided in two steps:

- [i] - gauging of classification system, and
- [ii] - redoing of classification system.

Classification system gauging happens through its analysis, and eventual alteration of category frontiers that compose both classification scales (regional and national).

The interventions in the classification system for its redoing are deeper and consist in: [ii.a] – insertions and/or eliminations of attributes, with its relative importance factor, in

the attributes matrix; [ii.b] – redefinition of relative importance factor of attributes and groups / systems in which they are organized, initially contemplated in the attributes matrix, and that will be kept; and [ii.c] – redefinition of classification scales. This way, the redoing of classification system (attributes matrix and classification scales) includes also the interventions done in the gauging step of this system (only in the classification scales). So, when classification system is redone, it is simultaneously gauged.

The procedures followed for system gauging are, however, simpler than those required for its redoing. Consequently, the system is gauged in a relatively short period, here defined as 3 (three) years after its initial elaboration or after each redoing, while the term established for its redoing is 6 (six) years.

So, the subdivision of classification system updating in two steps was the strategy adopted to enable its realization in a satisfactory manner, gauging the binomial [ term x intervention depth].

Terms here established are function of speed in which transformation happens in society, and that is why it may be altered in the future.

Society evolution implicates in the parameters alteration previously applied in the real estate market in terms of construction materials and processes, architectonic design, available technology in the building, company organizational structures, location, among others.

A certain period of time is necessary for consolidation of new parameters as reference in the real estate market. In addition is the period necessary for idealization, concept and implementation of an enterprise that contemplates this new parameters. This complete cycle requires a minimum period of time, estimated in 4 years for the Brazilian case.

However, during implementation phase of a certain office building in the Brazilian market, which takes around 2 years, market reference standards may already be having alterations. Until the term limit corresponding to half of its implementation cycle (in general, one year after the beginning of its implementation, in the Brazilian case), this building may insert these new standards, if desired. After this term, the building is considered rigid to alterations in its project. That is why the overlapping of total cycle of 4 years to half of the implementation phase of an enterprise already started, according to figure as follows. This figure illustrates the perception of market behavior as far as NRE / POLI / USP, which supports the adoption of mentioned terms.

