

**Systematization of Urban Instruments via SWOT Matrix Analysis: A Study  
of the Master Plans of Araraquara-SP, Brazil**

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#### **ABSTRACT**

This study aims to systematize and analyze the utilization of urban instruments stipulated by the City Statute in the first and second generations of the master plans for Araraquara, a city in São Paulo State, Brazil. We employed a modified SWOT analysis method to systematize information regarding exogenous conditions, which pertain to the regulation of instruments in accordance with federal legislations, and endogenous conditions, which relate to the instruments' implementation by the municipal government. Our findings indicate that Araraquara has yet to fully leverage the potential of the urban instruments outlined by the City Statute, either in their definition or implementation. Moreover, the municipality has shown some maturity, drawing from the experiences of the first-generation master plan. From this vantage point, numerous tools have either not been implemented, inappropriately applied, or undergone decharacterization due to amendments from complementary laws, particularly after the plan's revision in 2014.

**KEYWORDS:** Master plan. Urban instruments. SWOT.

## **1 INTRODUCTION**

Beginning in 1950, Brazil experienced a significant rural-to-urban migration that primarily targeted major capitals. This migratory shift resulted in substantial urban growth and, eventually, the formation of sprawling metropolitan areas, which posed considerable challenges in spatial organization. Consequently, the demand for urban center expansion within the capitalist framework of spatial production led to expansive territories characterized by fragmented urban fabrics and selective socio-spatial segregation (ROLNIK; SOMEKH, 2002).

The Federal Constitution of 1988 introduced an urban agenda designed to empower municipalities, subsequently stimulating the creation of new urban centers. The Constitution designated the municipality as the principal federative unit responsible for the development and execution of urban policies, including the assignment of roles in promoting territorial planning through urban land use management, land subdivision, and occupation. Furthermore, it tasked municipalities with legislating on local interests and, when necessary, complementing federal and state legislation (BRASIL, 1988).

Additionally, the Constitution mandated the master plan as a critical tool for the municipality's local policy development and urban expansion. This included allowing municipalities to leverage their specific territorial and socio-environmental characteristics through urban planning, with the aim of ensuring the well-being of its inhabitants by preserving the social functions of the city (BRASIL, 1988).

After approving the City Statute through Law No. 10.257 of July 10, 2001, municipal administrations adopted the master plan as their primary tool. Hence, urban instruments prescribed in the City Statute guide the objectives and strategies for democratic governance, aiming to fulfill the social functions of the city and property and to promote an equitable urban model (BRASIL, 2001).

Despite some municipalities having employed these tools even before the City Statute, one of the advancements introduced was the possibility for the government to institutionalize a set of instruments to facilitate urban interventions. This allows for a more dynamic and concrete approach to managing urban spaces (DALLARI, 2006). Thus, with the exception of mandatory elements, each municipality has the latitude to define which instruments to include in its master plan. This process involves democratic management mechanisms like public hearings, consultations and conferences, participatory budgets, and urban development

councils (BRASIL, 2001).

After more than twenty years following the City Statute's enforcement, the relevance of undertaking a specific and individualized analysis of master plans and their revisions in each municipality has gained prominence. This is especially true with the aim of assessing the progress of urban policy and the results achieved. The early generations of master plans carried the expectation of refining instruments and evaluating the physical, territorial, or socio-spatial outcomes.

This study aims to systematize and analyze the application of some urban planning instruments specified in the City Statute in the first and second generations of master plans in Araraquara, a Brazilian city in São Paulo.

## 2 METHODOLOGY

To examine the subject matter, we scrutinized the structure of the Araraquara Master Plan for Urban and Environmental Development and Policy (*Plano Diretor de Desenvolvimento e Política Urbana e Ambiental de Araraquara - PDPUA*) of 2005, and the Araraquara Master Plan for Environmental and Development Policy (*Plano Diretor de Desenvolvimento e Política Ambiental de Araraquara - PDDPA*) of 2014. We also considered the complementary laws that amended them and incorporated urban planning instruments from the City Statute in both Master Plans. The objective was to determine which of these instruments the municipality has effectively employed.

For the analysis, we selected three urban planning instruments from Araraquara that demonstrated substantial progress in their implementation. To distill this information, the SWOT strategic analysis methodology was applied. Just as strategic planning marks a transfer of concepts from corporate to urban planning, it is reasonable to adapt other analytical tools to examine municipal urban management (LOPES, 1998; VAINER, 1999).

