

POLITECNICO DI MILANO
Facoltà di Architettura e Società
Master of Science in Architecture
Emphasis in Landscape

**POWER OF ATTRACTIVENESS OF BRAZILIAN CITIES FOR
INTERNATIONAL REAL ESTATE INVESTMENTS:
THE CASE OF CURITIBA**

Supervisor: Marzia Morena
Co-Supervisor: Tommaso Truppi
Academic: Caio Smolarek Dias
Matricola: 735049

A.A.
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DEDICATORY

I have been raised in a family that believes that international education is the best option to obtain a profile of broad thinking, as well as to comprehend different manifestations of culture, belief, education, etc. As Friedrich Nietzsche rightly says, it is from one's struggles that he better achieves his goals.

For living in many countries for such a long time, one creates a new home wherever he is, adapting to the places he now lives in. But as Tolstoj says, for one to be universal he has to sing his own village, and it was from this quotation that the intention of researching about my home country began.

This dedicatory is meant for those who made me feel at home, even if far away from it; and for those who made me never forget where I came from and why I came here.

Therefore, it is for that purpose I would like to dedicate this research to my family and friends either in Europe as in Brazil.

From Brazil would like to dedicate and thank Solange Irene Smolarek Dias, for raising me and making me become the person I am today.

To Paulo da Silveira Dias Junior, Bruno Smolarek Dias and Marli Pereira da Silva Oliveira, for the endless support and affection.

To Luciane Regina Trevisol, for loving me even when I did not love myself.

To Rafael Reolon and Camoes Ribeiro do Couto Neto for being sometimes fathers, sometimes sons, but mostly brothers.

The academic environment of Faculdade Assis Gurgacz that has always supported me, and my eternal supervisor Fulvio Natercio Feiber.

In Italy I dedicate this work, initially, to Luigi Abruzzese, Manuel Ficial, Giuseppe Martinnoli and Claudio Tagliapietra for helping me on my initial struggle to support myself.

To Fondazione RUI and Residenza Universitaria Torrescalla, for believing in the kid who knocked their door 2 years ago and trusted me with a scholarship.

To the architectural studio AM Progetti in Milan, for opening my mind and their heart.

To the family Di Bartolo, I do not deserve the affection you have given me.

To my supervisors at Politecnico di Milano, Marzia Morena and Tommaso Truppi, for believing in me and supporting such a controversial theme.

To Luca Gobbetti, for being the best architectural student and professor I have ever met.

It is from the help of these people above mentioned that I was able to pursue my dreams. Thank you.

EPIGRAPH

“Humilitas occedit superbiam”. (Latin Saying).

“It is the pervading law of all things organic, and inorganic,
of all things physical and metaphysical,
of all things human and super-human,
of all true manifestations of the head, of the heart, of the soul, that
the life is recognizable in its expression,
that form ever follows function. This is the law”.
(SULLIVAN, Louis. Published on the Lippincott’s Magazine, March 1986).

“Establishing the nature of ‘good practice’ in urban regeneration is a
thorny problem. People tend to impose their own criteria according to
what it is they are trying to prove or what it is they think they would like
to hear.” (SMYTH, Hedley. *Marketing the city: the role of flagship developments in
urban regeneration*. London: E & FN Spon, preface).

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LIST OF ABBREVIATIONS AND ACRONYMS

AUX	Auxiliary Space
CAU	Curso de Arquitetura e Urbanismo
CAUUFPR	Curso de Arquitetura e Urbanismo da Universidade Federal do Paraná
CSIS	Consejo Superior de Investigaciones Cientificas
EXTW	External Wall
FGV	Fundação Getúlio Vargas
GDP	Gross Domestic Product
GIA	Gross Inside Area
GOA	Gross Outside Area
IBGE	Instituto Brasileiro de Geografia e Estatística
HDI	Human Development Index
IPPUC	Instituto de Pesquisa e Planejamento Urbano de Curitiba
MOMA	Museum of Modern Art
NPA	Net Productive Area
NRA	Net Rentable Area
NUA	Net Usable Area
PDSV	Pipes, Ducts, Shafts & Vertical Penetration
REIT	Real Estate Investment Fund
ROB	Rental Office Buildings
UFPR	Universidade Federal do Paraná
UN	United Nations
UTIL	Utility Space
WHO	World Health Organization
WWW	World Wide Web

ABSTRACT

It is intended to analyze the power of attractiveness of Brazilian cities for international Real Estate Investment Fund. From the analysis of Brazilian cities out of the international circuit of Real Estate investments – excluding São Paulo and Rio de Janeiro - that could offer infrastructure, quality of life and leisure; Curitiba comes as a competitor. The first chapter describes the history of Curitiba and why it became such an innovative place. On the following chapter is based the analysis of the research, comparing Curitiba, in which it is proposed the allocation of global Real Estate investments; São Paulo, the strongest and most expensive office space in Brazil; and Milan, one of the strongest office spaces in the world. From the indicators – which analyze issues such as quality of staff; city link with other places; and freedom from pollution; and also Human Development Index, indicator of the United Nations to measure the quality of life in cities, results confirmed the initial hypothesis that, on the present moment, the Brazilian cities analyzed are more attractive than the European city. From the possibility of Curitiba being a contestant for Real Estate investments, it is proposed an office tower to be placed on the Civic Center of Curitiba. 6 proposals of layout are designed in order to allocate different tenants in the building: open and closed office layouts for 1, 2 and 4 tenants per floor. Considering the profit of the workplace, calculations of the Efficiency Index of the plan and Density of the Workplace are done. On 4 out of 6 proposals the Index is rated 'excellent', with an efficiency of 80%. The density shows that open layouts have a higher capacity or workers than closed layouts. Façade systems for natural ventilation and lighting have been designed to minimize costs and not to create '*sick building syndrome*'. Concluding, it is believed that the project could be built on the site proposed, not only for the location, already, of office towers next to the site proposed, but also for the crescent demand in construction of office towers by internationally renowned Real Estate companies.

Key-words: City marketing. Real Estate Investment Fund. Office Tower.

RIASSUNTO

Intendiamo analizzare quanto possano essere attraenti le città Brasiliane per il mercato internazionale del Real Estate. Dall'analisi delle città Brailiane non ancora incluse nel circuito degli investimenti Real Estate, quindi escluse São Paulo and Rio de Janeiro, che possono offrire sia infrastrutture evolute che un'alto livello di qualità della vita, Curitiba può essere considerata una città dalle interessanti prospettive. Il primo capitolo descrive la storia della città di Curitiba e perché abbia le caratteristiche per diventare un luogo dalle infrastrutture innovative. Nel capitolo seguente invece affronteremo l'analisi centrale della nostra ricerca, confrontando Curitiba, che stiamo proponendo come possibile investimento, con São Paulo, il più ricercato e costoso spazio edificabile in Brasile, e Milano, una delle città con spazi edificabili tra i più ricercati al mondo. Dagli indicatori con cui abbiamo analizzato elementi quali qualità dello staff, collegamenti urbani tra i diversi posti, oltre al livello di inquinamento e Human Development Index (indicatore proposto dalle Nazioni Unite come misuratore della qualità della vita), risulta confermata la nostra ipotesi iniziale, cioè che al momento le città brasiliane risultano complessivamente più attraenti, per gli investitori, che le corrispettive europee. Partendo dalla possibilità di Curitiba come un potenziale piazza d'interesse per investimenti immobiliari, giustificata nelle analisi dei capitoli precedenti, infine abbiamo proposto la costruzione di una office tower nel centro di Curitiba, Sei proposte di layout sono state elaborate per l'allestimento di differenti unità, da destinare all'affitto, nell'edificio: uffici aperti e chiusi per uno, due o quattro affittuari per piano. Considerando i possibili proventi dall'affitto degli spazi, sono stati effettuati i calcoli relativi all'Efficiency Index del piano e alla Densità dello spazio lavorativo. Per quattro delle nostre 6 proposte l'indice di efficienza è risultato essere "eccellente" con un'efficienza dell'80%. La densità mostra che spazi aperti permettono una capacità maggiore di lavoratori che i corrispettivi chiusi. Sistemi di ventilazione ed illuminazione di facciata sono stati disegnati per minimizzare i costi senza però creare negli utenti dell'edificio alcun problema di *'sick building syndrome'*. In conclusione, crediamo che il progetto potrebbe essere effettivamente realizzato nel sito proposto, non solo per la presenza di office tower nelle adiacenze, ma anche per la crescente domanda in costruzioni di office towers da parte di compagnie Real Estate internazionalmente riconosciute.

Parole-chiave: City marketing. Investimento in fondo immobiliare. Torre di uffici.

RESUMO

É proposta a análise do poder de atratividade de cidades brasileiras para Investimento Internacional Imobiliário. Da análise das cidades brasileiras fora do circuito internacional imobiliário – excluindo São Paulo e Rio de Janeiro – que poderiam oferecer infra-estrutura, qualidade de vida e lazer; Curitiba aparece como um competidor. O primeiro capítulo descreve a história de Curitiba e por que se tornou um local tão inovador. No capítulo seguinte é embasada a análise da pesquisa, comparando Curitiba, proposta como competidora para investimentos imobiliários internacionais; São Paulo, mais forte e caro espaço de escritórios do Brasil; e Milão, um dos mais fortes e caros espaços de escritórios no mundo. Dos indicadores – que analisam questões como: qualidade de vida; ligação com outras cidades; e liberdade de poluição; juntamente com o Índice de Desenvolvimento Humano das Nações Unidas, indicador que mede a qualidade de vida nas cidades. Resultados confirmaram a hipótese inicial que, no presente momento, as cidades brasileiras analisadas se mostraram mais atrativas que a cidade europeia. Da possibilidade de Curitiba ser um competidor para investimentos imobiliários internacionais surge a proposta de uma torre de escritórios a ser construída no centro cívico paranaense. 6 propostas de layout foram projetadas para acomodar diferentes clientes no edifício: layouts abertos e fechados para 1, 2 e 4 clientes por andar. Considerando o aproveitamento do espaço de trabalho, cálculos do ‘Índice de Eficiência’ e ‘Densidade do Espaço de Trabalho’ das plantas foram realizados. Em 4 das 6 propostas o Índice foi considerado ‘excelente’, com uma eficiência superior a 80%. O cálculo da Densidade mostra que os layouts abertos tem uma maior capacidade de trabalhadores que os layouts fechados. Sistemas de fachada para ventilação e iluminação natural foram projetados para minimizar custos e evitar a ‘síndrome de edifício doente’. Concluindo, acredita-se que o projeto poderá ser construído no lote proposto, não somente pela localização de torres de escritórios já presente no local, mas também pela crescente demanda de construção de torres de escritórios por companhias imobiliárias de renome internacional.

Palavras-chave: City marketing. Fundo de investimento internacional imobiliário. Torre de escritórios.

1. INTRODUCTION

“In popular discourse, globalization often functions as little more than a synonym for one or more of the following phenomena: the pursuit of classical liberal (or “free market”) policies in the world economy [...], and the growing dominance of western [...] forms of political, economic and cultural life”. (STANFORD ENCYCLOPEDIA OF PHILOSOPHY).

Growth, integration and regulation of international markets, as well as changes on international economics and politics have increased the opportunities of investments in global markets¹. Developing countries have a higher rate of economic development, which allows them to offer differentiated returns to its investors².

Until the end of the 1980's, Brazil did not have a high power of attractiveness on the international market. Political and economical issues implied in high risks of investment³. After the “lost decade”, on the beginning of the 1990's, and specially after the implementation of the new currency, the Real, and the fall of the inflation, there was a change in the national scenario⁴. Such changes started an interest of international investors to come to Brazil. Investments of any sort are translated into job opportunities, investment in infrastructure issues and higher revenues for the municipality.

From the interest of international investors to come to Brazil it was initiated a “competition” - called city marketing - between Brazilian cities to attract these investments. Cities such as São Paulo, Rio de Janeiro and Curitiba invested in local issues, as well as proposed tax incentives to bring such companies to their territories.

On the new millennium, economy has faced a fast growth, which continued nearly constant for years. In the first trimester of 2008 the country's Gross Domestic Product – GDP, had the highest growth in the last 12 years⁵. It is not a coincidence that on the same year Standard & Poor's upgraded Brazil to an Investment Grade level⁶; and its country risk level has dropped from 300 to 217⁷. Brazil counts today with a strong economy, barely entering the international recession and coming out of it as a strong candidate for global investments⁸.

This research aims to analyze the effectivity of the city marketing discourse of one specific Brazilian city: Curitiba. Globally known for its unique urban planning strategy to

1 NEWELL, G.; WEBB, J. **Assessing risk for International Real Estate Investments**. 1996; *apud* SATO, G. E. 2008.

2 WHITAKER, B. **Why should investors consider International Real Estate Investment?** 2001; *apud* SATO, G. E. 2008.

3 2008.

4 LACERDA, A.C. **Empresas transnacionais, investimentos diretos estrangeiros e exportações na economia brasileira na década de noventa**. 2004; *apud* SATO, Glaucia Esther, 2008.

5 JUNIOR, 2008.

6 BLOOMBERG.COM, 2008.

7 BUSINESS WEEK, May 2008.

8 CUSHMAN & WAKEFIELD. **International Investment Atlas Summary**. 2010.

solve its local problems, it has been considered by Peter Hall as the “*ultimate innovative city of the 1980’s*”⁹. Curitiba is the capital of the State of Paraná, located in the Southern region of Brazil. It is the center of a metropolitan region composed by 27 municipalities. Despite being the 7th most populated metropolis of Brazil, it has the 4th highest Gross Domestic Product¹⁰; and one of the highest Human Development Index of the country¹¹.



IMAGE 01: Location of Curitiba in Brazil.



IMAGE 02: Curitiba and its metropolitan region.

From the array of investments now available in Brazil and considered attractive internationally, this research focuses basically in one, *Real Estate Investment Fund* – REIT, turned to the rental or sale of office buildings. REITs are used as a tool that can conciliate:

“Characteristics of Real Estate actives with the advantages of capital markets, in liquidity, transparency of information, existence of regulatory organs and professionalization of investment management and administration”. (SATO, Glauca Esther, 2008. Translated from Portuguese by the author).

Real Estate Investment Funds are not applied *ipsis litteris* in Brazil as they do in the United States. In Brazil it is called *Fundo de Investimento Imobiliário* - FII¹². For this system the structure is stiffer, which obliges investors on the majority of cases to have only one Real Estate enterprise at a time¹³.

For what concerns this sort of investment fund in Brazil, Rocha Lima and Alencar state

9 HALL, Peter. From the preface of the book **The creative city**, by Charles Landry and Franco Bianchini.

10 AGÊNCIA CURITIBA. **Guia do investidor: informações socioeconômicas**. 2009.

11 UNITED NATIONS. **Human Development Report Brazil**. 2009.

12 Real Estate Investment Fund, in English.

13 SATO, G. E. **A atratividade do investimento no Mercado de edifícios de escritórios na cidade de São Paulo por meio de fundos de investimento em participações sob a ótica do investidor estrangeiro**. 2008.

that:

“The Brazilian market will not reach sufficient maturity to encourage the entrance of external resources if the investments in Rental Office Buildings – ROB offered in a secured way do not migrate to anchor in more disperse portfolios, [...] in a dynamic system, being possible to buy and sell to renew the portfolio [...]”. (ROCHA LIMA, ALENCAR, 2005; apud SATO, Glaucia Esther. 2008. Translated by the author).

If Brazil is a country sought by international investors in order to place their office branches or headquarters, for the fact that there is a higher return rate than in developed countries¹⁴, there is also the necessity for Brazil to allocate and structure these investors with an international standard of quality. This so called international standard of quality is divided into 2 categories: indicators of attractiveness; and the infra-structure in which the company will be allocated.

For what regards the indicators of attractiveness, the research will focus on the Essential factors for locating a business¹⁵. The indicators can be found in the Real Estate monitors made by Cushman & Wakefield, a consulting company of that field. The company has been chosen for its notoriety concerning the theme; and for its yearly publishing on the issue, which allows the clientele to better analyze the market. Such monitor is made by asking companies which are the factors they consider when deciding to allocate their business.

According to the main focus of the research, of analyzing the investments made by municipalities - on quality of life, infra-structure, et cetera - to attract international investments, as well as the present Real Estate market, the indicators chosen to be analyzed in this research are namely:

- 1- Availability of qualified staff;
- 2- Transport links with other cities and internationally;
- 3- Cost of staff;
- 4- Value for money of office space;
- 5- The quality of life for employees;
- 6- Freedom from pollution.

These indicators are to be computed to compare the power of attractiveness of three cities: Curitiba, São Paulo, and Milan. These cities have been chosen for their initiative and will to be part of the circuit of cities that compete for Real Estate international attractiveness. Curitiba for its unique city marketing strategy; São Paulo for being the city with the highest power of attractiveness in Brazil; and Milan, one of the leading cities of the interna-

14 WHITAKER, B. **Why should investors consider International Real Estate Investment?** 2001; apud SATO, G. E. 2008.

15 CUSHMAN & WAKEFIELD, **European Cities Monitor** 2009.

tional circuit of attractiveness.

For what concerns the issue of the Brazilian portfolio of international standard Rentable Office Buildings – ROB, the proposal is to design an office building to be placed in the city of Curitiba. This part of the research presupposes an analytic view of the proposed site, in which the directive plan and local legislations are studied for the project.

When a commissioner hires an architecture firm to design a project; and a client buys/rents an office space to work, the major interest of these stakeholders is the Efficiency Index and the Density of the Workplace that the plan can achieve. The efficiency index is the ration that a plan has by the division of its Net Usable Area - NUA by its Net Productive Area - NPA. The density is the calculation of the amount of people a determined workplace can host comfortably.

Globally renowned projects of Real Estate Investment Fund have an Efficiency Index close to, or above, 80%. Above this percentage the project is considered Excellent on the Index table, which will be detailed on the chapter describing the project.

Therefore, the text initiates describing briefly the history of Curitiba and its succession of mayors that resulted in a period of roughly 30 years of the same intellectual and political interests. Its consequence is the possibility to continue long projects from one mandate to the other, facilitating the construction of infra-structural objectived delimitedated in the 1970's by the Planning Institute of the city.

From the historical background the research analyzes the capacity of Curitiba, São Paulo and Milan to attract international investments, based on the indicators previously described. It is not considered, on the analysis, the location of the cities on the globe and proximity with other financial centers of the world. On the final considerations of tha analysis is possible to see the ranking of the cities.

Having the analysis completed, it is intended to design a building in Curitiba that may become attractive for international investors to build, considering only: the site where inserted; its Efficiency and Density Indexes of the plan; and the façade.

On the final considerations, the methods and results are explained.

1.1. Objectives

The main objective of the present research is to compare the cities of Curitiba, São Paulo and Milan, according to their power of attractiveness for international investments on the field of Real Estate Investment Fund of office buildings; using as reference indicators from the Essential factors for locating a business, from the Real Estate consultant com-

pany Cushman & Wakefield¹⁶.

Specific objectives are to:

- Analyze the historical background of Curitiba;
- Understand why it has invested in its city marketing approach in such a unique way;
- Compare the power of attractiveness of Curitiba, Milan and São Paulo according to the indicators previously described;
- Design an office building that can be part of an international portfolio for Rentable Office Buildings;
- Design on the plans of the project open and closed layouts, permitting different tenants to be able to accommodate their needs;
- Design different layouts to host 1, 2 or 4 tenants per floor.

1.2. Hypothesis

Considering the growth of the Brazilian economy, previously described on the introduction, and its consequent increase on the Standard & Poor's Investment Grade level; as well as the financial issue in which developed countries are facing since the 2008 crisis; it is believed that the Brazilian cities outcome Milan on the analysis considering the power of attractiveness.

For the fact that Curitiba has been considered the most innovative city in the 1980's, and still continues to innovate, it is a possible contestant for the Real Estate International Fund global circuit.

From the construction, in recent years, of office towers by major global Real Estate companies in São Paulo and Rio de Janeiro - the 2 major financial centers of the country, it is possible that the project designed may be built in Curitiba.

¹⁶ CUSHMAN & WAKEFIELD. European cities monitor 2009.

2. HISTORY AND PLANNING OF CURITIBA

“Paraná has canyons, waterfalls and mountains, but Curitiba has been, is and will be in a plain of marshy fields [...], with no natural beauty catalogued in any encyclopedia. It has been left for the city to build itself, projecting attractions aggregating construction materials, dominating nature, changing the course of rivers, opening and closing streets. For that, Curitiba has always estimated, praised and, in some occasions, even delivered the political power to builders, were they architects, engineer-architects, civil engineers or military engineers.” (DUDEQUE, Irã Taborda. *Espirais de Madeira*. 2001, pag. 15-16)¹.

As a place that did not have many natural beauties, differently than the rest of the State of Paraná², Curitiba has turned to different means for attracting attention to itself. Architecture has been the most explicit and visible tool that the municipality used to “convince itself of its own importance”, and “the most secure way to present itself to Brazil and the World”³.

First discovered in 1531 by the Portuguese in search of gold and silver, it was not until the XVIII century that its residents gave up the search of these two minerals and turned to agriculture as a living. Until the XIX century, Curitiba was known as a supply and rest point for the troopers who would take cattle from the State of Rio Grande do Sul to the market fairs of São Paulo. Such an activity was the main economic resource for the city and the region around it for many years.

Only in 1811 the territory is officially considered a town, belonging to the captaincy of São Paulo⁴. With intention to populate the South of Brazil, the Portuguese crown, by then living in Rio de Janeiro⁵, decided to promote its lands to – mainly – European immigrants. Many nationalities came to Curitiba, including German, Arabic, Spanish, Dutch, Italians, Japanese, Africans, Polish, Ukrainian, Russian, and others. Such a fact is not only interesting to analyze how the region changed its way of living, but is also of considerable importance to understand the way its residents chose how the city was to develop in the coming years.

As a result of the immigration, Curitiba, as well as the rest of the South of Brazil, went through a density process, followed by a cultural and financial upgrade, which led the province of Paraná to separate from the State of São Paulo. The separation was viewed with much discontent, protest and prejudice by the elite of São Paulo⁶.

For the citizens of Curitiba, to invert such prejudice from the economical elite of the country, the result was to invest in the beauty and infra-structure in the city in order to

1 Translated from Portuguese by the author.

2 The Iguassu waterfalls, for example, is considered one of the Natural Wonders of the World. (New 7 Wonders).

3 DUDEQUE, I.T. **Espirais de Madeira**. 2001. Translated from Portuguese by the author.

4 From the text “**Emancipation of Paraná**”, from the Museum of the State of Paraná.

5 Brazil is the only example in the World where the European ruling family leaves the original country to reside one of its colonies.