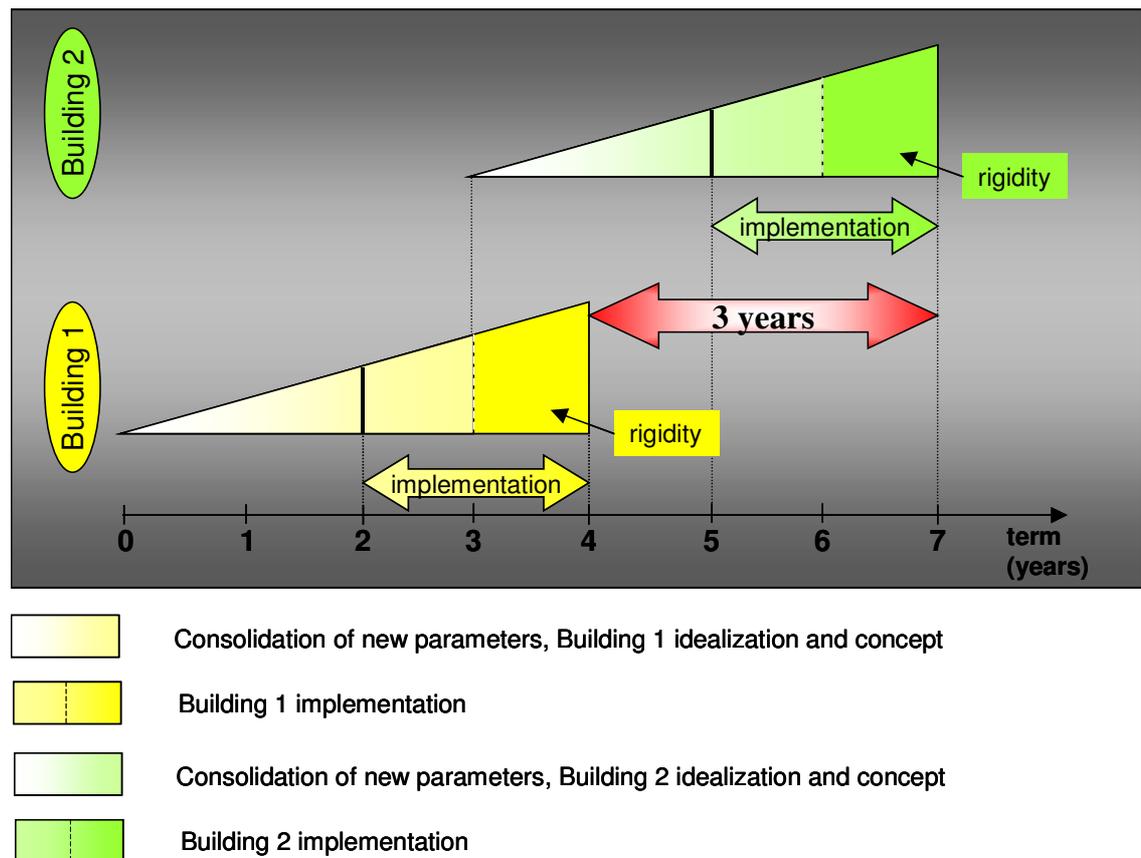


FIGURA 2.1 – JUSTIFICATION FOR ESTABLISHING A 3 YEAR TERM FOR CLASSIFICATION SYSTEM GAUGING AND FOR VALIDITY OF OFFICE BUILDING QUALITY CERTIFICATE.

The decisions on interventions involved in the classification system gauging process must be based on intense observations, covering all Brazilian office building classes.

The 6 year term established to redo the classification system is a bit more extensive than minimum duration estimated for the cycle that involves from the consolidation of new parameters in the real estate market to the end of enterprise implementation framed in these new parameters (4 years). The extension of 6 years is sufficient, since gauging is done in the system each 3 years, and according to market behavior perception by NRE / POLI / USP, which supports this certification system, the expected answer does not go through deviation within this period. Therefore, the redoing of classification system in a term less than 6 years, would be costing and would not cause any improvement in this system.

Analogically to procedures followed for elaboration of classification system, for its redoing attributes matrix, regional and national classification scales will be initially arbitrated. In case of attributes matrix specifically, for its arbitration, Delphi technique should be applied, interviews with building systems specialists and with participants from the Brazilian office buildings market should occur, and the behavior perception of the market in question by NRE / POLI / USP should be applied. The validation and gauging of attributes matrix and classification scales will be made right after, through consecutive tests, alternated with eventual adjustments. For this tests, it will be applied office buildings consolidated in the Brazilian real estate market.

In summary, with the binomials [term x intervention depth] here defined, it is intended following up, in a sufficient manner, of glimmering evolutions for Brazilian office buildings market by the certification system. Eventual alterations of these binomials may occur according to speed and pressure of society evolution that has repercussion in the Brazilian real estate market, which could only be detected in the future.

### **3 EXAMPLE OF OFFICE BUILDINGS QUALITY CERTIFICATE**

Each one of the components of the office buildings quality certification system in Brazil was defined, along with procedures and criteria for its application. This is described in chapter “2 DESCRIPTION OF THE QUALITY CERTIFICATION SYSTEM OF OFFICE BUILDINGS IN BRAZIL”. Recapturing, this certification system is made of:

[i] - **classification system:**

[i.1] - **attributes matrix;**

[i.2] - **classification scale;** and

[i.3] - **classification committee.**

[ii] - **issuing of a certificate,** by NRE / POLI / USP;

[iii] - **routine to verify validity of this certificate;** and

[iv] - **mechanisms to update the classification system.**

Here is presented only the missing detail in that chapter, which is the example of office building quality certificate, issued by NRE / POLI / USP for the building submitted to this certification system.



CERTIFICATE		
BUILDING	QUALITY ANALYSIS	
	CLASS	
<b>FL</b> (fictitious name to not identify it)	<b>AAA</b>	.Br
	<b>AAA</b>	in the city of São Paulo
<b>CLASSIFICATION VALID UP TO</b>	<b>August / 2007</b>	

## 1) CERTIFICATION SYSTEM FUNDAMENTALS

Real Estate Research Group of Polytechnic School of the University of São Paulo (NRE) is a body with independent performance in the Brazilian office buildings market. NRE analyzes and classifies office buildings, according to quality analysis criteria.

The classification granted to each building represents the NRE supported opinion from the application of models and criteria developed in its environment:

— these models and criteria were conceived supported by prevalent opinion detected among participants of Brazilian office buildings market, submitted to adjustments;

— these models and criteria are not available to the public and are kept secret, since it is not the institution objective to establish any primer to office building projects in Brazil, but only to offer the service to classify them according to criteria settled by it.

Quality analysis of Brazilian office buildings is done from user's point of view: quality reference applied in the analysis was built from this point of view and contemplates edification attributes that influences its performance while adequate environment for user activity development.

For quality analysis, building physical attributes and its location are considered: these are the attributes considered in the quality reference applied in the analysis. Attributes related to building administration are not considered, that is, this certification system does not evaluates office building management.

For each analyzed building two scores are attributed, represented by letters:

— national classification: contemplates only building physical attributes, ignoring location. The score is followed by extension "Br" in order to differentiate from the other classification;

— regional classification: contemplates building physical attributes and its location within a certain office market.

The application of this certification system is restricted to Brazilian office buildings market: the quality reference applied in the analysis is related to cultural, political, climatic, technological, economical and legal aspects among others, which are particular to each country.

This certification system does not cover all attributes contained in regulations related to office buildings in Brazil, since it is not the objective. On the other hand, attributes not standardized but considered important by office building users to develop their tasks adequately are contemplated. So, the attributes considered in the quality reference applied in the analysis are those noticed by this buildings user.

**This Certificate has a validity term of 3 (three) years.** The date, when attributed scores for the building expire, is indicated. This validity term was established due to glimmered evolution for the Brazilian office buildings market, resulting in alterations of parameters applied by this market, in terms of constructions materials and processes, architectonic design, technology available in the building, company organizational structures, location, among others. Seeing that



the speed of these alterations can eventually outdo current expectations, validity term could be reduced in the future. NRE stays alert to eventual changes on scores granted within inferior period to Certificate's validity. In this case, classification alterations will be communicated to Contractor by informative report (and to market, through its site [www.realestate.br](http://www.realestate.br)).

## 2) CLASSIFICATION PROCESS

The classification process followed to issue this Certificate includes obligatorily the following steps:

- i. **Indication of the relator:** after the signing of the contract the relator belonging to classification Committee is indicated. The relator constitutes the main channel of the NRE to receive information about the product being analyzed.
- ii. **Office building analysis by relator:** the relator visits the building to obtain necessary information to classify it.
- iii. **Internal report elaboration:** in this document the relator registers his/her findings about the visited building and suggests its national and regional classifications.
- iv. **Classification Committee meeting:** the scores (national and regional) suggested by the relator for the building are submitted to NRE Classification Committee judgment.
- v. **Certificate preparing:** Classification Committee final opinion concerning building scores (national and regional) constitutes NRE judgment with respect to product quality, according to presented quality reference.
- vi. **Classification divulging:** classifications (national and regional) divulging depends on express authorization of the Contractor. NRE will make available in its site [www.realestate.br](http://www.realestate.br) the score, or only the indication that the building is classified with authorization of the Contractor.

## 3) CLASSIFICATION OBTAINED BY THE BUILDING

The building was analyzed and judged according to quality parameters defined in the NRE Attributes Matrix of Office Buildings Quality.

Based on conditions detected for each attribute of the Classification Matrix, the NRE Classification Committee, in a meeting in August, 2004, attributed the following scores to the Building FL:

**\_class AAA . Br.**

**\_class AAA , in the city of São Paulo.**

The scores given to the attributes set of the Building and the resulting score are adherent to the requirements for classification according to the scores designed for all the attributes set of the classification matrix.