6 SMOLAREK, S. I. **A arquitetura do desejo**: o discurso da nova identidade urbana de Curitiba. 2006.

make it more attractive. Some examples of such attitude are: the invitation, in 1855, of the French engineer Pierre Taulais, to design the new urban fabric of the city; the construction, in 1886, of the *Public Path*⁷, the first urban park of the city; import of trams from France, in 1910; the construction of the first university of Brazil, the Federal University of Paraná – UFPR⁸, in 1912; and the invitation of the renowned French architect Alfred Agache, who had already designed the plans of Chicago, Camberra, and Rio de Janeiro, to make the Directive Plan of the city, in 1943⁹.

From this period, it is interesting to analyze two characteristics: the first is the cultural connection that Curitiba had with Paris, “capital of the world”. Despite the fact that the French immigration to Paraná did not bring a great number of people – unlike Germany, Poland, Italy and Japan – there was a greater cultural communication between Curitiba and Paris than with any other European capital. The second characteristic is the preoccupation that the politics and financial elite had concerning the functionality of the urban fabric and public transportation, issues which projected Curitiba into the international scenery.

2.1. ARCHITECTURE AND PLANNING AS URBAN SOLUTIONS

“Architecture in Curitiba was one of the arguments most explicit, most visible (and maybe the most obvious) for the city to convince itself of its own importance. It was like if facing an artistic, intellectual and political life different than the other centers of the country, the citizens of Curitiba would realize that constructing was the safest way to present themselves to Brazil, the world, and, daily, to the own citizens.” (DUDEQUE, Irã Taborda. **Espirais de Madeira**. 2001, pag. 35)¹⁰.

Until the 1960’s, Curitiba was seen as a “quiet and small city”¹¹, spatially and culturally far away from the financial and cultural capitals of the country – São Paulo and Rio de Janeiro, respectively. Despite all of the efforts to invest in the city to upgrade its image – such as: having internationally renowned architects to plan the city (in the late XIX century according to the Haussmann plan of Paris; and in the XX century according to the Charter of Athens); investing in local culture to build a regional identity¹²; constructing infra-structure to better provide public transportation and leisure; et cetera – Curitiba was still seen with much prejudice. Most of the prejudice came from the intellectual and financial elite of São Paulo.

Starting from the 1960’s, the municipal organization is marked by the use of “structu-
7 *Passeio Publico* in Portuguese.

8 In Portuguese UFPR stands for *Universidade Federal do Paraná*.

9 SMOLAREK, S. I. **A arquitetura do desejo: o discurso da nova identidade urbana de Curitiba**. 2006.

10 Translated from Portuguese by the author.

11 DUDEQUE, I.T. **Espirais de madeira**. 2011, pag. 35.

12 The pinnacle of such intention is the creation of the movement “*Paranismo*”, whose meaning is “natural and friend of Paraná”, engaged in its progress, prestige and integrity. (SMOLAREK. 2006). On the movement, regional symbols were used in music, arts, architecture, et cetera.

ral, strategic, slowly articulated”¹³ transformations. Not by chance this change in the way of planning the city is made, being linked to the creation of the Course of Architecture and Urbanism of the Federal University of Paraná – CAUUFPR¹⁴. Started in 1962, it was constituted in a singular moment in the history of the country, marked by the economic boom of that decade; and the architectural legacy that Brasilia left in the whole country¹⁵. The official policy of the course was related to the “formation of a leading local elite seeking to modernize the society of Paraná”¹⁶.

In 1965, year of the graduation of the first class of architects, is also created by the municipality the Institute of Research and Urban Planning of Curitiba – IPPUC¹⁷. Acknowledging the fact that it is more effective to plan the city on a constant basis, the institute’s role was to accompany the plans designed by architects to better implement them according to the local reality¹⁸. Such way of conducting the planning institute was in accordance with the method of government imposed by the military dictatorship, which from 1964 brought out of the barracks the motto of “strategies, tactics and operations” .

The architect Jaime Lerner, responsible for the creation and functional structure of IPPUC becomes, in 1968, its president. As one of the students from the first class of the CAUUFPR, Lerner had the opportunity to apply the motto of his graduation course¹⁹.

“The essential of the Lernist urbanism was the “hierarchy of the streets”, maintaining the “zoning and use of the soil” and regulating lots; intended to promote an “urban renewal”, preserving and revitalizing traditional historical areas, aiming to the “offer of public services and equipments”. (IPPUC. Thinking the city; apud SMOLAREK, Solange Irene. 2006)²⁰.

This sort of urbanism, called “humanist urbanism”²¹, is once again theoretically connected to Europe, based in Max Weber and the conception that the city is the realization of the individual and the bloom of culture. In this sort of plan there is a conviction that the city is made for people instead of automobiles.

It is revolutionary to think of a city, in the middle of the 1960’s, whose main urban planning characteristics are public transportation and urban renewal. When comparing with the examples such as the construction of Brasilia, and the majority of other modernist urban plans carried out in that decade, there is a considerable difference on the approach to the territory. Despite its difference, it is not the only urban project that gives priority to pede-

13 SMOLAREK. **A arquitetura do desejo: o discurso da nova identidade urbana de Curitiba**. 2006, p48.

14 CAUUFPR in Portuguese stands for *Curso de Arquitetura e Urbanismo da Universidade Federal do Paraná*.

15 CAUUFPR. **Presentation and History of the Course of Architecture and Urbanism of the Federal University of Paraná**.

16 Idem.

17 In Portuguese IPPUC stands for *Instituto de Pesquisa e Planejamento Urbano de Curitiba*.

18 IPPUC. **Creation of IPPUC**. no date.

19 As described on reference 27.

20 Translated from Portuguese by the author.

21 OLIVEIRA. Curitiba e o mito da cidade modelo. 2000, apud SMOLAREK, 2006.

strians over automobiles. The similarity can be found at the 1952 Philadelphia city center traffic proposal by Louis Kahn²². The project was never built.

From the years of 1966 until 1970 the IPPUC was working on the detailing and development of the projects envisioned by the urban change in the city. With only a few years of age, IPPUC was considered the Getúlio Vargas Foundation – FGV²³, as a national reference, “the one that gets closer to the ideal model for our country”²⁴.

From the beginning of the 1970’s, the image of Curitiba starts to be presented in the rest of Brazil as a “model city”²⁵. By then the preparation and detailing of the projects were finished and began to be implemented by the municipality. Differently than other progressivist modernist urban interventions in the same period – which would make an “urban surgery” and leave a scar on the face of the city for a long time – IPPUC has innovated by seeking to analyze the problems focusing on the general scope, that of the city; respecting the scale, the citizen and the history²⁶.

Since Brazil was under the regime of dictatorship, imposed by the military in 1964, all the mayors of the cities were to be designed by the governor, an individual with straight relations with the military. For the fact that the model of strategic planning of IPPUC was very fond of the military, The governor Haroldo Leon Perez nominates in 1971 the architect and also politician Jaime Lerner, ex-president of IPPUC, to assume the position as mayor of Curitiba. Lerner invites his colleagues of the Institute to assume key positions in the municipality, therefore being able to apply the strategic plans already drawn.

“The key-roles of the municipal administration was composed [...] by the Deliberative Council of IPPUC. The historical opportunity for the plan to be previously detailed gave the opportunity to apply it immediately, and without opposition. The successor of Lerner on the municipality, Saul Raiz (1975-1979) was a professional widely identified with the continuity of the application of the plan. [...] On this process, IPPUC was widely strengthened, for two reasons: obtained national and international recognition by the success on the application of the plan [...]. And the Brazilian situation, after the success of IPPUC, inverts: planners, from now on, are the executors and not the inverse, as normally.” (OLIVEIRA, 2000, apud SMOLAREK, 2006)²⁷.

The decisions that IPPUC decided to take for the urban scale paid off by the time the international oil crisis hit in the year of 1973. Such “sail against the tide” was of paramount importance for the World to recognize the role of Curitiba as a “model city”. The concept and praxis of IPPUC after the oil crisis is copied by several cities around the globe, receiving international appraisal for the work of its planners, who were now being invited to be

22 Based on the French medieval city of Carcassonne, the project concept envisioned that “just as Carcassonne was built for defense, Kahn envisioned the modern city center having to defend itself against the automobile”. Museum Of Modern Art – MOMA.

23 FGV in Portuguese stands for Fundação Getúlio Vargas.

24 DUDEQUE, I. T. Espirais em madeira. 2001.

25 Sánchez, Fernanda. **A reinvenção das cidades na virada de século**. 2001, pag. 31.

26 SMOLAREK. **A arquitetura do desejo: o discurso da nova identidade urbana de Curitiba**. 2006.

27 Translated from Portuguese by the author.

planning consultants.

In the beginning of the 1980's the hegemony of the technocratic view of the Lernerist approach was destabilized by social movements, and the opposition leads the municipality for five years – Mauricio Fruet from 1983 to 1985; and Roberto Requião from 1985 to 1988. Both candidates were politicians, and not architects/engineers. This period is marked not only by a halt in the previous way of planning/managing a city; but also by the end of the military dictatorship regime, in 1984.

In 1989 Jaime Lerner assumes, by free elections, the municipal government. Applying only 25 days before the poles, the candidate got 57% of the votes, remarking the profile of planning professionals to rule the city. It is clear that the percentage of votes for the candidate derive from an image already built upon the person. Lerner used the media with strong appeal for his campaigns, which made his image, as well as Curitiba, to be solid and referential²⁸.

The technocratic way of planning/managing was once more put in vogue. For the fact that the opposition had dismantled the previous array of planners in the municipal office, the percentage of importance – and relevance – that the IPPUC had on the decision making process had significantly decreased.

Despite Lerner's efforts, it was not possible to reproduce the importance and "prestige"²⁹ that IPPUC previously had. For that reason the motto of Lerner's third municipal campaign – from 1989 to 1992 – was turned to environmental issues. In this period Lerner initiated a process of city marketing of Curitiba. Intending to bring many international companies to invest and build in the city, and not being able to bring the staff of IPPUC to the municipality, the focus of Lerner's campaign was on "urban acupuncture"³⁰.

After Jaime Lerner's campaign, a succession of his followers – architects and planners involved with IPPUC – achieved the role as mayors of Curitiba. Rafael Greca was elected mayor from 1993 to 1996; and Cassio Taniguchi from 1997 to 2000 and from 2001 to 2004. In this period urban acupuncture strategies had increased the quality of life for citizens; and the income for the municipality, for the city marketing strategy proved to be successful.

For the increase in the quality of life, many of the projects consisted in the proper adequacy of old public spaces unused. An example is the transformation of several stone quarries around the historical center into open theaters, parks, et cetera. Among the works that were undertaken in this period are: the wire opera of Curitiba; Oscar Niemeyer Museum; Free University for the Environment; botanical garden; parks in honor of the immigrants – German, Polish, Japanese, Italian, Ukrainian, and more. For the social approach

28 DALDEGAN, M. C. **Mídia e política: um estudo sobre o prefeito Jaime Lerner nas primeiras paginas da Gazeta do Povo em dois períodos distintos (1971-1975 e 1989-1992)**. 2009.

29 SMOLAREK. **A arquitetura do desejo: o discurso da nova identidade urbana de Curitiba**. 2006. p62.

30 LERNER, J. **Acupuntura urbana**. 2003.

projects such as the “garbage that is not garbage”³¹; and others. These urban acupuncture, made with low quantities of money, have proven to be effective for the quality of life of the city, as well as improving its power of attractiveness for international investments.

The technocratic approach has proven to be effective not only on the municipal level but also regional. Jaime Lerner was elected governor of the State of Parana for two successive campaigns: from 1994 to 1997; and from 1998 to 2001. From the beginning of the 1990’s, when the decision of following environmental issues was taken, Curitiba has hosted: the United Nations – UN Global Forum of Cities, preparatory event for the United Nations Eco 92 in Rio de Janeiro. In 1995 was once more host for the UN Global Day of Habitat, preparatory event for the UN Global Conference in Istanbul.

2.2. CITY MARKETING

“I really like the phrase of Tolstoj that says: “If you want to be universal sing your village.” The more you belong to one place, the bigger your identity will be”. (LERNER, Jaime. *Vitruvius magazine*, no date)³².

Marketing the city is not a new, revolutionary concept. Movements such as City Beautiful were much related to financial aspects other than just aesthetic³³. On countries that were part of the industrial revolution of the XIX century, the idealistic concept of marketing the city occurs as a consequence of a problem pointed out in the late 1960’s with “the concentration of redundant industry and dereliction in the central urban areas”³⁴. This problem became known as “the problem of inner cities”³⁵.

For the city to be regenerated, its environment had to be recreated; and the protagonist for that action was the property development sector. Therefore, the focus of the regeneration was property-led³⁶.

Inner city problems is nothing more than the consequence of three movements of the second half of the XX century: the end of the man labor industrial cycle in developed countries, which shifted the economical focus from industrial to services; the mechanization of agriculture; and the effect of globalization.

For what concerns the first aspect, industries became smaller and more mechanized. The industrial work force of thousands of people in one plant was not needed anymore. As for the mechanization of agriculture, it lead many people to migrate from rural areas to the

31 In Portuguese *Lixo que não é Lixo*. The program consists on trading sacks of garbage that the population bring from urban river Banks for food.

32 Translated from Portuguese by the author.

33 ROSE, Julie. **The City Beautiful movement**. 1996.

34 SMYTH, Hedley. **Marketing the city: the role of flagship development in urban regeneration**. 1994. Page 12.

35 Idem.

36 Peter Hall, on the preface of the book **The creative city**, by Charles Landry and Franco Bianchini.

cities, which swallowed the urban boundaries and made industrial sites once placed on the outskirts of cities to be surrounded by neighborhoods. As far as globalization is concerned, industrial headquarters moved to places where wages were cheaper, and local governments were eager to give many incentives.

For politics and urbanists, facing the scenario of cities with large non productive industrial plants occupying spaces that are now part of the city center, it is understandable to question “what, if anything, could now provide the basis for urban economic revival”³⁷?

There is not a specific answer, but the common approach is that of city marketing, which is part of a greater movement, that of globalization, known as:

“Worldwide movement toward economic, financial, trade and communications integration. Globalization implies opening out beyond local and nationalistic perspectives to a broader outlook of an interconnected and inter-dependent world with free transfer of capital, goods, and services across national frontiers”. (Business Dictionary.com. Definition of globalization. no date).

Marketing derives from a “spectrum of concepts from economics, sociology and psychology, as well as from politics and biology”³⁸, and it is related to the concept of “promotion”, which includes advertising and public relations. It is, basically, a strategy for selling, whose major goal is to satisfy its customer. The customer requires a product of “high quality, at an affordable price and readily available”³⁹.

Therefore, city marketing is a way in which the local government invests in its service and infra-structure facilities in order to attract international investments. It is also:

“Largely dependent on the construction, communication and management of the city’s image [...]. Therefore the object of city marketing is the city’s image”. (KAVARATZIS, Michalis. From city marketing to city branding: towards a theoretical framework for developing city brands. 2004.)

Although city marketing can be seen as the answer for the question pointed above, there are still different ways of applying it. According to Peter Hall⁴⁰, there are two options of city marketing for a municipality to choose. The first is to heavily invest in a wide range of services – culture; entertainment; sports; education; et cetera. “*Up and down the land cities are scrambling to develop this facet of their economies, once regarded as unserious and even effete*”. It is part of a global race between cities to attract more international in-

37 The question is from Peter Hall, on the preface of the book **The creative city**, by Charles Landry and Franco Bianchini.

38 SMYTH, Hedley. **Marketing the city: the role of flagship development in urban regeneration**. 1994. Page 13.

39 Idem.

40 From the preface of the book **The creative city**, by Charles Landry and Franco Bianchini.

vestments, and become ever more Global Cities⁴¹.

The other option, not very common, is that in which:

“Cities seek to solve their own problems, they find answers that can be exported. The success of a city like Curitiba in Brazil, ultimate innovative city of the 1980’s, provides a model”. (HALL, Peter. on the preface of the book *The creative city*, by Charles Landry and Franco Bianchini.)

It is this option of city marketing we are to analyze, for Curitiba, as Peter Hall calls it the ultimate innovative city of the 1980’s, has developed its own way to solve its problems.

Despite the pluralistic cultural and identitarian characteristic, its will to improve its quality of life, infra-structure, and also prove to Sao Paulo and the country that it was not a lost place in the middle of nowhere, Curitiba could not have realized the projects they have without three major aspects of local public management:

- Continuity on the political management;
- To have professionals of engineering, architecture and planning as mayors;
- Capacity of its planners to be unique and ahead of their time, transforming their work into icons and an advertising campaign to attract national and international investments.

Concerning the first aspect, Curitiba presents a very unlikely political scenario compared with other Brazilian capitals. From the first democratic elections for the municipality, in 1954, for only three times the municipal political power belonged to the opposition. Apart from these three opposition mandates, the power of the municipality stayed between the same group of people⁴².

Such “group”, as the newspaper *Gazeta do Povo*⁴³ calls it, is composed by professionals of engineering, architecture and urban planning; and after the 1970’s also connected to IPPUC and the persona of Jaime Lerner. Despite its cohesion concerning the political discourse, there is not a hegemony of a determined political party. Instead the group “transits conservative political parties, of central and right wing”⁴⁴.

Such continuity is of vital importance for the intention of completion of the urban plans to be realized. If there were not, for nearly fifty years, the same group of people realizing urban projects according to a predetermined political and architectural discourse, most probably the success of the Curitiba plan would not have happened⁴⁵.

The second aspect concerns the fact that the majority of the individuals who were mayors of Curitiba were professionals of engineering, architecture or urban planning. This aspect is much related to the first one. For the fact that there has been a succession of

41 The term is from Saskia Sassen, from her book **Cities in a world economy**. 2006.

42 GAZETA DO POVO. **Não ruptura marca eleições em Curitiba**. 2008.

43 The newspaper with higher circulation in the State of Parana.

44 GAZETA DO POVO. **Não ruptura marca eleições em Curitiba**. 2008.

45 SMOLAREK. **A arquitetura do desejo: o discurso da nova identidade urbana de Curitiba**. 2006.

mayors belonging to the same intellectual and political opinion, it is necessary to analyze how this situation begins. The first democratic elections choose Ney Aminthas de Barros Braga to be mayor. Previously the commander of the military police of the State of Parana, Braga applies in his mandate strategic planning strategies used by the military. After Ney Braga, as described on the table below⁴⁶, there is a succession of mayors related to infra-structural issues concerning urban/strategic planning.

MANDATE	NAME	OCCUPATION	CHARACTERISTIC
1954-1958	Ney Braga	Military Police	Installed strategic planning into the municipality
1958-1961	Ibere de Mattos		
1962-1967	Ivo Arzua Pereira	Engineer	Invests in infra-structure; installes CAU-UFPR and IPPUC
1967-1971	Omar Sabbag	Engineer	Invests on nfra-structural issues, such as public transport and sewer
1971-1974	Jaime Lerner	Architect and Urbanist	Installs the new public transport ideas; inaugurated the industrial city; created the first pedestrian street in Brazil
1975-1978	Saul Raiz	Engineer	Continued to invest on the plans of the previous mandate
1979-1983	Jaime Lerner	Architect and Urbanist	Continued to invest on the plans of the previous mandate
1983-1985	Mauricio Fruet	Lawyer and Journalist	Opposition to the plans of the previous mandate
1985-1989	Roberto Requiao	Lawyer and Journalist	Opposition to the plans of the previous mandate; Creation of sub-municipalities; popular market
1989-1992	Jaime Lerner	Architect and Urbanist	BRT system; exchange of garbage for food; inauguration of parks and squares; environmental issues
1993-1996	Rafael Greca	Engineer	Continued to invest on the plans of the previous mandate; invested on low income housing
1997-2000 2001-2004	Cassio Taniguchi	Engineer	Continued to invest on the plans of the previous mandate; created the <i>automobilistic pole</i>
2005-2008 2009-	Beto Richa	Engineer	Sustainable development; infra-structural issues; urban planning

TABLE 01: List of mayors of Curitiba.

For what concerns the third aspect of the success of the urban planning of Curitiba, concerning the uniqueness of the projects and iconic language, some examples shall be illustrated and described.

⁴⁶ CURITIBA. List of mayors. Web site of the municipality of Curitiba.

1970's:



IMAGE 03: **Flower Street.** A project from IPPUC, the first pedestrian street in Brazil was built in only 72 hours, from Friday after commercial hours to Sunday evening.



IMAGE 04: **Structural Axis.** The city is divided into structural axis, realized for the passage of the Bus Rapid Transport.



IMAGE 05: **Barigui Park.**



IMAGE 06: **Iguaçu Park.** Brazil's biggest urban park, with 8.000.000 m².



IMAGE 07: **Paiol Theater.** An old military hardware is transformed into a theater.



IMAGE 08: **Revitalization of the historic center.**

1980's



IMAGE 09: **São Lourenço Park.**



IMAGE 10: **Bus Rapid Transport.** Implementation of the revolutionary public transportation system.



IMAGE 11: **Interconnected Bus.** Curitiba is the first city the world to use interconnected bus.



IMAGE 12: **Polish Park.** Created in honor of the polish immigration to Curitiba.



IMAGE 13: **Tube stations.** Work like a metro station, where the client pays before entering, increasing the velocity of the system.



IMAGE 14: **Tube stations.** The design of the stations provides easy access to the buses.

1990's

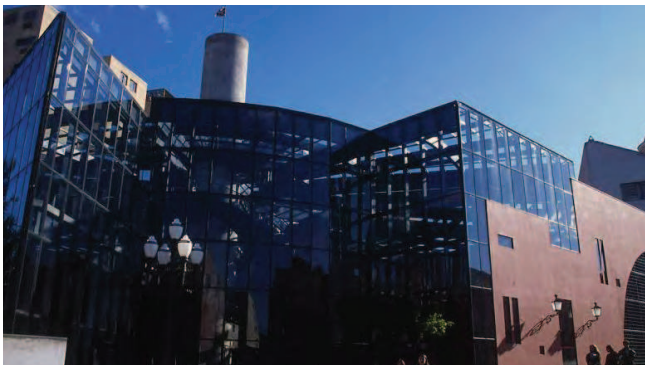


IMAGE 15: **Memorial of the city.** Built to celebrate the 300th anniversary of Curitiba.



IMAGE 16: **Lixo que não é lixo.** The municipality exchanges garbage for food.