Concerning the attributes groups

EFFICIENCY OF THE PROJECT  
AIR CONDITIONING AND VENTILATION  
GAS SYSTEM  
ELECTRICAL SYSTEM  
FIRE DETECTION AND FIGHTING SYSTEM  
TELECOMMUNICATION / INFORMATION SYSTEM  
PARKING  
ELEVATORS  
ACOUSTIC TREATMENT  
LOCATION,

the building obtained scores in the same level or superior to the class reference scores.

Concerning the attributes groups

DIFFERENTIALS OF THE PROJECT  
PLUMBING SYSTEM  
LIGHTING SYSTEM  
PROPERTY SECURITY  
FACADE,

the scores were below the class reference scores.

The construction of the Building FL was finished in April 2003. It has 17 office floors and a total private area of 59,304 m<sup>2</sup>, according to the Contractor. The private area of each floor varies between 1,283 m<sup>2</sup> and 2,219 m<sup>2</sup>.

It is located on Av. Brigadeiro Faria Lima, in a region considered of prestige in the current



scenery of office buildings market in the city of São Paulo.

The classification given reflects the highest quality, in the considered scale, and this quality is almost invulnerable, once Certificate's validity term is expired. Factors that induce up and down the scores are described as follows.

**Factors with scores equal or higher than the class reference**

The conditions detected for these building attributes had an exceptional adequacy to the current highest construction standards and these attributes were considered positive differentials in the Building class, even if they may belong to groups of attributes that had a score that is inferior to the class reference.

\_ Efficiency of the project: floor private area (for corporative user), floor shape, flexibility for opening the slab for the construction of private internal staircases, imposed material for internal walls, ceiling height, raised floor, height between ceiling and roof, shafts.

\_ Differentials of the project: heliport, smoking room.

\_ Air conditioning (AC)/ ventilation system: existence of thermo-accumulation central, system's continuous performance even in case of electrical energy absence, energy consumption by the AC system below the average (two chillers, out of a total of three, are gas operated).

\_ Gas system: isolation of the gas distribution system.

\_ Electrical system: individual metering of electric power consumption, emergency generators (they supply all the common area and part of the private area).

\_ Fire detection and fighting system: computerized building abandonment control by zones, fire stopping in shafts, fire dampers in air conditioning ducts, hot line telephone system for direct communication with the fire command center operator, possibility of different firefighting system due to use (gas).

\_ Telecommunication / information system: existence of service stations for

telecommunications providers, availability of resources in the current highest standards.

\_ Property security: presence detectors in certain common areas, detectors of opened fire rated doors.

\_ Parking: individual disposition of parking spaces, covered parking spaces / total parking spaces rate, independent access for trucks, docks.

\_ Elevators: quantity of elevators, elevator serving docks, basement floors exclusive elevators, security elevator, service elevators' load capacity, main elevators' speed, internal size of service elevator cabin, all elevators supplied by emergency generators.

\_ Acoustic treatment: acoustic sealing (horizontal and vertical) in the internal finishing of the facade (curtain wall); adequate treatments in generators' room.

\_ Location: edification's visibility, upgrading urban region, neighborhood, services in the Building neighborhood.

The location considered among the positive factors for the building score has summed up quality to the building when its regional classification was judged. Since the building is already situated in the highest level of the national classification scale, that is, without regards to its location, the benefic contribution of location was in the sense of keeping it in the highest scale class, this time the regional scale.

**Factors with scores inferior to the class reference**

The conditions detected for these building attributes were most distant to the Building class highest construction standards. Even though, the negative contribution of these attributes was very small within the final scores and within its groups scores, and did not harm the high scores obtained.

\_ Efficiency of the project: there is no exigency as to the material of the ceiling in the private area, neither of its execution form, no exigency as to the material of the raised floor in the private area (these attributes are freely chosen according to the occupant's criteria).



\_ Differentials of the project: there are not facilities for meetings and corporative events, there is not any coffee shop.

\_ Plumbing system: non-existence of water reusing system, of rain water collecting and treatment system for certain uses, of underground water drainage system for certain uses.

\_ Lighting system: there is no exigency as to luminaries, lamps, reactors, illumination in private areas (these attributes are freely chosen according to the occupant's criteria).

\_ Property security: quantity of pedestrian entrances in the building, CCTV cameras not associated to alarms and without night vision (infrared).

\_ Facade: thermic control and cleaning of the material most used as facade covering (glass), curtain wall.

#### 4) CLASSES DEFINED BY NRE

NRE uses two classification scales in its analysis, one to generate opinion on the regional classification and the other on national classification.

In spite of being numerically distinct, the scales are equal as to quantity of categories, as well as to their definition.

Each classification scale is composed of 7 (seven) categories, defined as follows:

**Class AAA:** highest quality and almost invulnerable. Exceptional adherence of the conditions detected for the building set of attributes to the current highest construction standards, corresponding to market prevalent opinion (necessities and anxieties of the user), according to models and criteria developed by NRE. Once certificate validity term is expired, this adherence is most unlikely to be adversely affected by foreseeable evolutions of real estate market standards in terms of construction materials and processes, architectonic design, available technology in the building, company organizational structures and location within the urban range, this last parameter is used only for regional classification.

**Class AA:** very high quality and not significantly vulnerable. Excellent adherence of the conditions detected for the building set of attributes to the current highest construction standards, corresponding to market prevalent opinion (necessities and anxieties of the user), according to models and criteria developed by NRE. Once certificate validity term is expired, this adherence is not significantly vulnerable to foreseeable evolutions of real estate market standards in terms of construction materials and processes, architectonic design, available technology in the building, company organizational structures and location within the urban range, this last parameter is used only for regional classification.

**Class A:** high quality and very little vulnerable. Very good adherence of the conditions detected for the building set of attributes to the current highest construction standards, corresponding to market prevalent opinion (necessities and anxieties of the user), according to models and criteria developed by NRE. However, once certificate validity term is expired, this adherence may be more vulnerable than the adherence of higher classes, to foreseeable evolutions of real estate market standards in terms of construction materials and processes, architectonic design, available technology in the building, company organizational structures and location within the urban range, this last parameter is used only for regional classification.

**Class BBB:** good quality and little vulnerable. Good adherence of the conditions detected for the building set of attributes to the current highest construction standards, corresponding to market prevalent opinion (necessities and anxieties of the user), according to models and criteria developed by NRE. But, once certificate validity term is expired, this adherence is more probably adversely affected than the adherence of the higher classes, by foreseeable evolutions of real estate market standards in terms of construction materials and processes, architectonic design, available technology in the building, company organizational structures and location within the urban range, this last parameter is used only for regional classification.

**Class BB:** regular and vulnerable quality. Regular adherence of the conditions detected for the building set of attributes to the current highest



construction standards, corresponding to market prevalent opinion (necessities and anxieties of the user), according to models and criteria developed by NRE. Once certificate validity term is expired, it is probable that this adherence be adversely affected by foreseeable evolutions of real estate market standards in terms of construction materials and processes, architectonic design, available technology in the building, company organizational structures and location within the urban range, this last parameter is used only for regional classification.

**Class B:** minimum quality and very vulnerable. Minimum adherence of the conditions detected for the building set of attributes to the current highest construction standards, corresponding to market prevalent opinion (necessities and anxieties of the user), according to models and criteria developed by NRE. Once certificate validity term is expired, it is very probable that this adherence be adversely affected by foreseeable evolutions of real estate market standards in terms of construction materials and processes, architectonic design, available technology in the building, company organizational structures and location within the urban range, this last parameter is used only for regional classification.

**Class C:** inadequate and highly vulnerable quality. Inadequacy of the conditions detected for the building set of attributes to the current highest construction standards, corresponding to market prevalent opinion (necessities and anxieties of the user), according to models and criteria developed by NRE. Once certificate validity term is expired, it is highly probable that this inadequacy be adversely affected by foreseeable evolutions of real estate market standards in terms of construction materials and processes, architectonic design, available technology in the building, company organizational structures and location within the urban range, this last parameter is used only for regional classification. After this term, it is highly probable that the building quality turns into a despicable one and the building does not fit in this classification scale anymore.

It is possible that the analyzed building does not reach the minimum level of quality considered in

each classification scale, and then NRE does not issue this Certificate to such building.