IMAGE 17: **Museum Oscar Niemeyer.** Is one of the most renowned recent projects of the architect.



IMAGE 18: **Wire Opera.** Built in less than 2 months is an icon for the city.

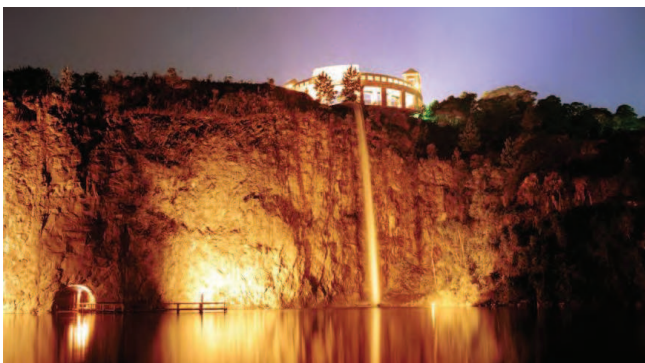


IMAGE 19: **Tanguá Park.** One of the old quarries of the city turned into a park.



IMAGE 20: **German Park.** Built to honor the german immigrants.



IMAGE 21: **Japanese Square.** Built to honor the visit of the japanese emperor for the festivity of the 100th anniversary of the japanese immigration.



IMAGE 22: **Open university for the Environment.** This internationally renowned project comes from the renovation of an unused quarry.

3. CURITIBA, TARGET FOR INTERNATIONAL INVESTMENTS

Previously we have analyzed the historical background of Curitiba, how its urban settlement developed from a mining failure to rest point for the troops that moved from Rio Grande do Sul to São Paulo and from that to the immigration and consequent changes on the XXth century. The lack of natural beauties have created upon the citizen of Curitiba a characteristic which made him eager to build better infra-structural and leisure amenities.

In this part of the research we are to analyze how successful the Curitiba plan really is. Taking into consideration some of the indicators from the research on Real Estate international investment of the consulting company Cushman & Wakefield, namely:

- Availability of qualified staff;
- Transport links with other cities and internationally;
- Cost of staff;
- Value for money of office space;
- Quality of life for employees;
- Freedom from pollution.

These indicators are used to compare Curitiba with two other city marketing contestants on the attraction international investments: São Paulo and Milan. But why compare Curitiba with these cities amongst many others? The first comparison is São Paulo, the most populated metropolis and highest income generator of South and Central America. São Paulo and Curitiba are direct competitors for international investments in Brazil. The second is Milan, an European city allocated amongst the top 10 “leading cities for business”¹. Milan and Curitiba have a similar population quantity; and both cities are known for their change in character after the second half of the last century: Milan from a highly industrial city to an international service location; and Curitiba from an agricultural city to an industrial and service center.

3.1. COMPARISON BETWEEN CURITIBA, MILAN AND SÃO PAULO

Before analyzing the cities according to the indicators described above, this first analysis intends to compare the Human Development Index – HDI of the municipalities in comparison with their countries. This initial comparison allows us to understand the reality of the cities according to the national level.

Human Development Index is an indicator used by the United Nations since 1990 to

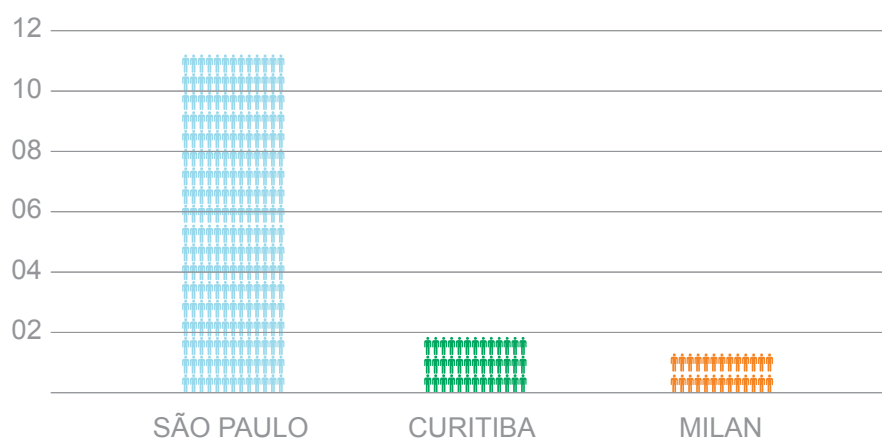
¹ CUSHMAN & WAKEFIELD. **European cities monitor 2009**; pag. 4.

calculate the rate a city and/or country develops. It has been created to put “people back at the center of the development process in terms of economic debate”². The indicator is measured gathering information related to income, life expectancy and education of a determined place.

Curitiba is the capital city of the State of Parana, located in the South of Brazil. Internationally known for its urban planning concepts and practices. Counts with 1.851.215³ inhabitants , which makes it the seventh most populated city in Brazil. Its Human Development Index is of 0.856, in comparison with the 0.813 of the Brazilian average⁴, 75th most humanly developed country in the world according to the index⁵.

Milan is the capital of the region of Lombardy, located in the North of Italy. Internationally known for its industrial past and currently as an international fashion and design center. It is chosen as the 10th best place in the world for locating a business⁶. Counts with 1.306.800 inhabitants⁷, the second highest population of the country. Its Human Development Index is of 0.940, in comparison with the 0.951 of the Italian average⁸, 18th most humanly developed country in the world according to the index⁹.

São Paulo is the capital of its homonymous State, located in South East Brazil. Internationally known as a megalopolis and a highly industrial and services center. It has been consider the 3rd best place for European companies to expand in 5 years time, behind New York and Shanghai¹⁰. Counts with a population of 11.037.593 inhabitants¹¹, making in the biggest city in South and Central America. Its Human Development Index is of 0.841, in comparison with 0.813 of the Brazilian average¹².



Graph 01: Population, in millions (not considering metropolitan area).

2 UNITED NATIONS. **History of the Human Development Report**. 2009.

3 IBGE. **IBGE Cidades, Curitiba**.

4 UNITED NATIONS. **Human Development Report Brazil**. 2009.

5 UNITED NATIONS. **Brazil HDI Rank**. 2009.

6 CUSHMAN & WAKEFIELD. **European cities monitor 2009**; pag. 07.

7 COMUNE DI MILANO. **Sistema Informativo Censimenti**.

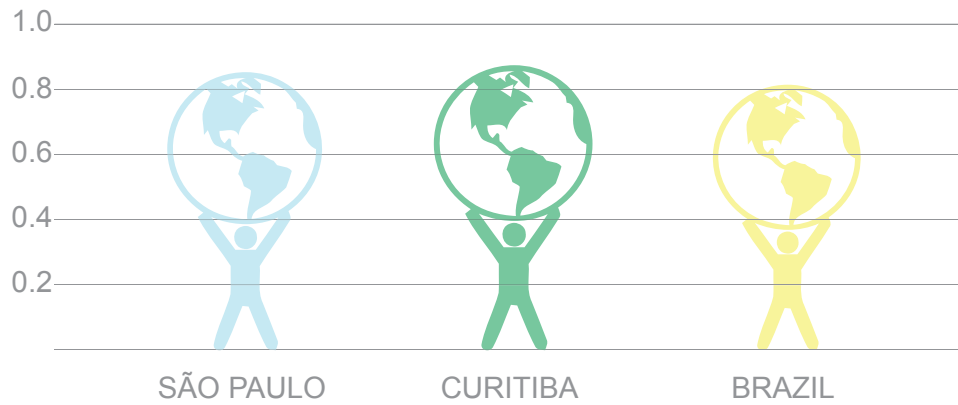
8 UNITED NATIONS. **Human Development Report Italy**. 2009.

9 UNITED NATIONS. **Italy HDI Rank**. 2009.

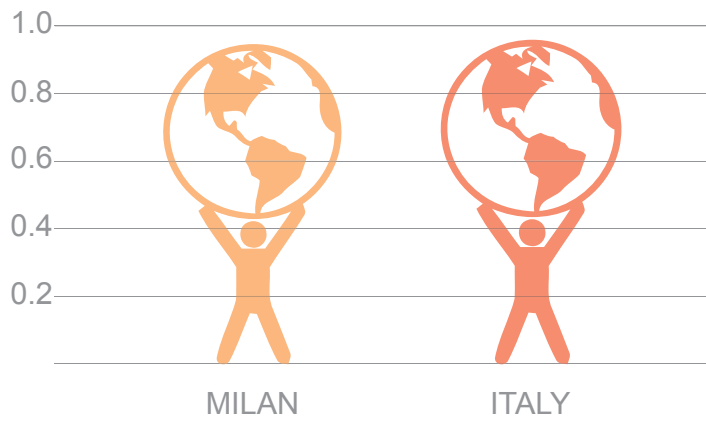
10 CUSHMAN & WAKEFIELD. **European cities monitor 2009**; pag. 14.

11 IBGE. **IBGE Cidades, São Paulo**.

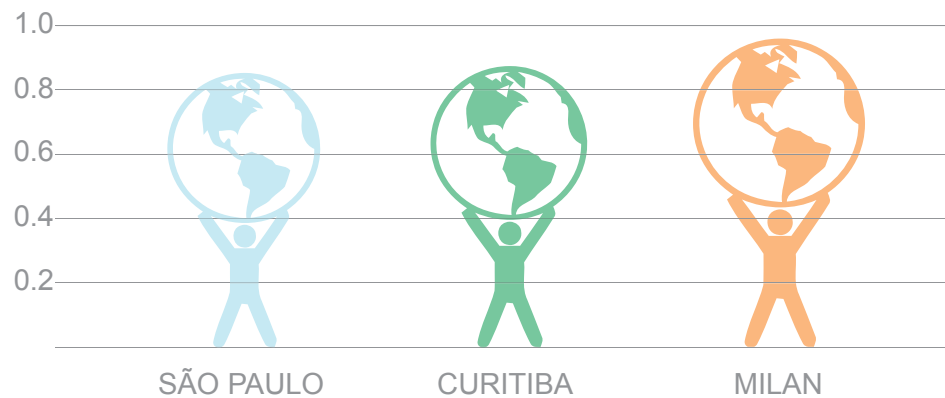
12 UNITED NATIONS. **Human Development Report Brazil**. 2009.



Graph 02: Human Development Index comparison between São Paulo, Curitiba and Brazil.



Graph 03: Human Development Index comparison between Milan and Italy.



Graph 04: Human Development Index comparison between São Paulo, Curitiba and Milan.

3.1.1. Availability of qualified staff

For an entrepreneur, qualified staff is one of the most important issues that lead him to invest in other places in the world.

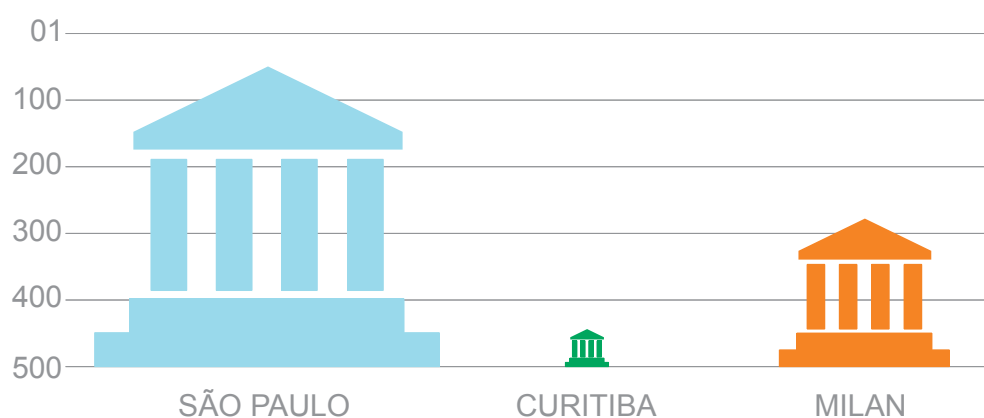
For this research the indicator of qualified staff shall take into consideration the ranking position of the best qualified university in the city analyzed, according to the web-site *webometrics*¹³, part of the *Consejo Superior de Investigaciones Cientificas* – CSIS – the largest public research body in Spain¹⁴. The indicator is valid for its concern on “*global performance and visibility of the universities*”¹⁵.

Apart from the numbers ranked for the best university of each city, this indicator also intends to analyze the number of faculties present in the cities, in order to know the range of courses that the cities offer.

The best ranked university of Curitiba is *Universidade Federal do Parana*, ranked as the 457th best university in the world¹⁶. Curitiba has 79 graduating institutions, between faculties and universities¹⁷.

The best ranked university of Milan is *Università Degli Studi di Milano*, ranked as the 282nd best university in the world¹⁸. Milan has 50 graduating, between faculties and universities¹⁹.

The best ranked university of São Paulo is *Universidade de São Paulo*, ranked as the 53rd best university in the world²⁰. Sao Paulo has 197 graduating institutions, between faculties and universities²¹.



Graph 05: Best ranked universities of São Paulo, Curitiba and Milan.

13 The Word stands for *Ranking Web of World Universities*. Webometrics.

14 WEBOMETRICS. **About us.**

15 WEBOMETRICS. **About the ranking.**

16 WEBOMETRICS. **Top 8000 universities, from 451 to 500.**

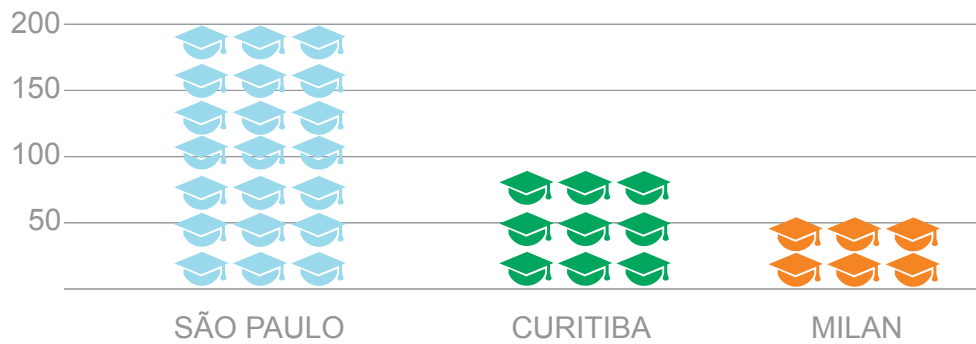
17 MEC. **Instituições de educação superior e cursos cadastrados, Curitiba.**

18 WEBOMETRICS. **Top 8000 universities, from 251 to 300.**

19 MIUR. **Cerca università Milano.**

20 WEBOMETRICS. **Top 8000 universities, from 51 to 100.**

21 MEC. **Instituições de educação superior e cursos cadastrados, São Paulo.**



Graph 06: **Number of graduating institutions.**

3.1.2. Transport links with other cities and internationally

International transport is considered a must for cities competing for global investments. This indicators analyzes the quantity of airports – national and international – that each city has and the quantity of travelers that use their services annually. The quantity of travelers is done by the sum of arrivals and departures of each airport on the last yearly report available.

Curitiba has two airports: *Bacacheri*, a national airport located inside the city boundaries; and *Afonso Pena*, international airport located on the city of *São Jose dos Pinhais*, on the metropolitan area. On the year of 2009 the airport of *Bacacheri* transported – considering arrivals and departures – a total of 30.897 passengers²². On the same year the airport *Afonso Pena* transported a total of 4.853.733²³. The addition of the airports give us a total number of passengers transported by the airports of Curitiba are 4.884.630.

Milan, as well as Curitiba, has two airports: *Milano Linate*, located inside its urban limits; and *Milano Malpensa*, located in the city of *Varese*, close to the metropolis. On the year of 2007 the airport of *Milano Linate* transported 9.924.558 passengers²⁴. The airport of *Milano Malpensa*, on the same year, transported 23.717.177 passengers²⁵. From the addition of the number of passengers transported by the airports of Milan we arrive at the total of 33.641.735.

São Paulo has four airports, two inside its territory and other two on the metropolitan area. The airports inside the city boundaries are: *Campo de Marte*; and *São Paulo/Congonhas*. The other two are: *São Paulo/Guarulhos*, the biggest airport – in dimension and traffic – of Brazil, located in the city of *Guarulhos*; and *Viracopos/Campinas*, in the city of

22 INFRAERO. **Movimento operacional aeroporto de Bacacheri: 2002-2009.**

23 INFRAERO. **Movimento operacional aeroporto internacional Afonso Pena: 2002-2009.**

24 MIT. **Analisi della ripartizione territoriale Del traffico aereo in Italia: Anni 2006 e 2007.**

25 Idem.

Campinas. Both are located inside the metropolitan area of São Paulo.

On the year of 2009 the airport of *Campo de Marte* transported 312.460 passengers²⁶. *São Paulo/Congonhas* transported 13.699.657 passengers²⁷. *São Paulo/Guarulhos* transported 21.727.649 passengers²⁸. Lastly *Viracopos/Campinas* transported 3.364.300²⁹. These four airports combined total of 39.104.066 passengers arriving and departing.



Graph 07: Number of airports.



Graph 08: Number of passengers per year, in millions.

3.1.3. Cost of staff

Closely related to the quality of staff, the cost of the personnel that shall work in the office space is of paramount importance for the entrepreneur. This indicator is realized by the average of salary prices for staff related to services, including vacancy, unemployment and other taxes. When the information is given in different currencies, the exchange shall be given on the day of the research.

²⁶ INFRAERO. **Movimento operacional aeroporto Campo de Marte: 2002-2009.**

²⁷ INFRAERO. **Movimento operacional aeroporto de São Paulo/Congonhas: 2002-2009.**

²⁸ INFRAERO. **Movimento operacional aeroporto internacional de São Paulo/Guarulhos – Governador Andre Franco Montoro: 2002-2009.**

²⁹ INFRAERO. **Movimento operacional aeroporto internacional de Viracopos/Campinas: 2002-2009.**

Curitiba presents an average of salary for employments related to services of R\$1.819,00³⁰. Milan presents an average of €2.457,00³¹. São Paulo presents an average of R\$1.950,00³².

If we take into consideration the different rate of currencies between the Brazilian *Real* - R\$ - and the Euro - €³³, in which R\$1,00 is equal to €0,45³⁴; and exchange the Brazilian values into the European currency, the prices for the cost of staff in Curitiba and São Paulo would be of €812,20; and €870,69 respectively.



Graph 09: **Cost of staff, in Euros (€).**

3.1.4. Value for money of office space

Analyzes the price of an office space. For this research the price is per square meters – m² – per month of rent; and comprises infra-structure already installed. The prices researches are valid for constructions on the financial centers of the cities. When the information is given in different currencies, the exchange shall be given on the day of the research.

In the case of Curitiba, the location chosen for the research is Centro/Batel, and the maximum price per square meter of office space is of R\$ 50,00³⁵.

For Milan the location chosen is Centrale/A2, which comprises Brera, Duomo, Cordusio, Torino. The maximum price per square meter of office space is of €31,50³⁶.

30 AGÊNCIA CURITIBA. **Guia do investidor: informações socioeconômicas**. 2009.

31 The information is based on an average of the price of €2.156,00 by the EUROSTAT European Commission, 2009; and €2.758,00 by the ISTAT, 2007.

32 AGÊNCIA CURITIBA. **Guia do investidor: informações socioeconômicas**. 2009.

33 Exchange rates considering the date as May 29th 2010.

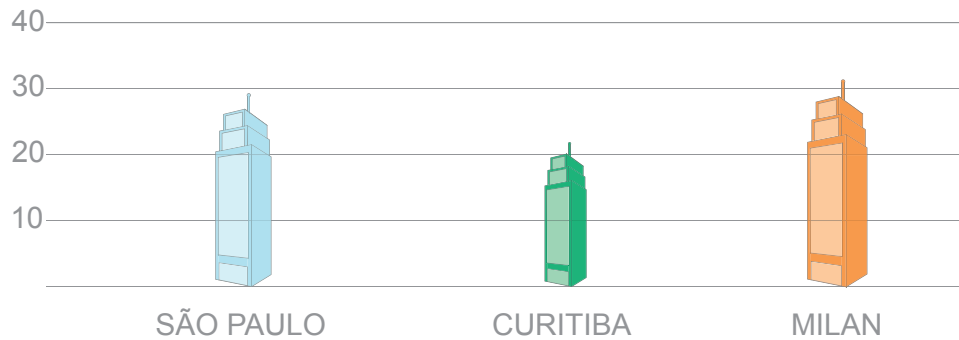
34 BANCO CENTRAL DO BRASIL. **Conversão de moedas**. 29/05/2010.

35 CORPORATE EVOLUTION CURITIBA.

36 AGENZIA DEL TERRITORIO. **Banca dati delle quotazione immobiliare**.

In São Paulo the location of the research is that of Morumbi, and the price per square meter of office space is of R\$65,00³⁷.

Taking into consideration the difference in currency between the Brazilian *Real* and the Euro, the prices of the office spaces in Curitiba and São Paulo would be of €22,33; and €29,02 respectively³⁸.



Graph 10: Value for money of office space, in Euros (€).

3.1.5. Quality of life for employees

This indicator is dedicated not to the financial infra-structure that each city provides to its workers, but also leisure. It is based on a calculation of quality of life of cities made by the United Nations – UN, in which the amount of square meters of green area inside of a city is offered for each resident. The UN World Health Organization – WHO recommends that each city provides at least from 9 to 12m² of green area per inhabitant³⁹.

Curitiba, known as the ecological capital of Brazil, counts with 55m² of green area per resident⁴⁰. Most of this area has been transformed from old mines and other unused empty lots to parks.

Milan is a city that intends to upgrade much of its green areas to host the EXPO of 2015. Up to now it counts with 12m² of green area per inhabitant⁴¹.

São Paulo, despite of its grand parks, does not count with many to fulfill the needs of its population. The megalopolis has 4m² of green area per inhabitant⁴².