## 5) CLASSIFICATION COMMITTEE

*Classification Committee is composed of professors and researchers of the NRE, identified in this section of the Certificate.*

#### 4 FINAL CONSIDERATIONS

The great classification diversity currently applied in the real estate market in reference to office buildings quality aroused the interest on this subject.

Office buildings market studies, including Brazilian and international markets, made explicit the absence of solid criteria to be followed in order to issue these classifications, which result from casual and particular judgments of companies / individuals involved with building under analysis.

So, it was corroborated the convenience of having a quality certification system to make the office buildings market hierarchical in a discerning, impartial and single way. Furthermore, this certification system should also consider quality perishability of these buildings.

This office building quality certification system was elaborated meeting described requirements, with adequate application to the entire Brazilian market.

From the operation of the above-mentioned system, the quality certification service of product in question started to be offered to office buildings market in Brazil by NRE / POLI / USP, from the second semester of 2004 on.

Therefore, this certification system will reflect in this segment of real estate market through information quality improvement produced on their buildings. It is up to the market to adopt it in order to contribute to its own evolution. In this sense, several participants of this market, conscious of this lack, moved forward collaborating with the research and becoming interested in the results. Furthermore, there is the following representative chart of office buildings quantity submitted to the NRE / POLI / USP system during its ten first months in operation, as well as regional classifications issued (city of São Paulo):

TABLE 4.1 - OFFICE BUILDINGS PRIVATE AREA SUBMITTED TO THE NRE / POLI / USP SYSTEM AND REGIONAL CLASSIFICATIONS ISSUED (CITY OF SÃO PAULO).

CLASS	PRIVATE AREA (M <sup>2</sup> )
AAA	141,200
AA	19,500
A	142,200
BBB	6,300
BB	-
B	-
C	-
<b>TOTAL</b>	<b>309,200</b>

As far as characteristics of elaborated certification system, besides its restrict applicability to office building product located in Brazil, it is important to emphasize the intrinsic subjectivity to it, as well as its impartiality.

This certification system reflects the subjective opinion of the certificate issuing institution, even though it has objective components and fundamentals.

In this sense, building insertion in certain category is objective, since it results from framing in the classification scale the scores generated by the attributes matrix.

On the other hand, the filling of attributes matrix is subjective: even though there are conducting criteria, it involves judgment.

Also, are not Cartesian the procedures followed for the organization of this matrix and the classification scales, since their structure is a result of initial arbitration followed by gauging and validation.

However, such matrix was structured seeking impartiality, with support of prevalent opinion detected among market participants, which was accepted as valid, except for some adjustments.

Still aiming impartiality of this certification system, the classification committee was established. It is responsible for the opinion on building classification. So, the subjectivity is transferred to institution ambit, detaching from the individual who at first judges the building through filling in attributes matrix. Since the institution has independent performance in the Brazilian office buildings market, even though opinionative, the classification issued by it is impartial.

In summary, the score granted to analyzed building represents the impartial and supported opinion of the institution from the application of models and criteria developed in its environment.

At last, there are two important comments about such models and criteria:

[i] - they are particular to the institution, and therefore, classification issued by it should not be compared to classification issued by other institutions or in other countries;

[ii] –the same way that risk classifying agencies (rating agencies) proceed, these models and criteria are not available to the public, and are kept secret, once it is not the institution objective to establish primer to office building projects in Brazil, but only to classify them.

#### **4.1 Expansion of the system applicability**

This quality certification system of office buildings in Brazil was conceived for directed and exclusive application to such product located in any part of Brazilian territory.

However, all methodology applied for elaboration of this certification system can be, after adaptation, applied again in this same market niche in other countries, or in other market niches (hotel, shopping center, residential building, etc.) in Brazil or overseas, for elaboration of quality certification system of each product in each country.

The necessary adaptation is evident: quality reference to be applied in the quality analysis must be correct and specifically defined for each case. User's point of view of each product must be considered, and the selection of group to be involved in the researches (participants of each market) must be careful.

Therefore, considering such adjustments, the methodology here presented is ready for elaboration of quality certification equivalent systems of other civil construction products, in the Brazilian or international market.

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