37 ROCHAVERA CORPORATE TOWERS.

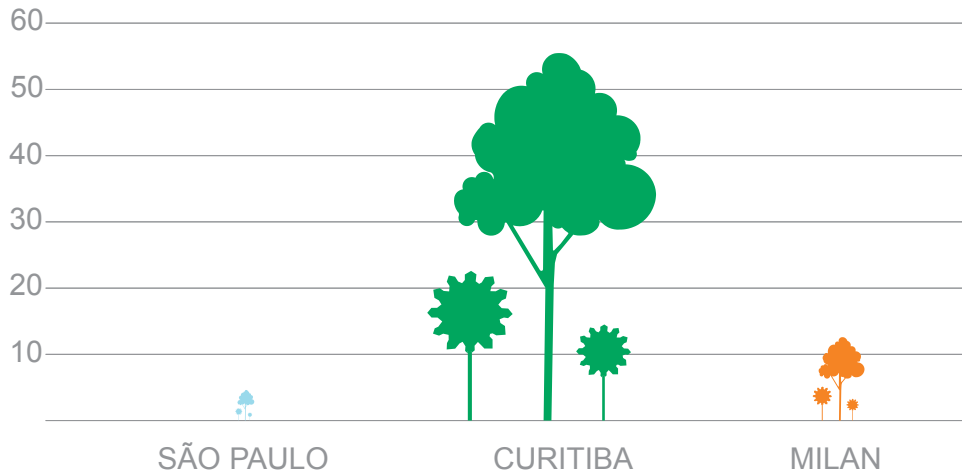
38 BANCO CENTRAL DO BRASIL. **Conversão de moedas**. 29/05/2010.

39 WORLD HEALTH ORGANISATION. **Global age-friendly cities: a guide**. 2007.

40 Such information was found on the Jaime Lerner Foundation web-site; and on FAZZANO, Alicia; WEISS, Marc. **Curitiba, Brazil. Metropolitan economic strategy report**. 2004.

41 COMUNE DI MILANO. **Pollution charge al via**.

42 ADITAL. **Asfaltos permeáveis podem reduzir problemas ambientais nas cidades**. 2009.



Graph 11: **Green area per resident, in m².**

3.1.6. Freedom from pollution

This indicator is strictly related to the previous, for this is also a quality of life issue. In this indicator the level of pollution present in the cities analyzed is confronted. This indicator shall analyze the levels of pm10 – particles with a diameter less than 10 micrometers. The calculation is analyzed by the amount of pm10 particles are present in one cubic meter.

Curitiba is the most industrialized city in the State of Parana and second in the South of Brazil. Its levels of pm10 particles are of 91ug/m³ ⁴³.

Milan is considered by the newspaper Telegraph as the most pollutant city in Europe⁴⁴. Its levels of pm10 particles are of 110ug/m³ ⁴⁵.

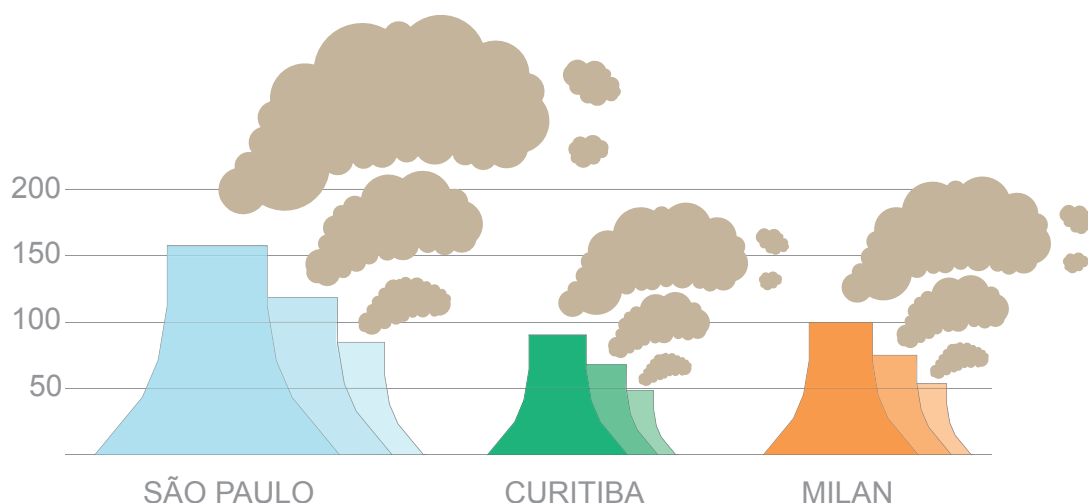
São Paulo is known as one of the most polluted cities in South America, has levels of pm10 particles of 157ug/m³ ⁴⁶.

43 BAKONYI *et alli*. **Air pollution and respiratory diseases among children in the city of Curitiba Brazil.**

44 TELEGRAPH. **Milan 'is pollution capital of Europe'**. By Michael Day. 2008.

45 AGENZIA REGIONALE PER LA PROTEZIONE DELL' AMBIENTE. **Livelli pm10 Milano, 03/2009.**

46 PEREIRA *et alli*. **Air pollution and neonatal death in São Paulo, Brazil.** 2004.



Graph 12: **Pollution analysis, in pm10 particles in 1m³.**

3.2. FINAL CONSIDERATIONS

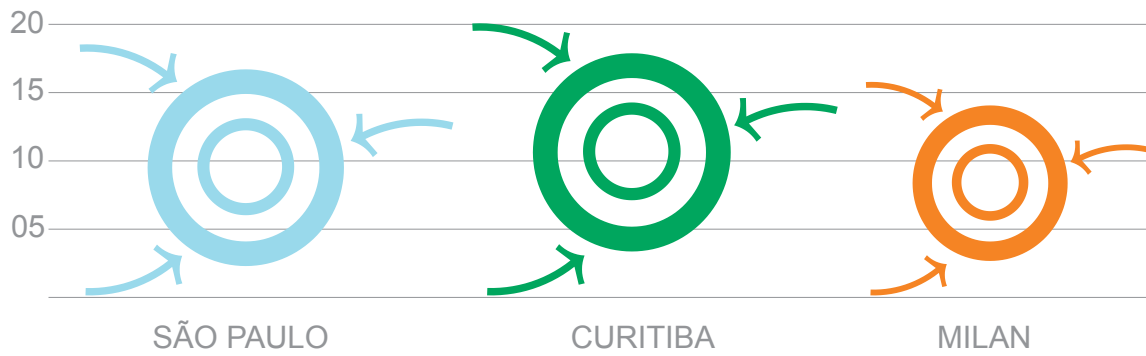
From the analysis of the tables, is possible to validate the power of attractiveness of São Paulo, Curitiba and Milan. The process of validating the attractiveness of each city is based on the indicators described. Each of the indicators has been quantified and/or qualified according to the references. The cities have been scored according to the value – highest of lowest – of each indicator.

The values derive from 1 to 3, and are given to the highest score - not necessarily the highest value. Some indicators have two tables to be explained, in those cases the numbers will be described as one value in addition to the other. The values are shown in the table below⁴⁷.

	CURITIBA	MILAN	SÃO PAULO
INDICATORS			
Human Development Index	2	3	1
Availability of qualified staff	1 + 2	2 + 1	3 + 3
Transport links with other cities and internationally	2 + 1	2 + 2	3 + 3
Cost of staff	3	1	2
Value for money of office space	3	1	2
Quality of life for employees	3	2	1
Freedom from pollution	3	2	1
TOTAL	20	16	19

TABLE 02: Resulting values of the indicators applied to Curitiba, Milan and São Paulo.

⁴⁷ The values do not consider the first analysis, namely: population.



Graph 13: **Power of attractiveness of São Paulo, Curitiba and Brazil.**

From the position of the values of each indicator the total values concerning the power of attractiveness of each city can be calculated. As a resultant, the value for the Brazilian cities of Curitiba and São Paulo are similar, being higher than that of Milan.

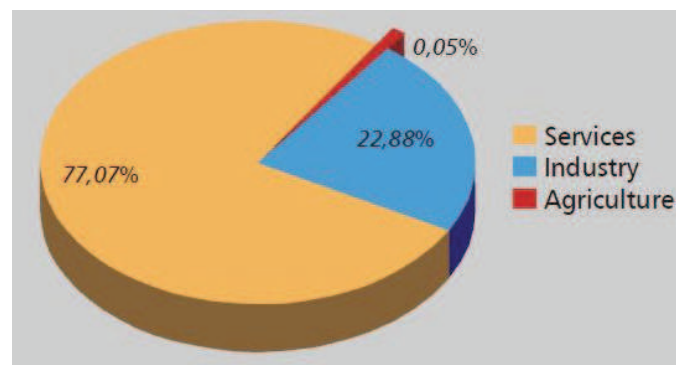
From the results it is possible to confirm the initial hypothesis of the research, which states that Curitiba is a potential alternative for international Real Estate investments in Brazil.

4. PROJECT

From the resulting values of the indicators calculated for the cities of Curitiba, São Paulo and Milan, we have come to the conclusion that Curitiba is a potential participant for international Real Estate investments.

From this statement it is intended to design a building that shall attract potential investors to Curitiba. This projetual phase of the research is, therefore, dedicated to the analysis of potential references and the design of the building.

Considering that the GLP of Curitiba is 77% turned to services¹, it is proposed to design an office building.



Graph 14 : Composition of the GLP of Curitiba.

4.1. ANALYSIS

According to Bruno Zevi², there are five ways to articulate a criticism to a determined monument³: urbanistic analysis; architectonic analysis; volumetric analysis; analysis of the decorative elements; and analysis of scale. Since these five items are used for the criticism of an architecture already built, it is proposed the use of these same items on the project's elaboration, considering the posterior critic of the element designed.

4.1.1. Urbanistic analysis

The site chosen for the project is placed on the civic center of Curitiba, which is also known as one of the financial centers of the city. The civic center is the neighborhood where the Legislative power has been placed, in the 1950's. Apart from the Palace of the Governor of the State of Parana, in the Civic Center are also placed skyscrapers for office buildings, generally for law firms and other jurisdictional functions. This area is placed

¹ CURITIBA, **Socioeconomic information - Investor Guidebook**. 2008.

² ZEVI, Bruno. **Saber ver a arquitetura**. 5.ed. São Paulo: Martins Fontes, 1996.

³ To be understood as an architectonic work.

strategically on the urban fabric, for its connection with public transportation infra-structure, public and private equipments, such as the forum, the governor’s office, office skyscrapers, museums, parks, and others. Using public and private infra-structure, from the site it is easy to be connected with the city’s bus station and airport.

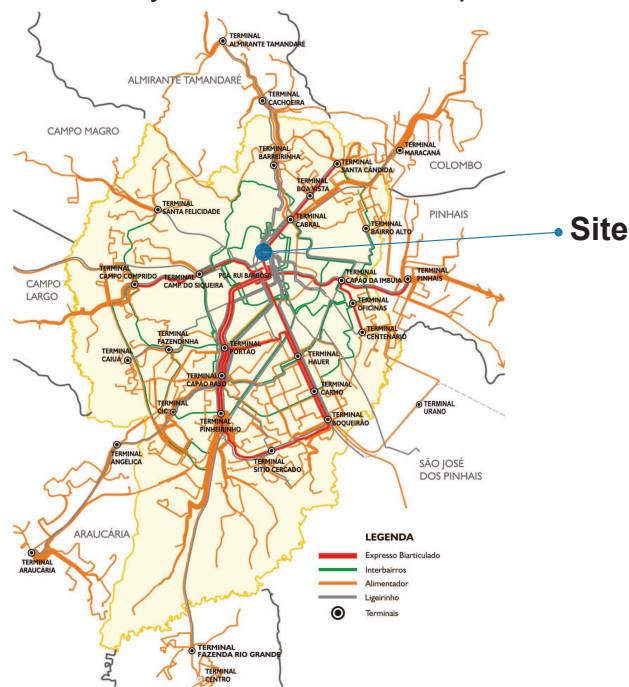


Image 23: **Public Transportation map of Curitiba.** The blue circle indicates the location of the site.

Curitiba’s building code does not restrain the implementation of a high rise office building in the area. Included on the chapter 24 of the code, entitled “Guidance for the elaboration of a building project – office building: administrative headquarters or public service”⁴.

The law 9800/2000, on its article 20, establishes the area of the civic center as a special sector, where the administrative-institutional activities of the State and Municipal Public Service are located. Such law aims to:

“divide the territory of the municipality in zones and sectors and establishes criteria and parameters of land use and occupation, with the objective to guide and order the growth of the city”. (CURITIBA, Prefeitura Municipal. Lei No 9.88 de 03 de Janeiro de 2000)⁵.

On the special sector of the civic center residential use and activities related to commerce and services are permitted⁶.

The site has been chosen for its positioning on the urban fabric, which permits a strategic connection with other institutional and commercial services. The site is also located in front of a structural axis of the public transportation BRT system, allowing easy access to different parts of the city.

4 CURITIBA. **Código de obras. Decreto 212/07 – Regulamento de edificações.** 2007.

5 Translated from Portuguese by the author.

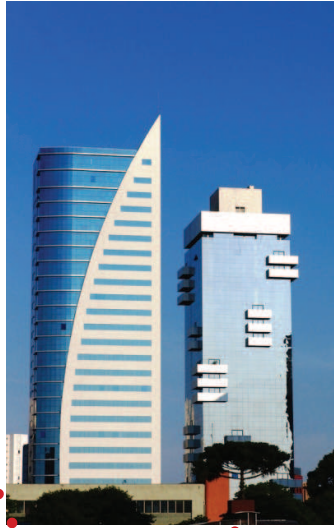
6 CURITIBA, Prefeitura Municipal. **Lei No 9.800 de 03 de Janeiro de 2000.**



Museum Oscar Niemeyer



Federal University



Civic Center



Public Path



Botanical Gardens



0 1km 2km

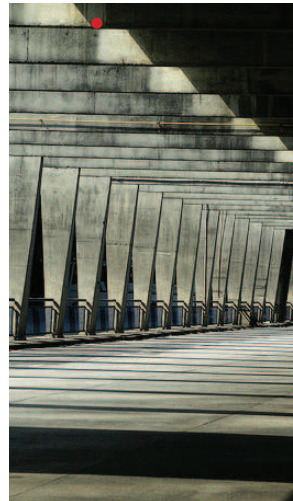
Image 24: General map of Curitiba with principal equipments. Site in blue. Scale indicated.



Barigui Park



City Center



Bus/Train Station



Catholic University



City Center



Museum Oscar Niemeyer



Forum



0m 500m 1km

Image 25: General map of the Civic Center of Curitiba. Site in Orange.



Iguaçu Palace



Office Buildings



Shopping Center

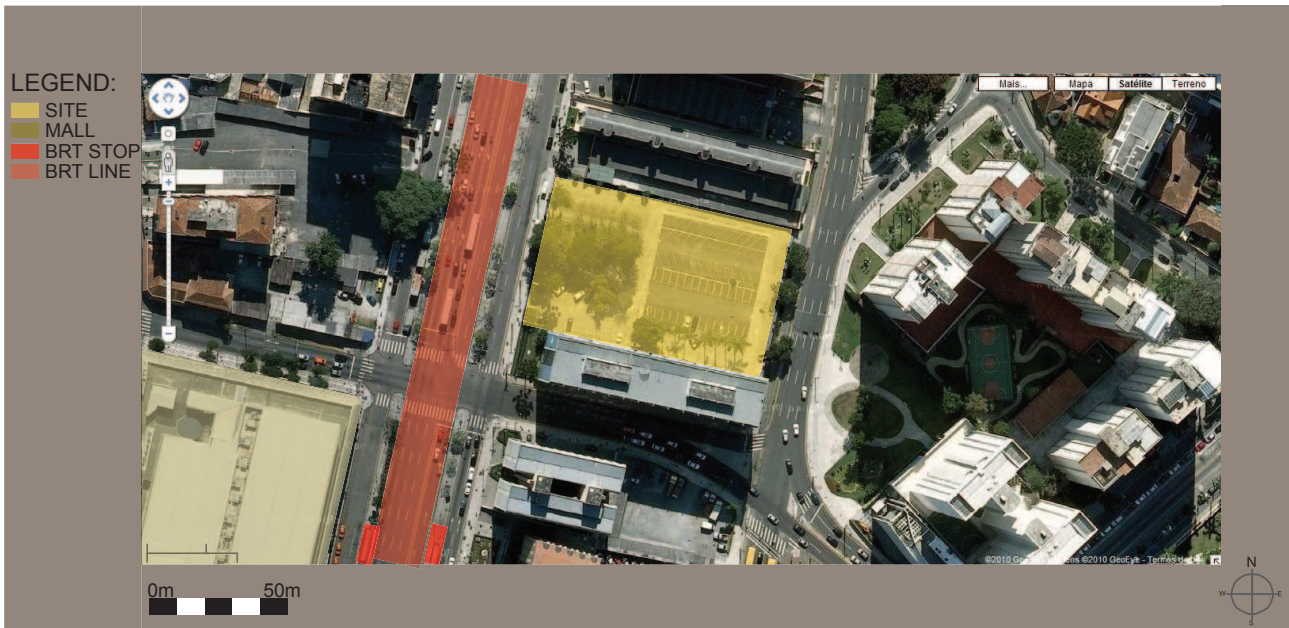


Arab Memorial



Office Buildings

Considering the dimensions, it is 50m X 83m and total area of 4150m². It is accessible by 2 roads, on the Western and Eastern sides. Its rotation from the azimuth is of 12°.



Drawing 01: **Site and proximities.** Scale indicated.

4.1.2. Architectonic analysis

4.1.2.1. Plan

Considering the plan, being this an office building, the floor area is intended to give as much profit as possible. Such profit is achieved when the project is possible to have a high efficiency index.

There are many different methodologies to increase the efficiency index of a building, but basically all of them aim to increase the functionality by eliminating all undesirable extra space on the plan. The optimum situation is required with the analysis of density of the workplace. Density is reached with the calculation and specification of the amount of area both productive and rentable per workplace⁷. To maximize the space used on the building, it is necessary to⁸:

- Diminish the number of enclosed offices;
- Increase open spaces;
- Create small meeting rooms;
- Shared desks;
- Increase the amount of common areas.

⁷ JOHNSON CONTROL. **Environmental Satisfaction, personal control and the positive correlation with increased productivity.** No date.

⁸ Idem.

An example used as reference of such actions is the New York Times building, designed by Renzo Piano and completed in 2007. On the plans displayed below, of open and closed office layouts for tenants, it is possible to see the open space dedicated to storage archives and other common use needs.



Image 26. Open plan layout of the New York Times building. No scale.

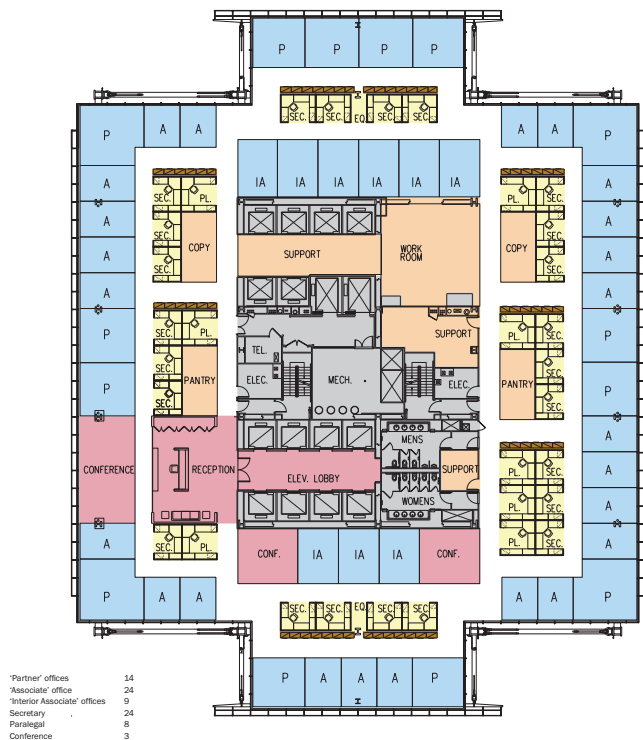


Image 27: Closed plan layout of the New York Times building. No scale.

On a simplified way, the scheme of the efficiency index is done as shown below⁹:

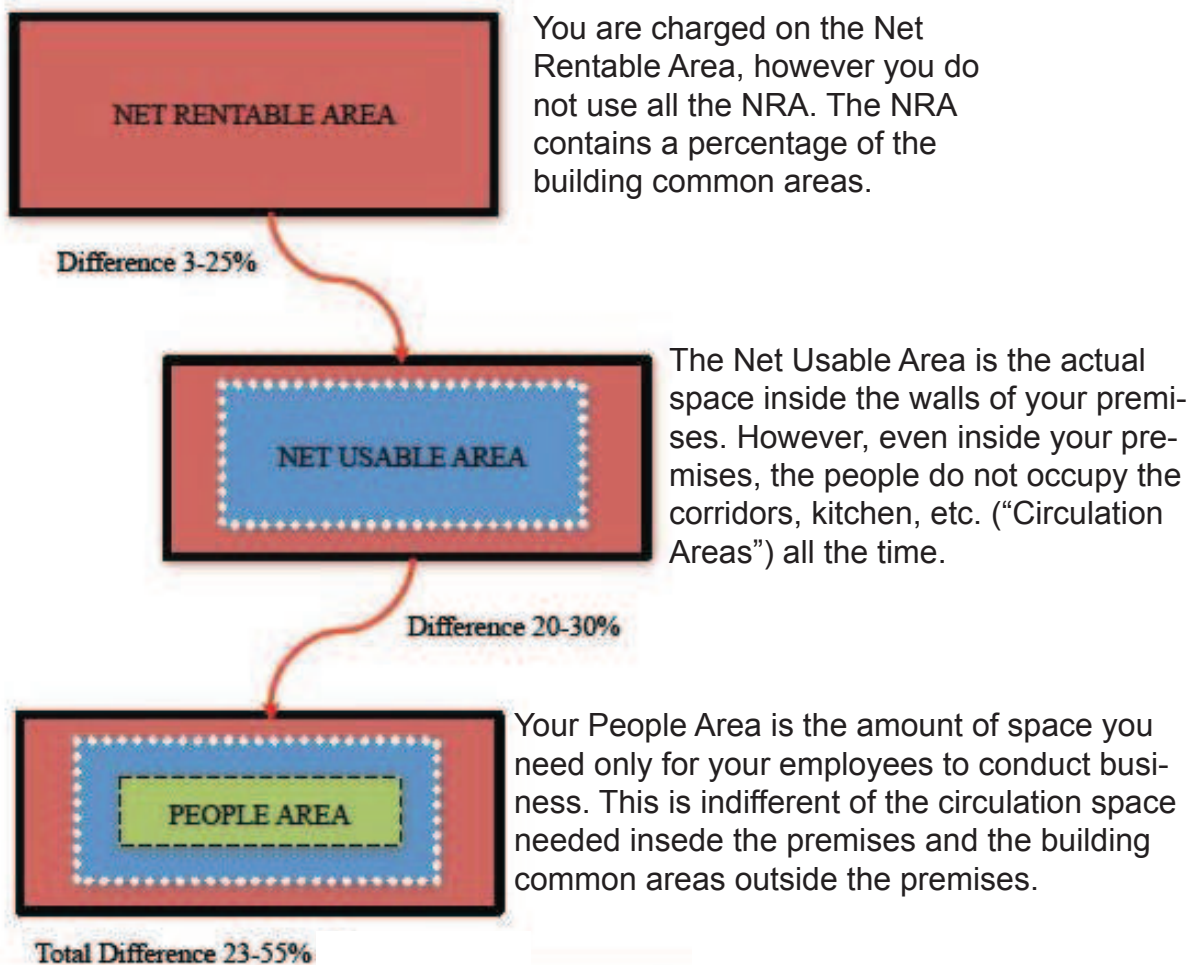


Image 28 : Simplified scheme of the Efficiency Index of a building.

The efficiency index separates different parts of the plan according to its use and calculates the percentage of each of them. The categories for the efficiency index¹⁰ are:

- GOA – Gross Outside Area
- EXTW – External Wall
- GIA – Gross Internal Area
- PDSV – Pipes, Ducts, Shafts & Vertical Penetrations
- NRA – Net Rentable Area
- UTIL – Utility Space
- NUA – Net Usable Area
- AUX – Auxiliary Space
- NPA – Net Productive Area

The efficiency index chart shows in detail how to separate different parts of the plan and calculate them. The block displayed on the horizontal indicate the major categories

⁹ GRIFFIN PARTNERS. **Hidden Cost – Higher Rent – Lower Cost**. No date.

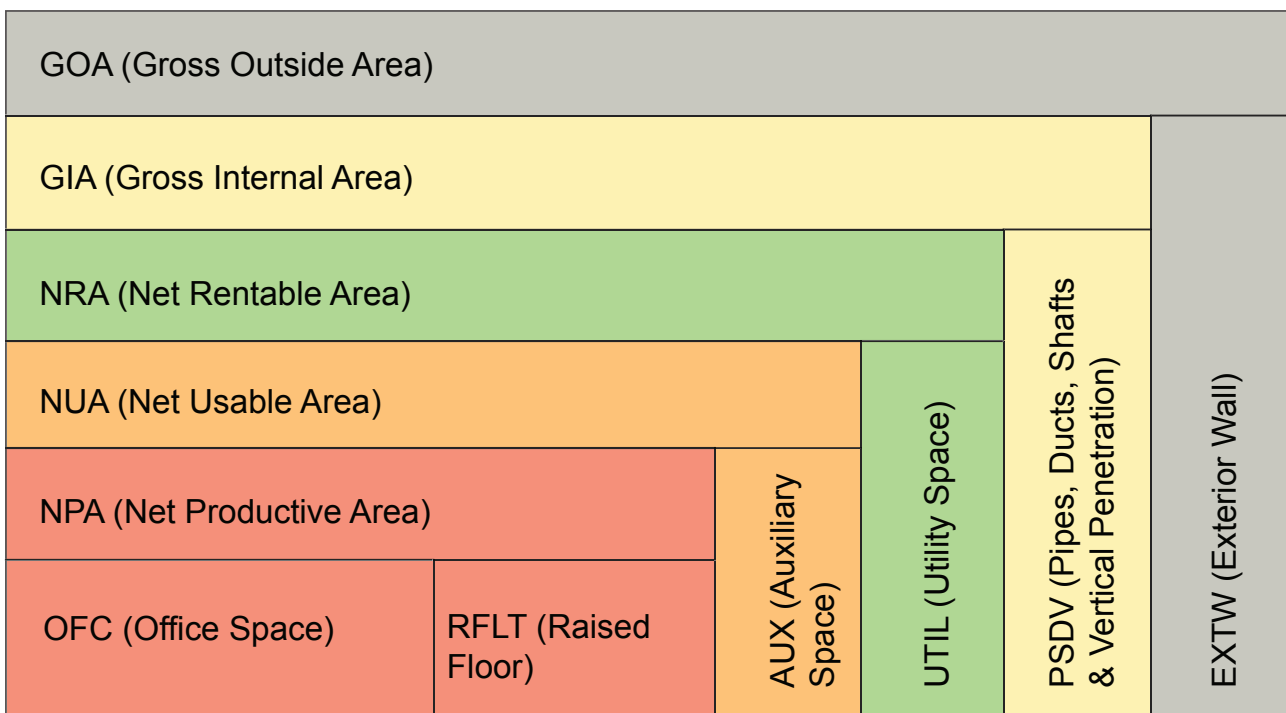
¹⁰ JOHNSON CONTROL. **Environmental Satisfaction, personal control and the positive correlation with increased productivity**. No date.

to be calculated. The vertical blocks indicate the parts that you must subtract in order to achieve the next category. For example, if I want to analyze the area of the Gross Internal Area – GIA of the plan from the Gross Outside Area – GOA, I must subtract from GOA the Exterior Walls. That calculation can be done for all the categories in both ways: upwards and downwards.

Despite the fact that one can measure and calculate all the separate parts of the plan, the efficiency index analyzes only the ratio between the Net Usable Area - NUA and the Net Productive Area - NPA. NUA is characterized by the whole free area of work - offices, corridors of access, open archives, etc. NPA is achieved by reducing from NUA the auxiliary space, which is characterized by the main corridors.

The ratio is done by the division of NUA by NPA and the percentage is divided into 4 categories¹¹:

- Excellent: NPA 80% of NUA or higher
- Good: NPA 75% - 80% of NUA
- Enough: NPA 70% - 75% of NUA
- Poor: NPA 70% of NUA or lower



Graph 15: Efficiency Index chart.

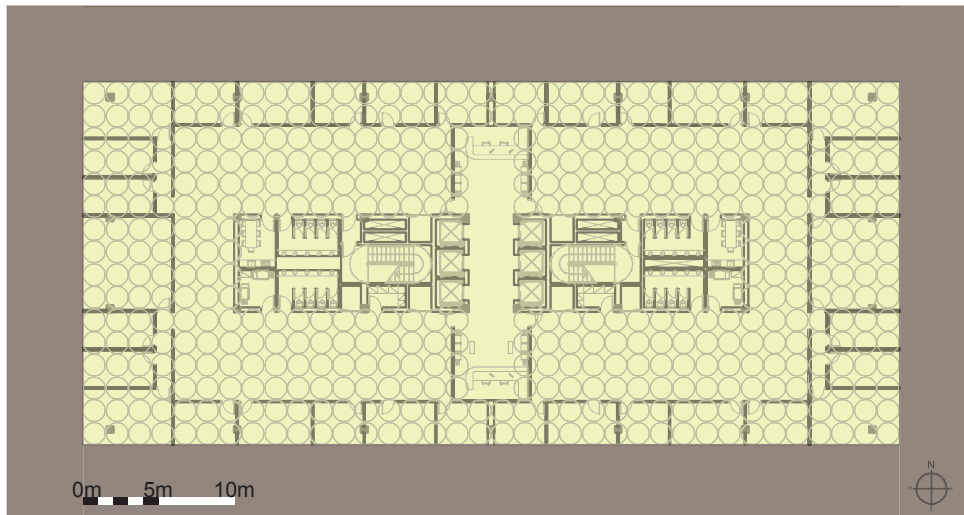
The best way to achieve a desirable efficiency index, according to technological systems available up to now to divide internal spaces and to create modules of work with furniture, is through geometry. Considering the quotation that says that: “The efficiency of a building is directly tied to its Shape” ; it has been decided to design the building following

¹¹ JOHNSON CONTROL. **Environmental Satisfaction, personal control and the positive correlation with increased productivity.** No date.

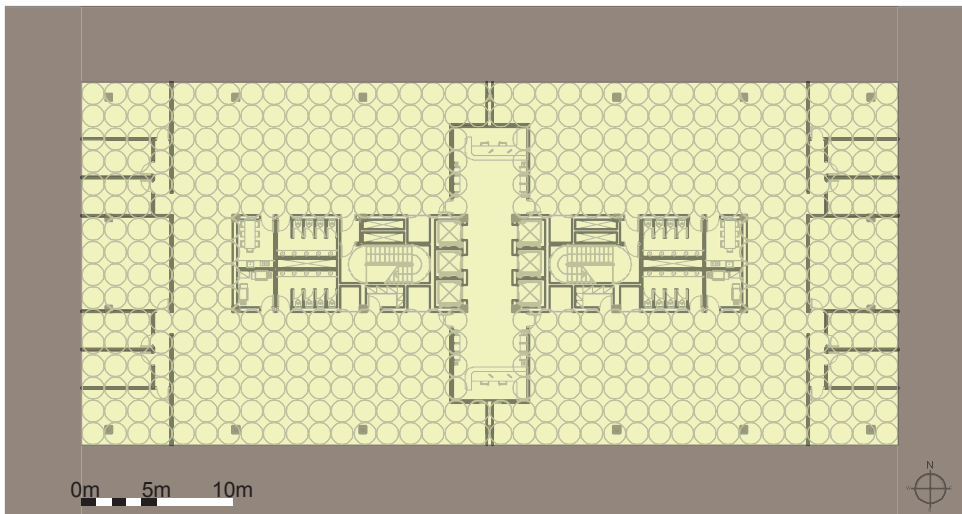
a rectangular shape.

The module created for the workplaces are of 1,5m X 1,5m and are replicated all through the plan of the building. The total plan has 54m of length by 24m of width, totaling 1296m² of area.

Concerning the fact that different tenants have different needs, the plans have been designed according to 2 main categories of use: closed and open offices. The difference is based on the fact that on closed offices, there is a lower density of workers on the space division; whereas on the open the density is higher.



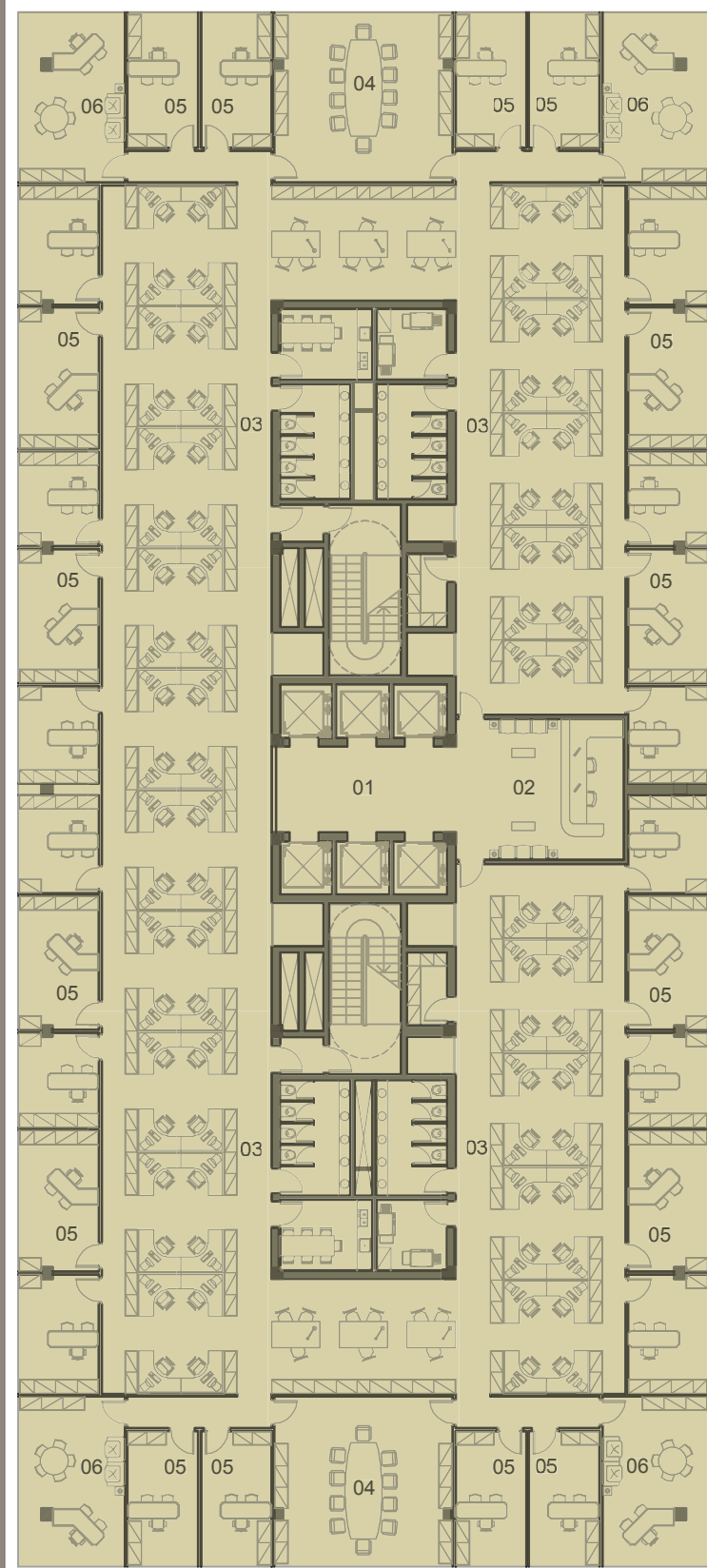
Drawing 02: **Modular scheme for the composition of the plan of the closed layout.** Scale 1/500.



Drawing 03: **Modular scheme for the composition of the plan of the open layout.** Scale 1/500.

Also concerning probable differentiation of needs in size of offices, the plans have been designed to host 1, 2 or 4 tenants per floor. Therefore there are 6 different layouts for the plans. Closed offices with 1, 2 or 4 tenants; and open offices with 1, 2 or 4 tenants.

- LEGEND:**
 01. HALL
 02. ENTRANCE
 03. OFFICE
 04. MEETING
 05. MANAGER
 06. CEO
 ■ TENANT

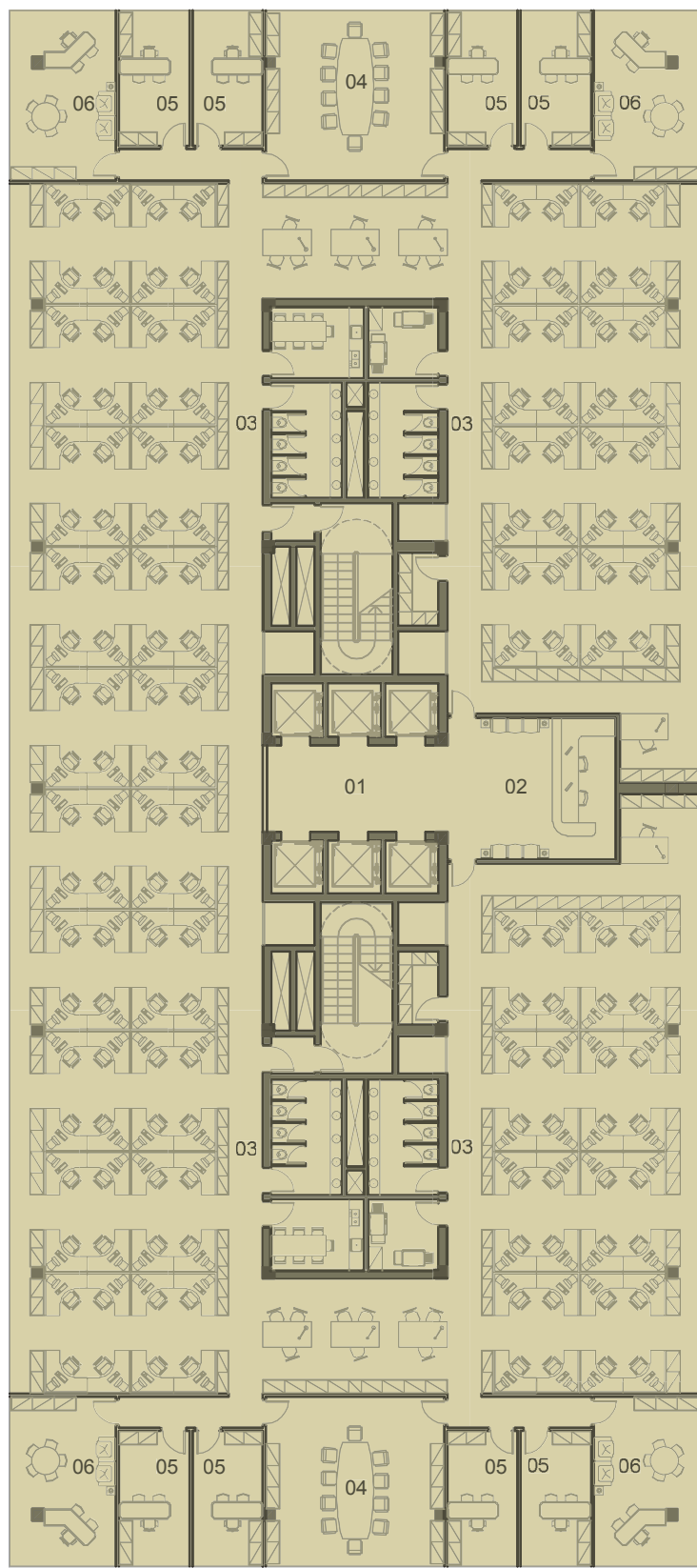


0m 5m 10m



Drawing 04: Plan of the proposal of closed office for 1 tenant per floor. Scale 1/250.

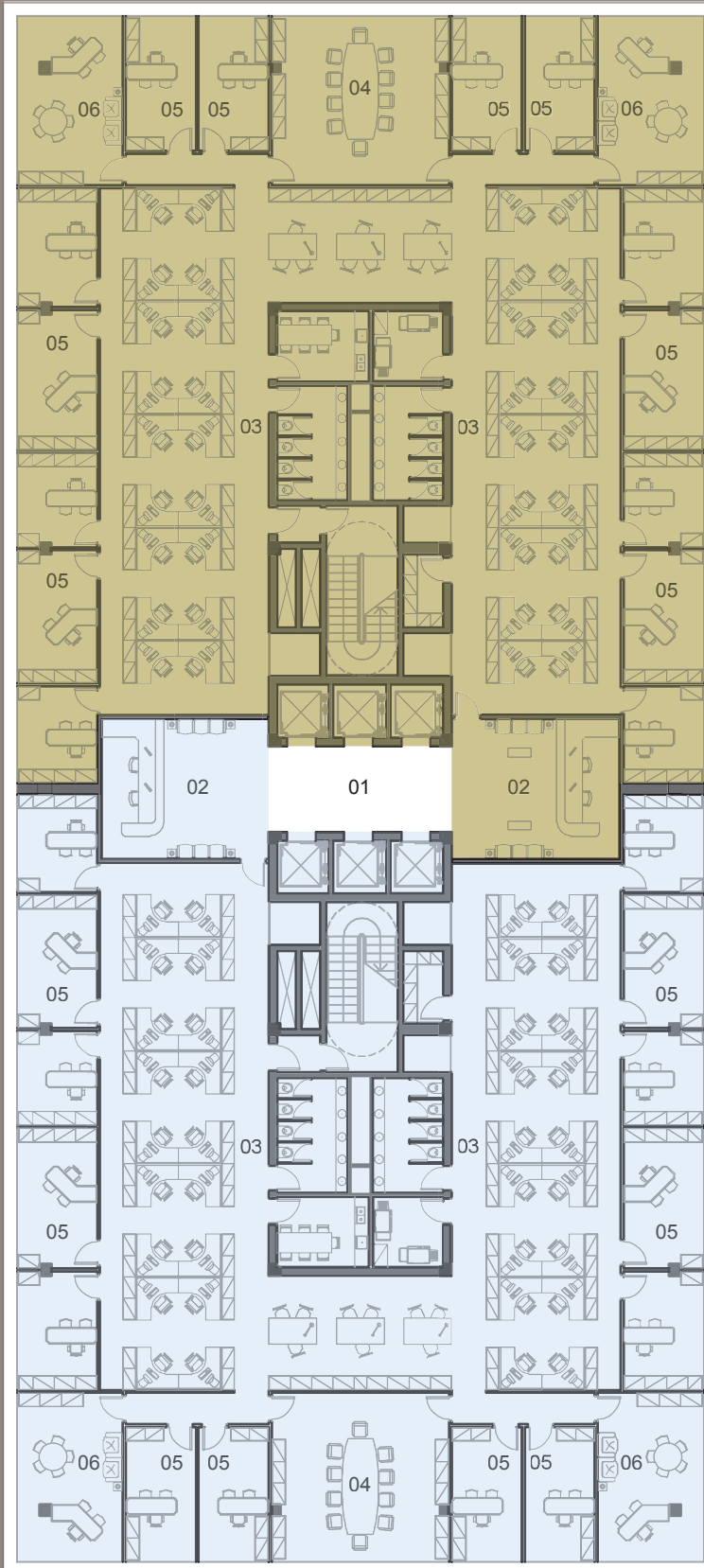
- LEGEND:**
 01. HALL
 02. ENTRANCE
 03. OFFICE
 04. MEETING
 05. MANAGER
 06. CEO
 ■ TENANT



Drawing 05: Plan of the proposal of open office for 1 tenant per floor. Scale 1/250.

LEGEND:

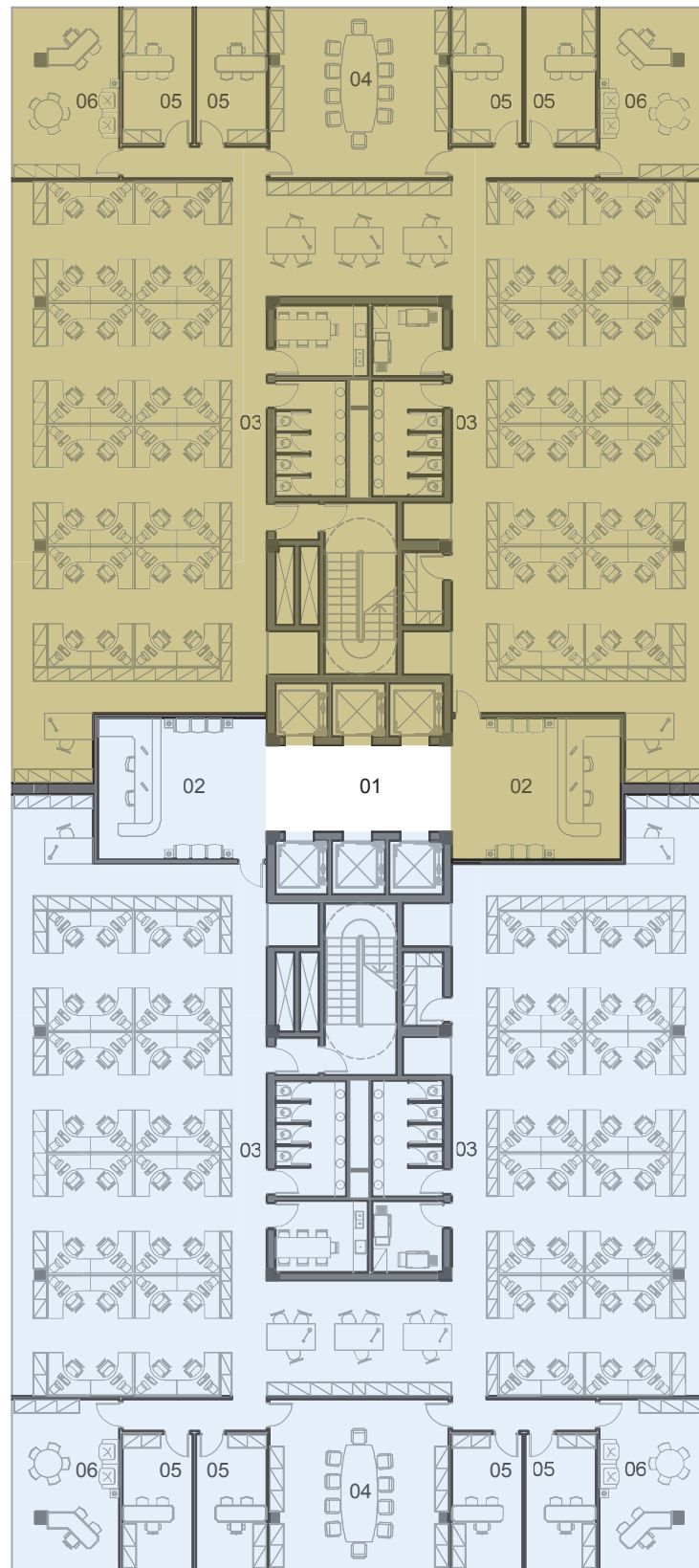
- 01. HALL
- 02. ENTRANCE
- 03. OFFICE
- 04. MEETING
- 05. MANAGER
- 06. CEO
- TENANT
- TENANT



Drawing 06: Plan of the proposal of closed office for 2 tenant per floor. Scale 1/250.

LEGEND:

- 01. HALL
- 02. ENTRANCE
- 03. OFFICE
- 04. MEETING
- 05. MANAGER
- 06. CEO
- TENANT
- TENANT



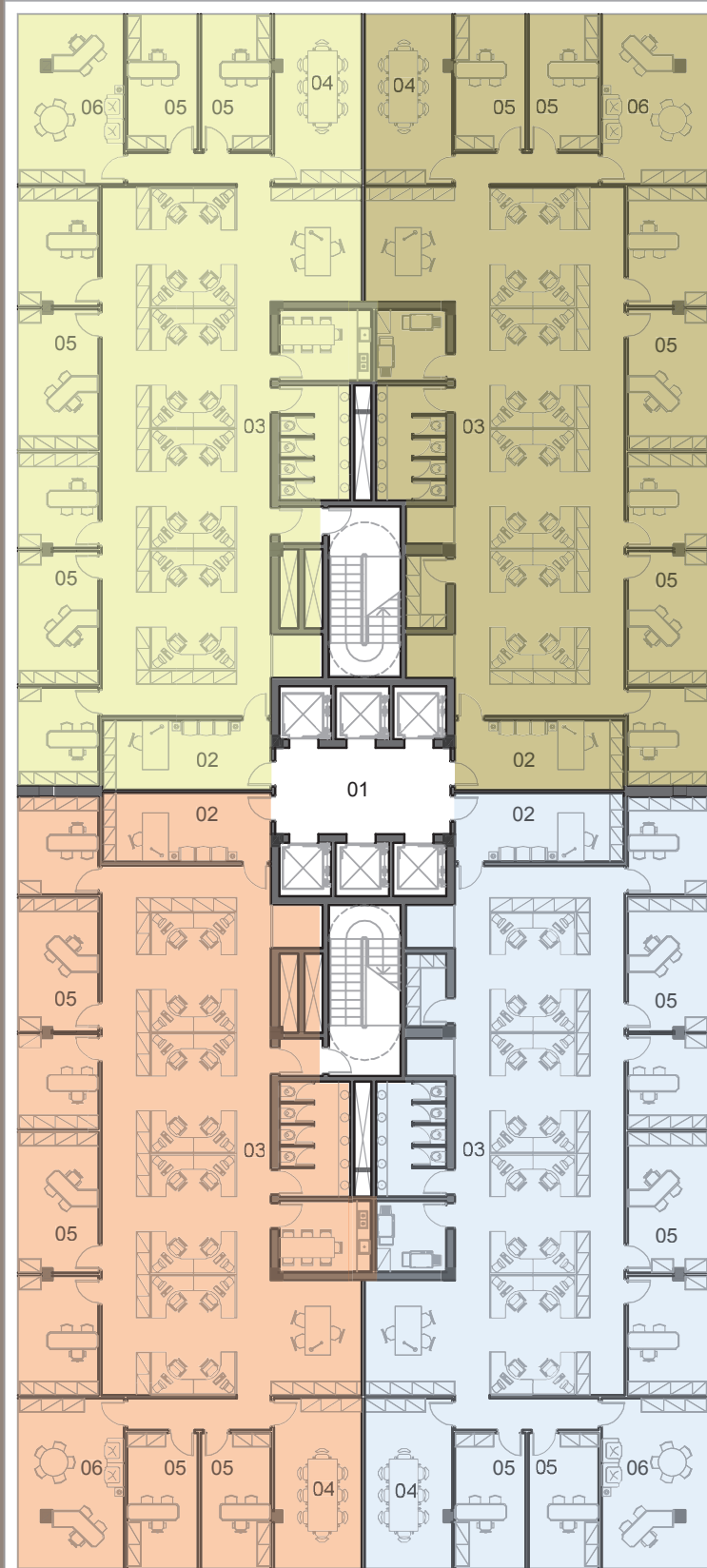
0m 5m 10m



Drawing 07: Plan of the proposal of open office for 2 tenant per floor. Scale 1/250.

LEGEND:

- 01. HALL
- 02. ENTRANCE
- 03. OFFICE
- 04. MEETING
- 05. MANAGER
- 06. CEO
- TENANT
- TENANT
- TENANT
- TENANT

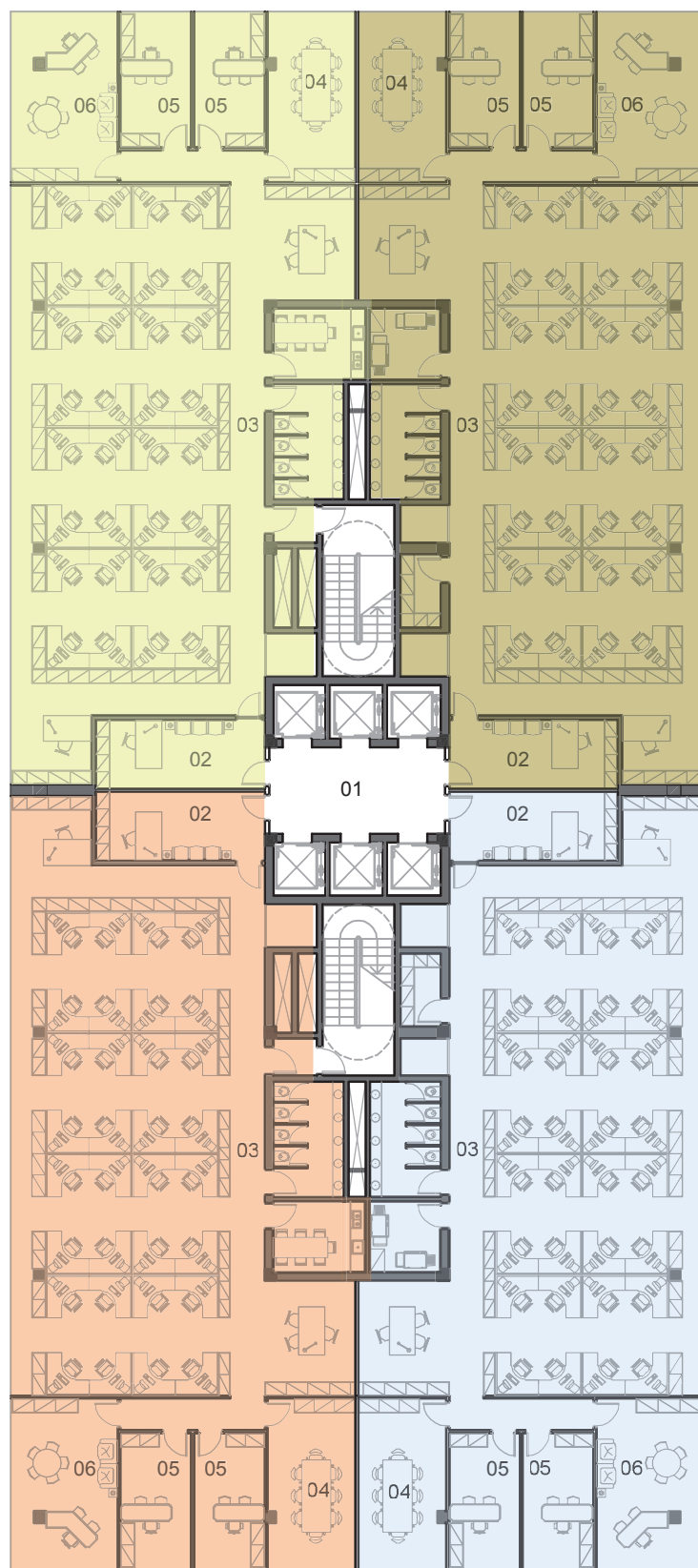


Drawing 08: Plan of the proposal of closed office for 4 tenant per floor. Scale 1/250.

LEGEND:

- 01. HALL
- 02. ENTRANCE
- 03. OFFICE
- 04. MEETING
- 05. MANAGER
- 06. CEO

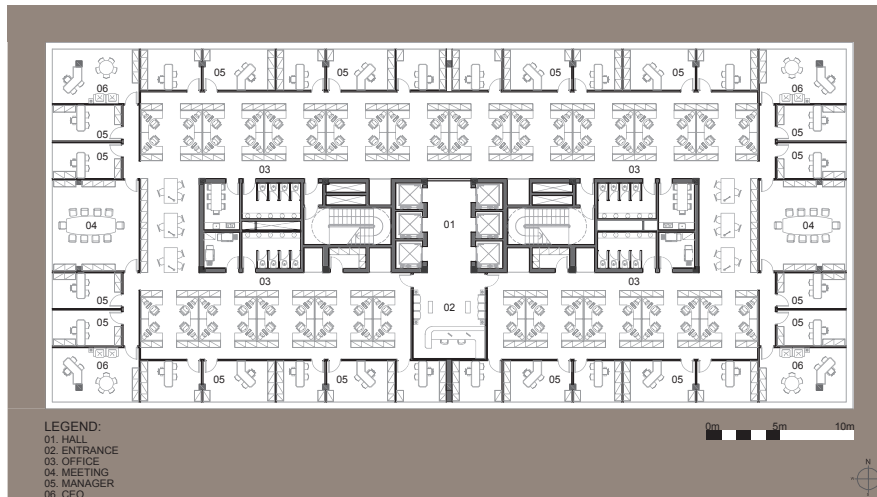
- TENANT
- TENANT
- TENANT
- TENANT



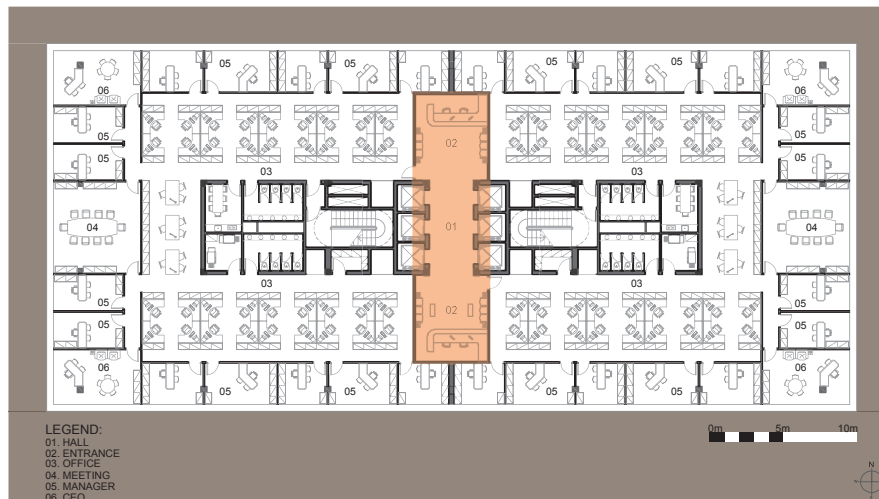
0m 5m 10m



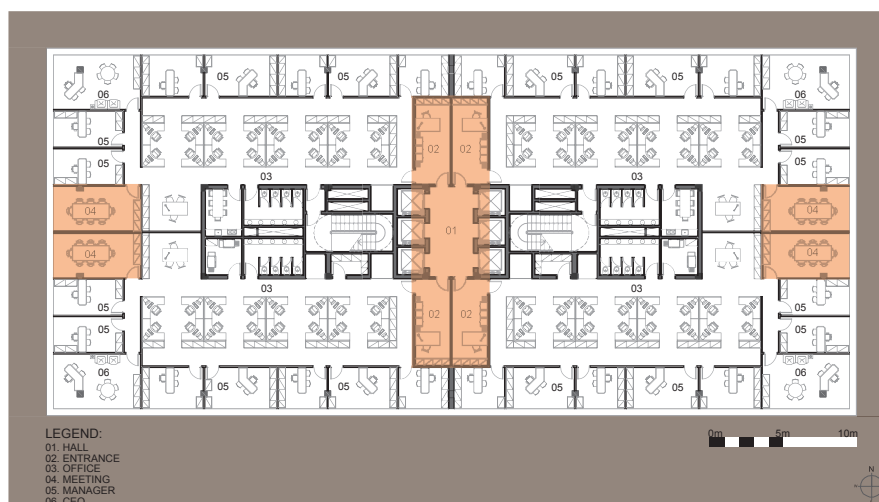
Drawing 09: Plan of the proposal of open office for 4 tenant per floor. Scale 1/250.



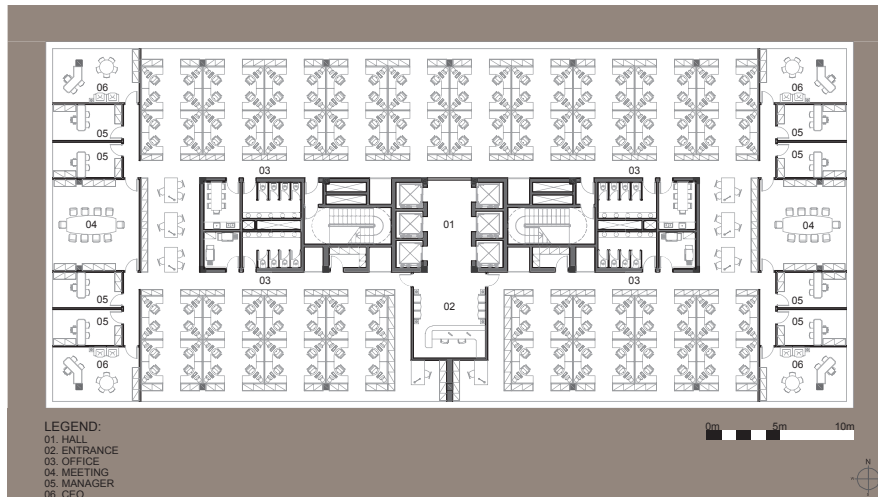
Drawing 10: Plan of the proposal of closed office for 1 tenant per floor. Scale 1/500.



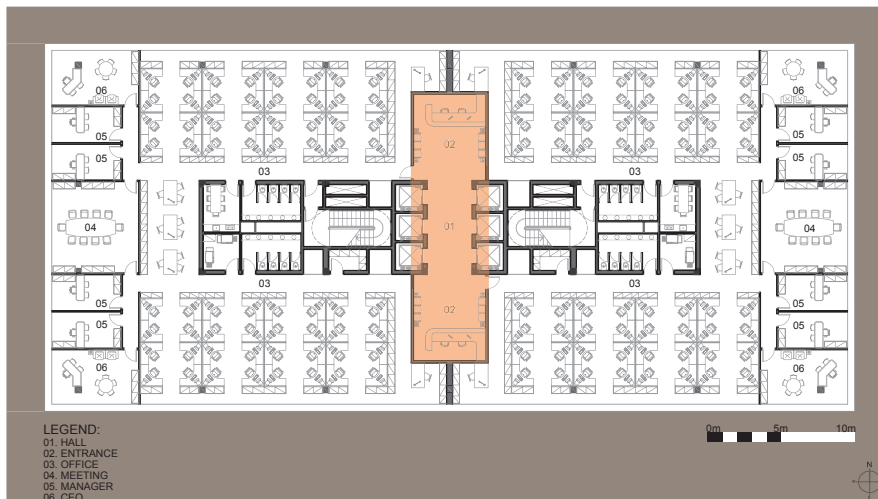
Drawing 11: Plan of the proposal of closed office for 2 tenant per floor. Scale 1/500. Areas in red indicate the change in the plan to accommodate the tenants.



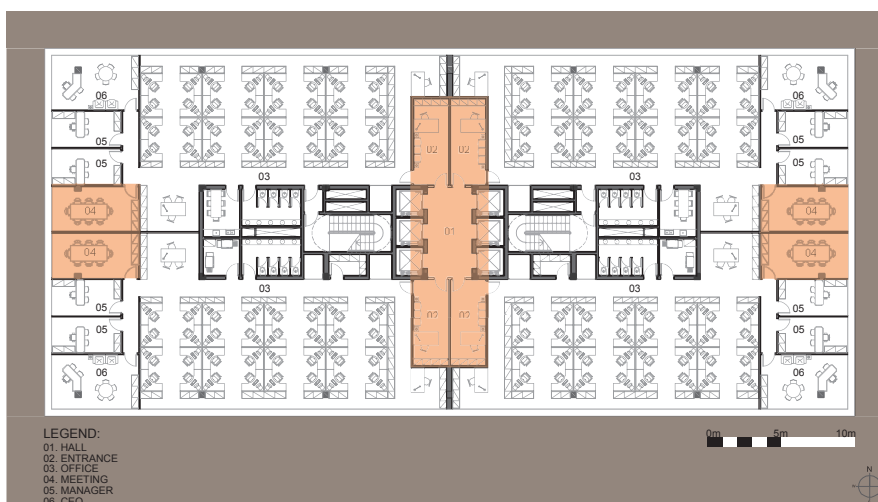
Drawing 12: Plan of the proposal of closed office for 4 tenant per floor. Scale 1/500. Areas in red indicate the change in the plan to accommodate the tenants.



Drawing 13: Plan of the proposal of open office for 1 tenant per floor. Scale 1/500.



Drawing 14: Plan of the proposal of open office for 2 tenant per floor. Scale 1/500. Areas in red indicate the change in the plan to accommodate the tenants.



Drawing 15: Plan of the proposal of open office for 4 tenant per floor. Scale 1/500. Areas in red indicate the change in the plan to accommodate the tenants.

To calculate the efficiency index of all 6 propositions, it is necessary to evaluate the Net Usable Area and Net Productive Area of these proposals. Therefore, for each of these proposals, these areas have been identified and calculated in the following way:

	1 TENANT CLOSED	1 TENANT OPEN
NUA	1063,49m ²	1063,49m ²
AUX	208,3m ²	208,3m ²
NPA (NUA - AUX)	855,19m ²	855,19m ²
EFF. INDEX (NPA / NUA)	80,41%	80,41%

Table 03: **Efficiency Index calculations of the proposal of plans with 1 tenant.**

	2 TENANTS CLOSED	2 TENANTS OPEN
NUA	524,29m ²	524,29m ²
AUX	101,3m ²	101,3m ²
NPA (NUA - AUX)	423,26m ²	423,26m ²
EFF. INDEX (NPA / NUA)	80,73%	80,73%

Table 04: **Efficiency Index calculations of the proposal of plans with 2 tenants.**

	4 TENANTS CLOSED	4 TENANTS OPEN
NUA	270,35m ²	270,35m ²
AUX	58,92m ²	58,92m ²
NPA (NUA - AUX)	211,43m ²	211,43m ²
EFF. INDEX (NPA / NUA)	78,2%	78,2%

Table 05: **Efficiency Index calculations of the proposal of plans with 4 tenants.**

From the calculations it is possible to consider the fact that, firstly, both proposals with the same number of tenants have the same efficiency index. This occurs because the design of the main corridors – for fire escape – have the same dimensions. A second consideration acknowledges that the efficiency index of the solution with 2 tenants is the highest, making it possible to commissioners to profit from it.

Although the efficiency index is equal for the open and closed proposals with the same number of tenants, the density of the workplace is considerably different. The density of the workplace is done by dividing the Net Productive Area – NPA by the number of staff of the office.

	NET PRODUCTIVE AREA	WORKERS	DENSITY
1 TENANT CLOSED	855,19m ²	116	7,37m ² per worker
1 TENANT OPEN	855,19m ²	166	5,15m ² per worker
2 TENANTS CLOSED	423,26m ²	57	7,42m ² per worker
2 TENANTS OPEN	423,26m ²	77	5,49m ² per worker
4 TENANTS CLOSED	211,43m ²	26	8,13m ² per worker
4 TENANTS OPEN	211,43m ²	38	5,56m ² per worker

Table 06: **Density calculation of all proposals of plans.**

The calculation of the density is read being the lowest the number of square meters per worker the highest the density. Therefore, from the calculation of the density is possible to analyze that the open layouts, despite having the same Net Productive Area than the closed layouts, has a higher density. A consequent consideration evaluates the proposals with 1 tenant per floor as the most dense.

As the calculation of the efficiency index demonstrated that the proposals with 2 tenants per floor were more attractive, and the proposals with 1 tenant per floor have a higher density; both of the proposals – with 1 or 2 tenant per floor – demonstrate that are able to guarantee an excellent efficiency index and density, being considered as commercially viable.

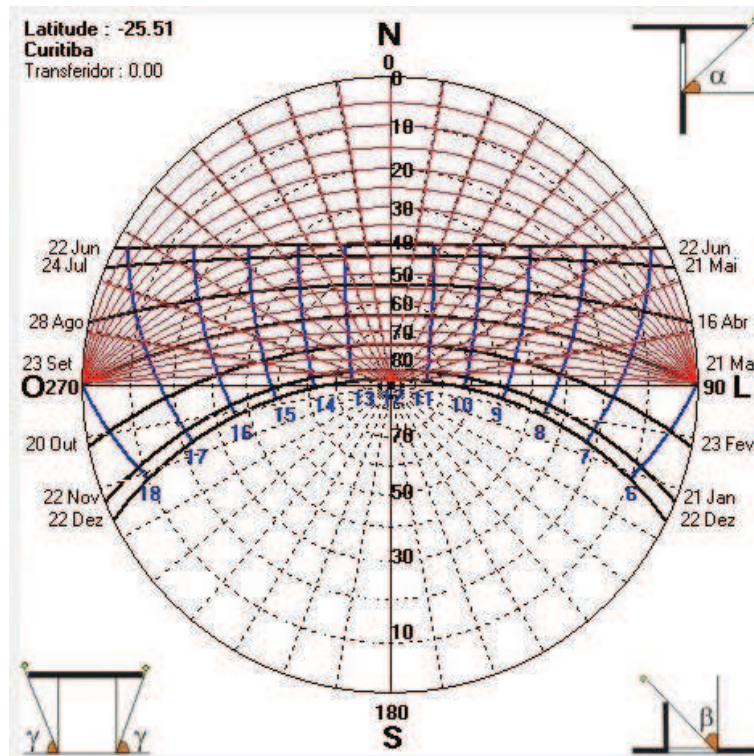
The proposals of 4 tenants per floor, despite having a good efficiency index, has on the open layout a density close to the other proposals of open layout. The proposal for 4 tenants per floor with a close layout has the lowest density of all 6 proposals.

4.1.2.2. Façade

The North façade has an angle from the azimuth of 12°, being considered at North. Therefore all façades will be considered on the full angle – North as 0°; East at 90°; South at 180° and West at 270°.

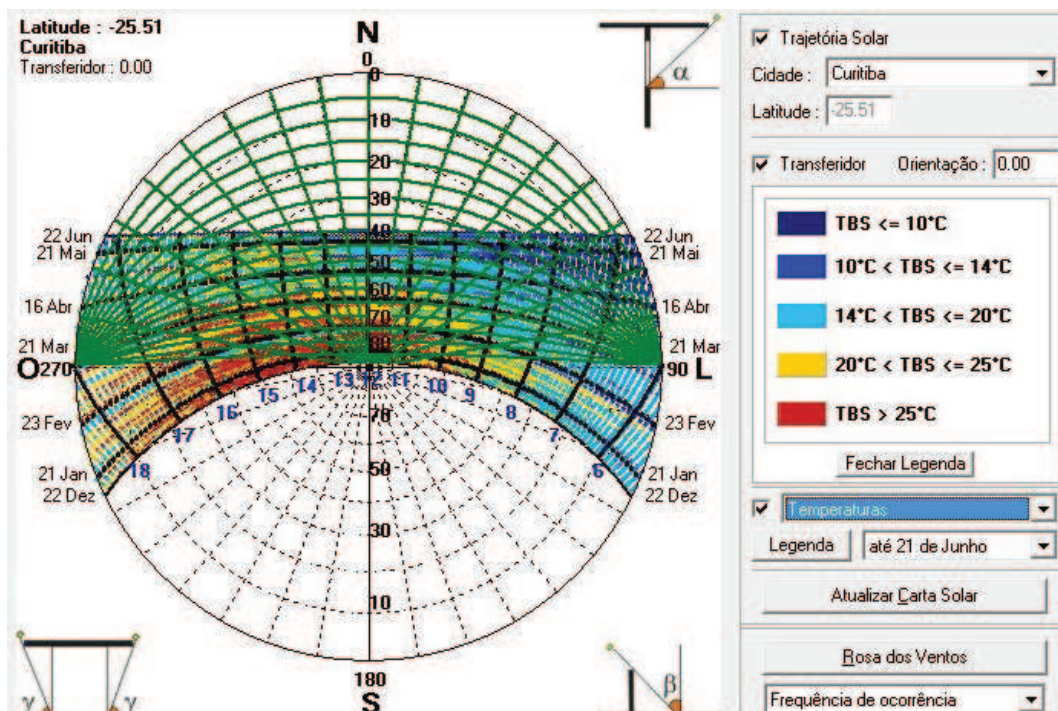
From the indications of the sun chart of Curitiba it is possible to indicate that the sun is very present throughout the year. In winter it rises before 07:00 and sets after 17:00. The altitude of the sun in winter at 12:00 is that of 40° from the ground. In summer the sun at 08:30 and 18:30 – time when working hours begin and end – are at 40° and 5°, respectively¹².

¹² All the charts come from the program SolAr, developed by the LabEEE - Laboratory of Energetic Efficiency in Buildings - of the UFSC - Federal University of Santa Catarina.



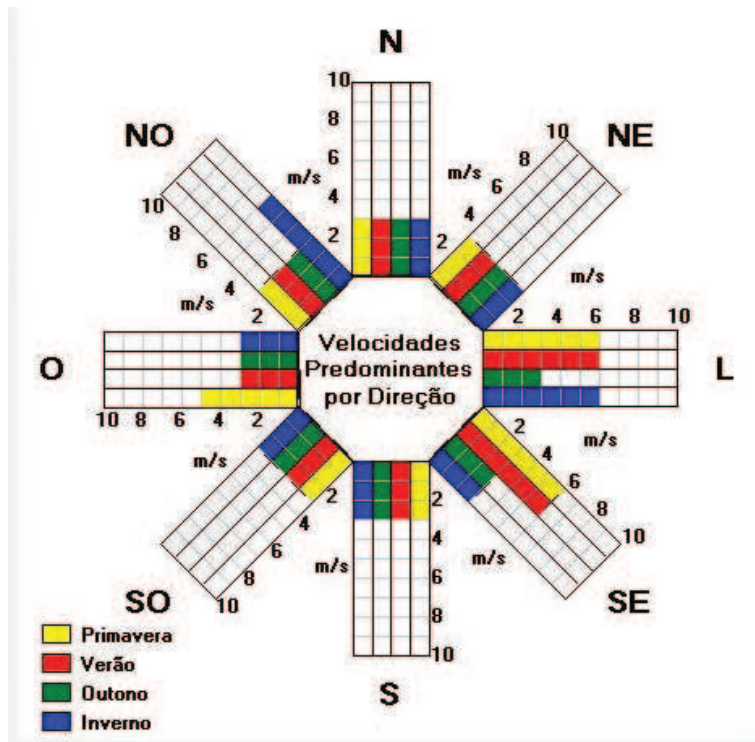
Graph 16: Sun Chart of the city of Curitiba.

Despite the fact that the sun is much present all year long, the temperature range of Curitiba is considered low for the Brazilian standard. From the temperature range is possible to see that throughout the year the temperature with most percentage is that between 14° and 20°. The weather can be considered moderate, since temperatures above 25° and below 14° are not as present.

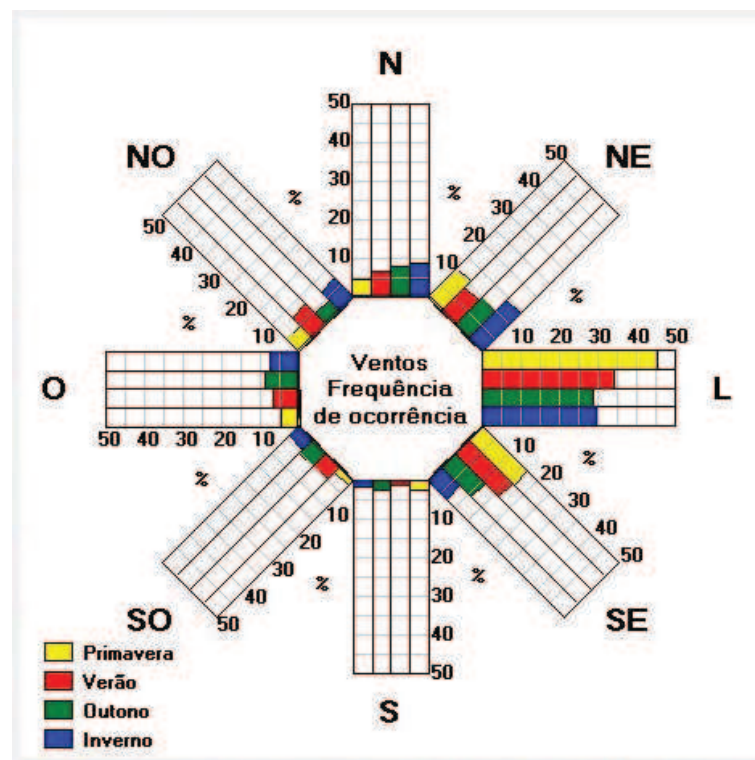


Graph 17: Temperature Chart of the city of Curitiba.

As well as the temperature yearly range, winds are also present in Curitiba, not so much in intensity, but in frequency. The velocity of the winds do not pass the 6m/s range, but are constant nearly all year long, coming mainly from East – from the Atlantic ocean.

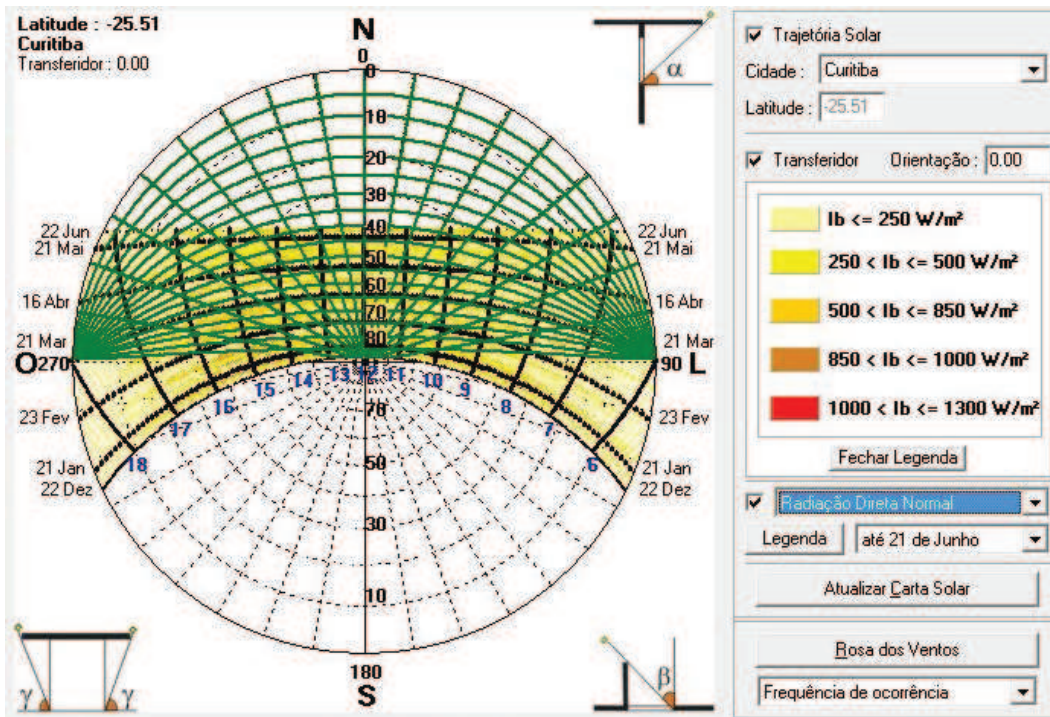


Graph 18: Wind Chart of the city of Curitiba, by velocity throughout the 4 seasons.

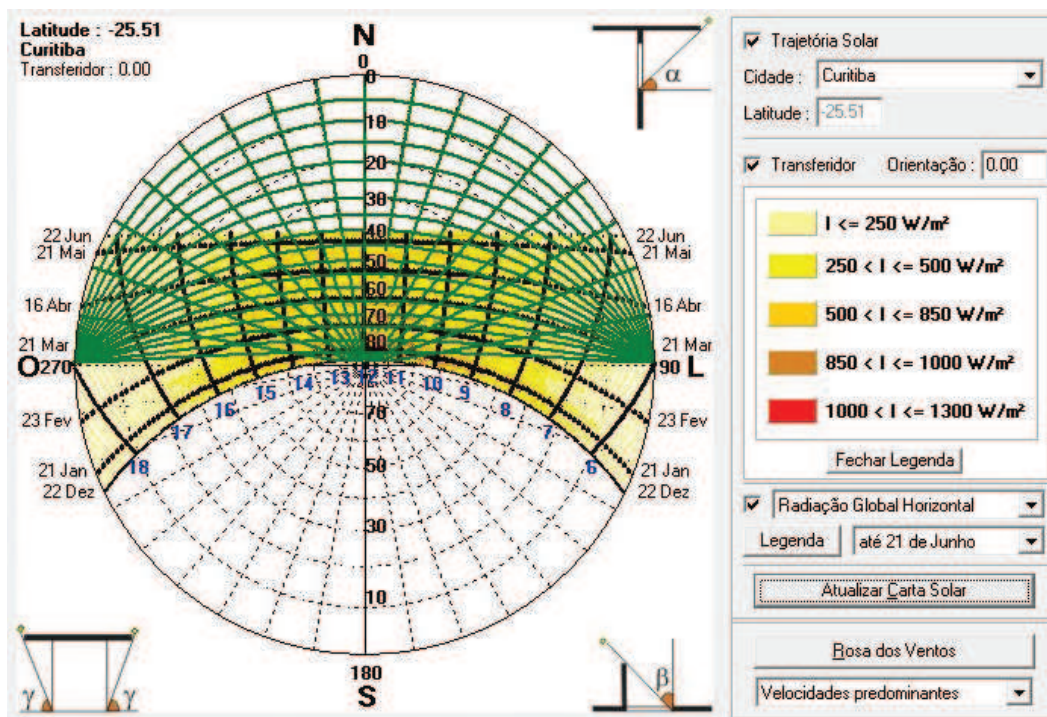


Graph 19: Wind Chart of the city of Curitiba, by frequency throughout the 4 seasons.

Sun radiation charts tells us that Curitiba does not have a high direct sun radiation, being leveled between 250W/m^2 and 850W/m^2 ; and a global horizontal radiation up to 1000W/m^2 .



Graph 20: Direct radiation Chart of the city of Curitiba, by W/m^2 .



Graph 21: Horizontal global radiation Chart of the city of Curitiba, by W/m^2 .

From this analysis is possible to say that Curitiba is a city that is a city considered cold – for the Brazilian average – with temperatures that fall to 0° in winter and up to 35° in summer. It has a steady sun radiation and a sun that is present all year long.

For the fact that sun radiations are not extreme, but there is a considerable change in temperature all through the year, it can be concluded from the analysis that the façade is to be built with a technology that allows comfort for its users all year long.

The transparent material to be used in the façade is insulated glass. Such technology consists of two panes of glass which are separated by a sealed air space. The air cavity allows the façade to lose heat in winter, and cold in summer¹³.



Image 29: Insulated glass.

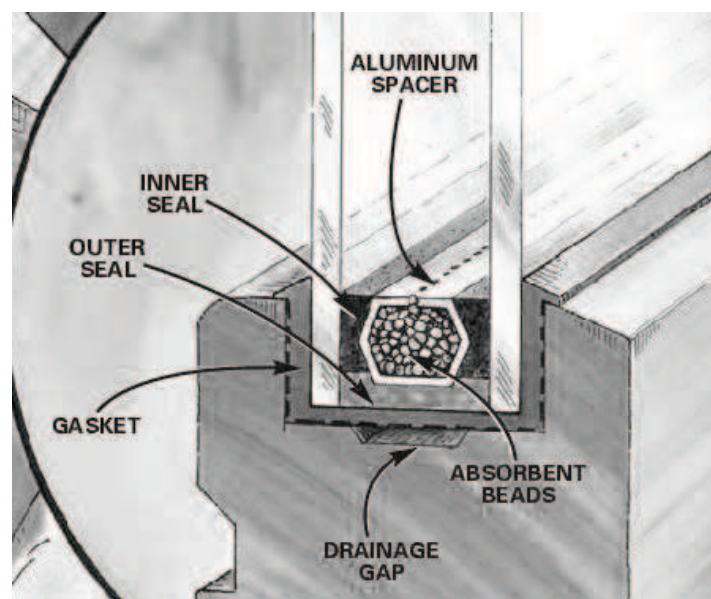


Image 30: Insulated glass detailed section and materials. Credits EverSeal Systems.

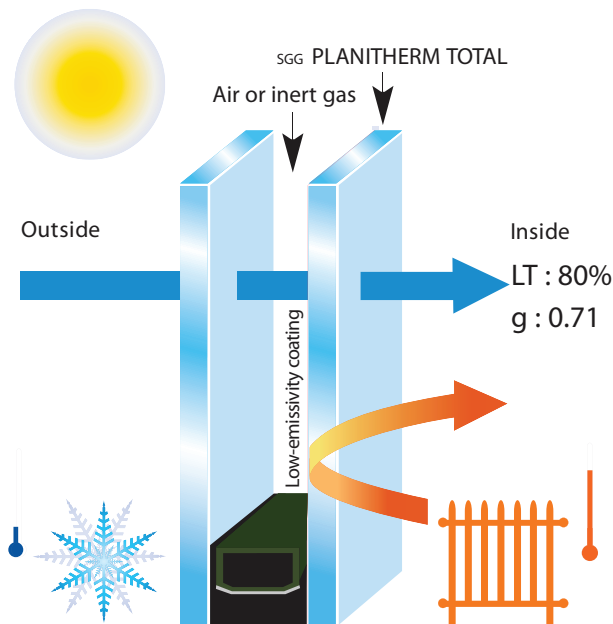


Image 31: **Schematic diagram of the behaviour of insulated glass.** Credits Senator Windows.

The system chosen for the allocation of the façade is the Curtain Wall technology. The advantages of such system are¹⁴:

- Weight 20% - 30% less than traditional systems;
- Space saving of 20cm - 30cm less than traditional systems;
- Time and cost saving due to pre-fabrication;
- More resistant to water and air infiltration;
- Low maintenance requirements.

Although insulated glass is a technology to prevent heat gain issues on the inside of the building, it is not enough. It is also necessary to use natural ventilation strategies to maximize the thermal comfort. Natural ventilation strategies allow the architecture not to suffer from the “sick building” syndrome¹⁵.

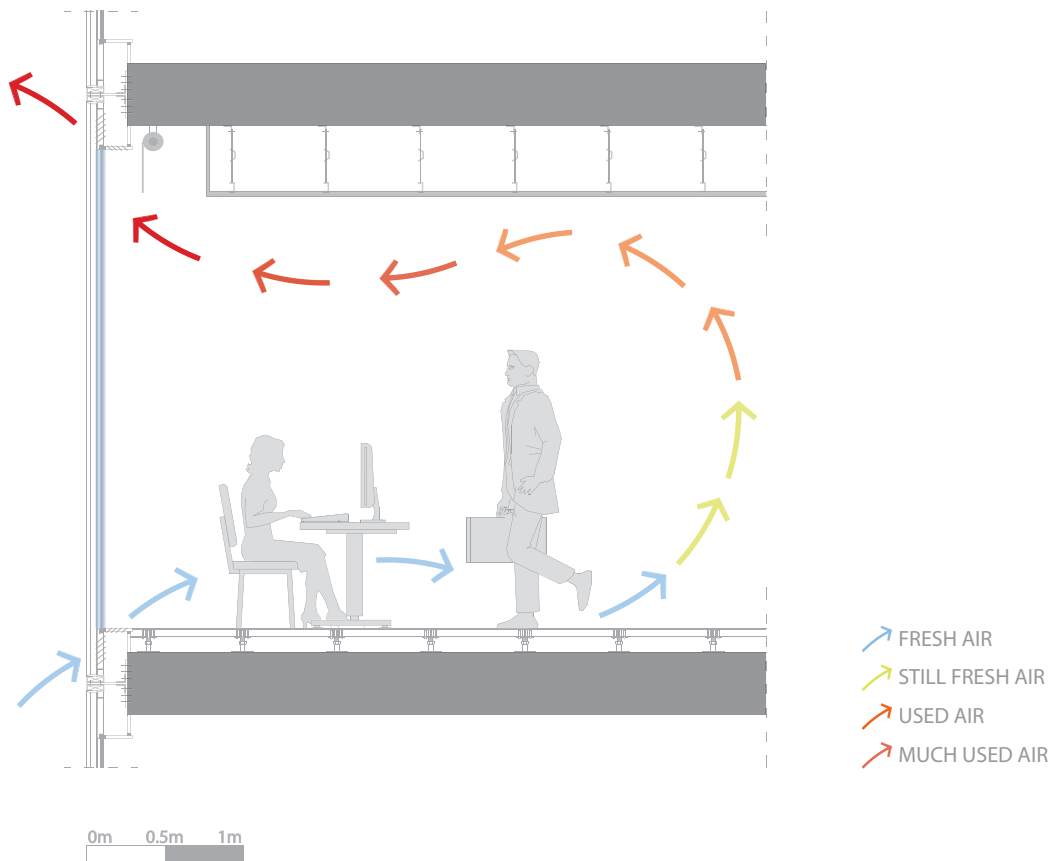
Natural ventilation strategies rely on the nature to, mainly, cool the interior of the building during warm seasons. Since in Curitiba the temperatura is mainly warm - 10 months of the year¹⁶ - such system is indicated.

The system inserts cool air from the lower part of the floor, refreshing is and pushing the warm, used air by the higher part of the floor.

¹⁴ Idem.

¹⁵ Sick building syndrome is an issue that occurs in skyscrapers that do not have openings, being the only source of ventilation Heating and Ventilation Air Conditioning systems. When a person gets sick in those buildings, in a short time many other people also do for breathing the same air without refreshment.

¹⁶ See Graph 17.



Drawing 16: **Section illustrating the air renewal by the natural ventilation system.** Scale indicated.

As reference for the technology used for the natural ventilation system, it is displayed below the images of the system applied on the Stadttor building, in Dusseldorf - Germany. The architect studio responsible for the project is Petzinka Pink and Partner.



Images 32 and 33: **Dusseldorf Stadttor building and its natural ventilation system.**

The air supply and exhaust openings in the external façade are allocated near the ledge, connecting floor and ceiling.

“They are laid out in staggered form from bay to bay to prevent vitiated air extracted on one floor entering the space on the floor immediately above”. (PIORAZIZ, Harris. Double skin façades for office buildings. 2004.)

Another example is the Eurotheum building, located in Frankfurt. The studio that designed it is Novotny Mähner and Associates. The façade type is made by modules of 1335mm wide and 3350mm tall. Each of these units are precast and were allocated *in situ*.

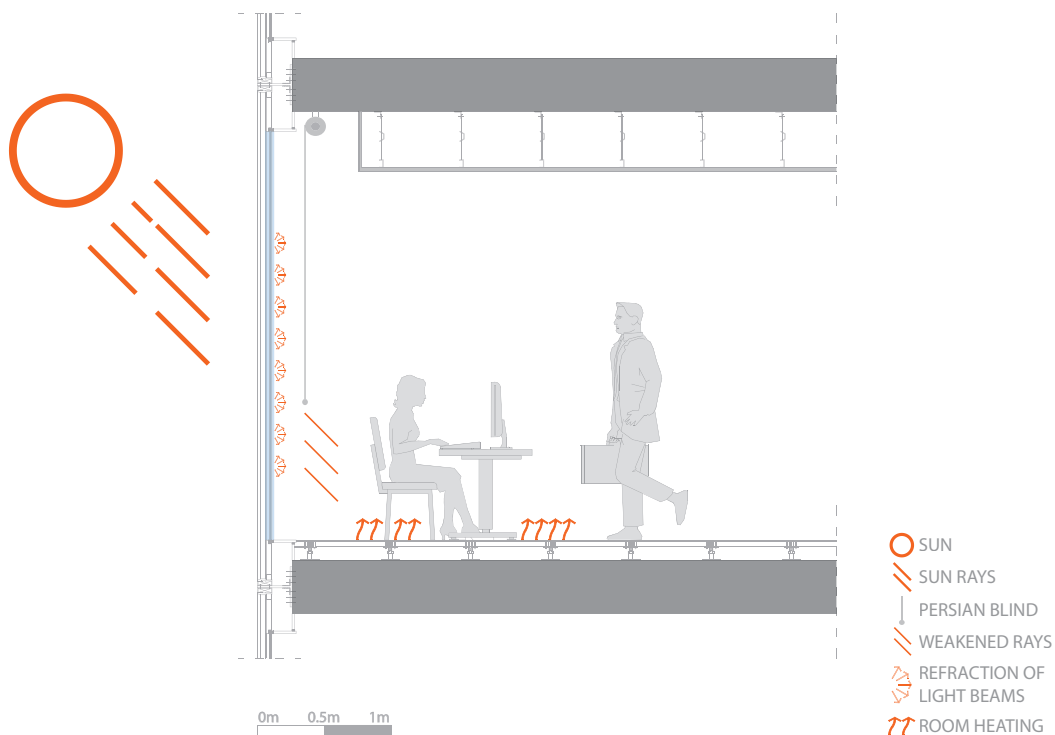
“Fresh air is supplied through 75mm diameter holes in the vertical metal fins on each side of the glazing unit. Warm air is extracted through an exterior opening at the ceiling level. This opening is equipped with louvers to prevent the penetration of rain and is covered with anti-bird mesh”. (PIORAZIZ, Harris. Double skin façades for office buildings. 2004.)

The façade design for this project follows the system designed for the Eurotheum.



Images 34 and 35: Eurotheum office tower and its façade system.

As for the shading device, since the sun in Curitiba does not represent a threat to its inhabitants¹⁷, a venetian or persian blind system is capable of solving possible direct lighting issues.



Drawing 17: Section illustrating the natural lighting system. Scale indicated.

¹⁷ See Graphs 20 and 21.

4.1.3. Volumetric analysis

The volume of the building is based on the modularity placed inside of it. Since the plan is the generator of this project, following the motto of “form follows function”¹⁸, the volumetry of the building shall also follow the same concept.

From the *Books on Architecture* from Vitruvius¹⁹, an architecture must be made by the arrangement of:

- Base;
- Median zone;
- Crowning.

The dimensions of the typical plan are 54m X 24m. On the ground floor these dimensions are reduced to 44m X 14m, an offset of 5m in every direction to accommodate the needs of the floor comfortably and allow the exterior space to be covered by a canopy.

As for the height of the building, it has 162m, disposed in 42 floors - 40 for offices, ground floor and roof. The height is exactly 3 times its width. Such height would make it the tallest building in the whole South of Brazil. The proportion of 3 to 1 is considered visually appealing, with intentions to attract visitors, tourists and potential investors.

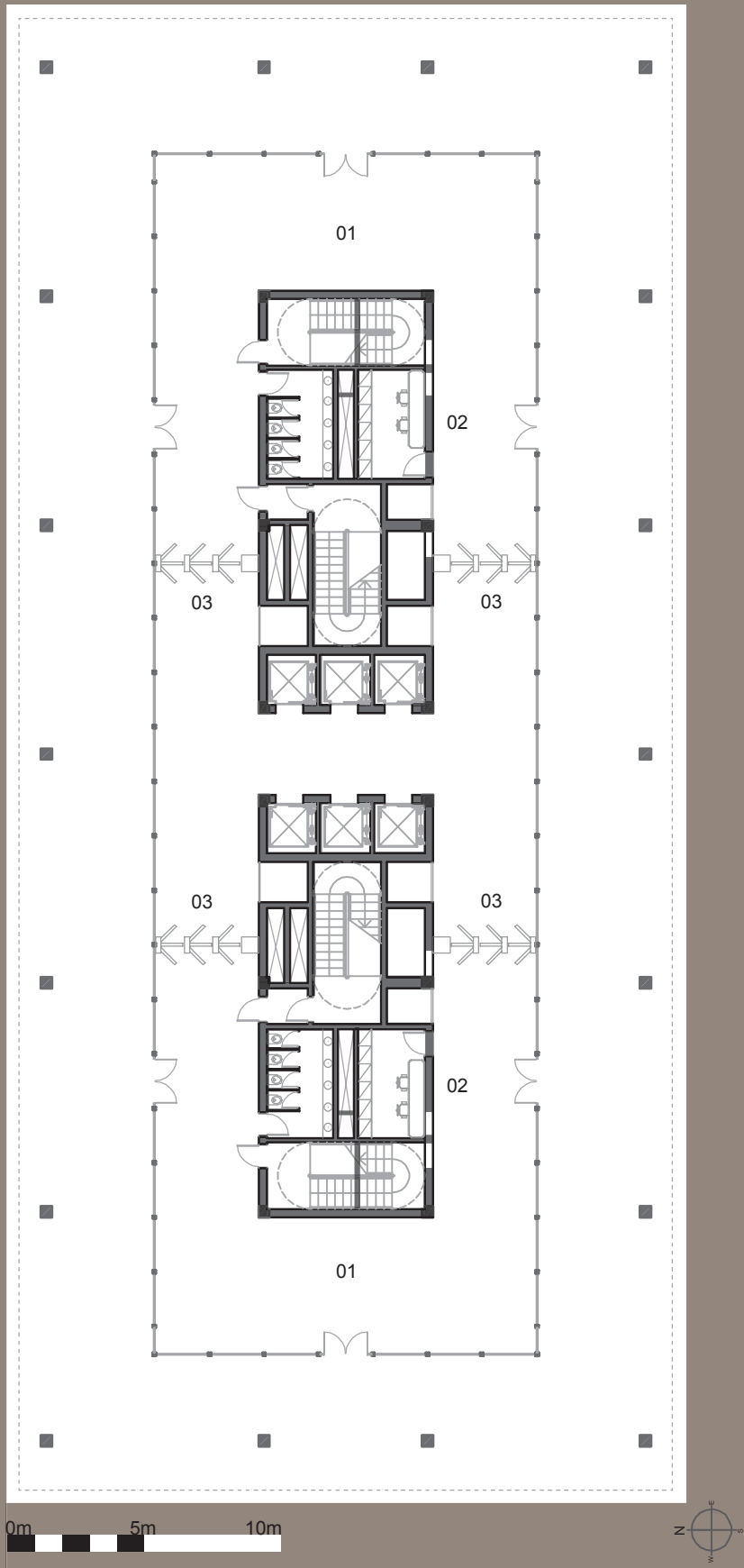
On the top floor the characteristics of the plan are equal to those on the ground floor. Both have also the same height: 5,5m. On the ground floor to make it a grand space; on the top floor to host infra-structural needs, such as the elevator machine room, water deposit, electrical services, etc.

The whole volume of the tower means not to be massive, breaking the whole dimensions of the width, length, height and decorative elements on the façade into multiplications of one dimension: 1,5m.

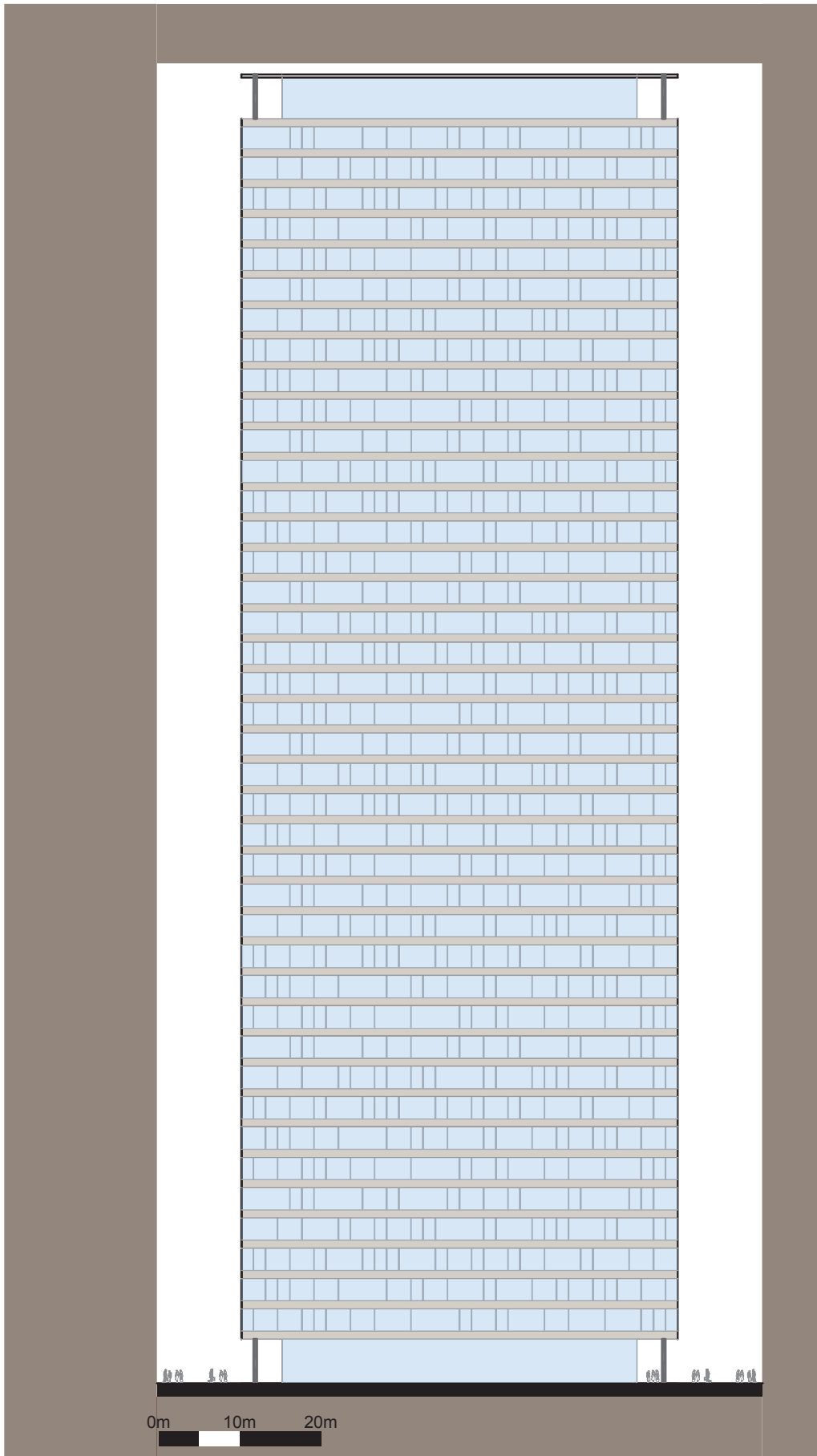
¹⁸ The phrase is from the first modern American architect, Louis Sullivan. **New Jersey Science & Technology University**.

¹⁹ Marcus Vitruvius Pollio. **De Architectura**.

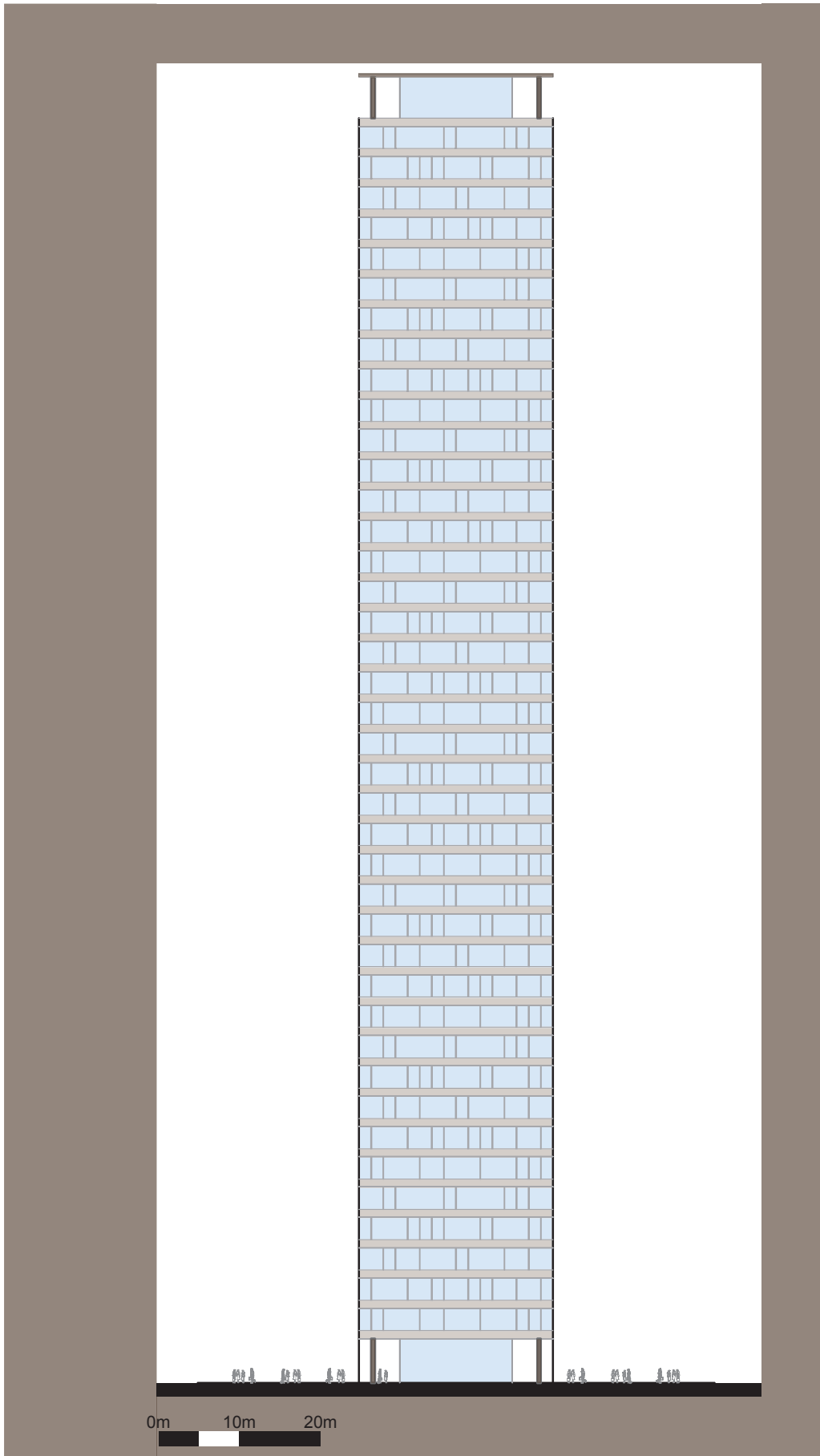
LEGEND:
01. HALL
02. RECEPTION
03. SECURITY



Drawing 18: **Ground floor plan.** Scale 1.250.



Drawing 19: **North - South elevation.** Scale 1.750.



Drawing 20: **East - elevation.** Scale 1.750.

4.1.4. Decorative elements analysis

The façade, despite being of a curtain wall system made by steel and glass, does not aim to be a dull game of continuation of lines from the first floor to the last. Therefore, the module of 1,5m is also applied on the façade, allowing it to be different than plain minimalist approaches. Despite having a movement on its panels, the façade also follows a rhythm, repeating itself every 5 floors. Since the building counts with 40 floors in which the façade system is applied, the rhythm is repeated 8 times.

4.1.5. Scale analysis

For Bruno Zevi²⁰, “scale means ‘dimension in relation to man’, and not “dimension of man”. Having that in mind, the height of the building is also meant to follow the modularity used on the layout of the plan.

Aiming to transcend the modularity from the plan and bring it to the façades and volume of the architecture, the generating dimension of 1,5m X 1,5m can be seen all through the building. The plan has total dimensions of 54m X 24m. The height of each floor, counting the raised floor and low ceiling is of 2,75m; and the whole floor height is of 3,75m. All measures come from the modularity of the generating dimension of 1,5m.



Drawing 21: Section illustrating the use of modularity to design the height of used spaces and total height of each floor. Scale indicated.

20 ZEVI, Bruno. *Saber ver a arquitetura*. 1996; p. 170.

5. FINAL CONSIDERATIONS

When analyzing a country that has been called the “country of the future” for nearly a century, the best way to describe the Brazilian people’s character is by the sociologist Fernando Azevedo²¹, who states that Brazilians are predominantly affective, irrational and mystic.

Such description could be very well placed in Rio de Janeiro in the 1960’s when the people would gather by the sea shore and listen to bossa nova all through the evening. In a world where there is a competition against cities in different continents for international investment on the Real Estate market, it is important to be professional and attractive.

Concerning the Brazilian reality, São Paulo and Rio de Janeiro are already attractive places for the Real Estate sector. In 2009 São Paulo had 6 of the 10 strongest growing main streets in all Americas, being the highest the avenue Alameda Lorena, with 110% growth from 2008²². The European strongest growth on the same period was Rue St. Catharine, in Bordeaux, with nearly 18% growth. On the other hand, São Paulo, which also counts with the most expensive rental space of all Latin America²³, €2.695,00 per square meter/year; is still much cheaper than in Europe. In Milan the same period in Via Monte Napoleone would cost €6.800,00²⁴.

From the opportunities created in Brazil with the Real Estate crisis started in 2008, this research gained a high interest. Not for the fact that Brazil became an attractive place, it has been since the beginning of the 1990’s – as described on the introduction. But, mainly, for other opportunities that the country has to offer to international investors.

Analyzing which are the Brazilian cities that could offer a infra-structure, quality of staff and leisure – all elements asked for businessmen when investing overseas – the idea of Curitiba suddenly comes to mind. A place recognized internationally for its innovative way to solve urban problems, but also a competitor on the city marketing race for investments.

Thus, on the first chapter of the research, it is described the history of Curitiba and from it is possible to understand why it became such a unique place. Not only the will of its mayors resulted in it, but also the will of the people in continue with the same political discourse for nearly 30 years; which allowed many of the project already planned in the end of the 1970’s by the Planning Institute of the city – IPPUC – to be constructed even on the 1990’s.

Therefore, the second chapter is based on the analysis of the present research intended to collect data from Curitiba, city in which it is proposed the allocation of global Real Estate companies and investments; São Paulo, the strongest and most expensive office space in Brazil – in order to have a comparison between cities in the same social, financial, etc. condition; and since city marketing strategies deal with cities in a world

21 BRUAND, Yves. **Arquitetura contemporânea no Brasil**. 1999.

22 CUSHMAN & WAKEFIELD. **Main streets across the World 2009**.

23 Considering not only office spaces.

24 CUSHMAN & WAKEFIELD. **Main streets across the World 2009**.

economy²⁵, the city of Milan, one of the strongest office spaces in the world, has been analyzed.

From the indicators – which analyze broad issues such as quality of staff; city link with other places and internationally; and freedom from pollution – given by the Real Estate consulting company; and also the Human Development Index, indicator of the United Nations to measure the quality of life in cities around the globe, results have been collected from governmental data bases and other credited sources, and have confirmed the initial hypothesis that, on the present moment, the Brazilian cities analyzed are more attractive than the European city.

Thus, since it has been proved the possibility of designing an office tower in Curitiba, the fourth chapter describes the project. Located in the Civic Center of Curitiba, the site is close to the Legislative center – and one of the financial centers – of the city. It is surrounded by office towers, a shopping center, 2 parks and the most visited museum in the South of Brazil. It is also served by a Bus Rapid Transport line, which connects through public transportation the site with all the city, including bus/train stations and airport.

Since there is a higher profit of the office space in pure geometric shapes, the plan of the building has been designed in a rectangular shape.

On the analysis of the layout of the office space, 6 proposals are designed in order to make possible different tenants use the building. Open and closed office layouts have been designed; and in each of those has been drawn proposals for 1, 2 and 4 tenants per floor.

Considering the profit of the workplace, calculations considering the Efficiency Index of the plan, in which the Net Productive Area is divided by the Net Usable Area, have been made. In 4 out of 6 proposals, excluding the ones with 4 tenants per floor, the Efficiency Index has counted with a percentage higher than 80%, which is considered '*excellent*'. On the proposals below 80%, the percentage was of 78%, considered '*good*'. The Density of the Workplace has also been calculated, demonstrating that the open layout have a higher capacity of workers than the closed ones.

Façade systems for natural ventilation and lighting have also been designed, and are intended to minimize costs and not to create "sick building syndrome". The system designed is that of curtain wall, for its rapidness in installation and reduction in costs compared with traditional systems. The transparent part of the façade system is designed in insulated glass, to improve thermal comfort inside the building all year long.

For the design of the plan, façades and total height of floors and building, the measure of 1,5m served as generator dimension. The measure transcends the flooring system and passes on through all the architecture.

As synthesis, it is believed that such project could be built on the site proposed, not only for the location, already, of office towers next to the site proposed, but also for the crescent demand in construction of office towers by internationally renowned Real Estate companies in Brazilian soil.

²⁵ SASSEN, Saskia. **Cities in a world economy**. 2006.

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