The SWOT analysis, also known as the SWOT matrix, is a staple in business administration, developed by Harvard Business School professors in the 1960s (LOPES, 1998; VAINER, 1999). It serves to evaluate the impact of an action or product in a straightforward, objective, and constructive manner, wherein guidelines for an action plan are established to mitigate risks and augment the likelihood of success (CHIAVENATO, 2003). Therefore, this analytical method was utilized for Araraquara's urban policy to develop a model that could be replicated in other cities.

The SWOT matrix, known as the FOFA analysis in Portuguese, assesses the competitiveness of a process by considering four variables, as represented by their acronyms in English and Portuguese: Strengths (S)(*Forças*), Opportunities (O)(*Oportunidades*), Weaknesses (W)(*Fraquezas*), and Threats (T)(*Ameaças*).

Unlike studies that address a business environment where internal aspects precede external ones (i.e., from micro to macro), this research focuses on a municipality. To enhance the readability of summary tables, the sequence of the four variables has been inverted: Opportunities (O) and Threats (T) appear in the top row, while Strengths (S) and Weaknesses (W) are situated in the bottom row, thus going from macro to micro. Below, Table 1 illustrates the foundational structure of the inverted SWOT matrix.

Table 1 - Basic synthesis of the inverted SWOT matrix

	OPPORTUNITIES (O)	THREATS (T)
EXOGENOUS CONDITIONS INSTRUMENT FOR THE CITY STATUTE AND OTHER NORMATIVE LEGISLATIONS	What does the City Statute say about the opportunities generated by this instrument? What objectives and expected outcomes are outlined in the City Statute? What is the contribution of this instrument to Brazilian urban policy?	What are the limitations that compromise the full implementation of the instrument?
	STRENGTHS (S)	WEAKNESSES (W)
EXOGENOUS CONDITIONS MUNICIPALITY	How has Araraquara adapted the opportunities provided by the instrument to the local scenario? What characteristics of Araraquara contribute to the application of the instrument?	What does Araraquara present as a limiting factor for implementing the instrument?

Source: Adapted from Medeiros, 2021.

Therefore, opportunities and threats pertain to conditions exogenous to the instrument and are based on the directives of the City Statute and complementary legislations. Data for each quadrant were sourced from primary documents such as federal laws, technical reports, scientific articles, theses, and dissertations. Strengths and Weaknesses relate to conditions endogenous to the city of Araraquara and its instrument application. Data for these quadrants were gathered from the municipality's master plans, complementary laws, specific legislations, municipal decrees, local government and municipal council websites, meeting minutes, theses, and dissertations.

In summary, employing the inverted SWOT matrix aims to aid in analyzing strengths and opportunities to maximize their positive effects while concurrently minimizing weaknesses and threats.

### 3 CHARACTERIZATION OF ARARAQUARA

Araraquara is situated in the Central Administrative Region of São Paulo State, in southeastern Brazil, covering an area of 1,003.63 km<sup>2</sup>. The city has an estimated population of 231,159, yielding a population density of 230.3 individuals per square kilometer (SEADE, 2023). According to the Firjan Municipal Development Index, which evaluates factors such as education, health, employment, and income, Araraquara attained a high consolidated development index of 0.8510 in 2016. This positioned the city 46th in the state and 76th nationally. Araraquara excels in the sectors of Education and Health, with scores of 0.9812 and 0.9253, respectively, while showing moderate development in Employment and Income, evidenced by an index of 0.6465 (FIRJAN, 2018).

Originally spurred by coffee agriculture, the region corresponding to Araraquara witnessed the establishment of a railway in 1885 and gained city status in 1889 (GONÇALVES, 2011). The city began its territorial urban expansion in the 1940s and 1950s. This expansion was marked by a dispersed urban layout and speculative land subdivision designed to create urban voids that would subsequently serve as reserves of urban land. From 1945 onward, the municipal government controlled new land subdivisions by setting regulation and oversight criteria, although this did not deter the creation of subdivisions beyond the existing urban boundaries (CINTRÃO, 2004).

The phenomenon of horizontal urban sprawl was accentuated between 1975 and 1980, primarily due to a high number of approved land subdivisions. Interestingly, the properties resulting from these subdivisions grew disproportionately compared to the population increase.

In effect, considerable urban voids appeared, interspersed between the pre-existing urban structure and the newly approved subdivisions (CINTRÃO, 2004). Between the years 1950 and 2000, a total of 245 subdivisions received approval, with nearly 45% of them sanctioned between 1970 and 1980 (GONÇALVES, 2010).

Several events during the 1980s and 1990s, including an economic downturn, had a tangible impact on the city's urban structure, especially when assessed in relation to Araraquara's standing within its microregion (GONÇALVES, 2010). This trend persisted from 2000 to 2010, when the urban area doubled relative to the municipality's landmass, even as the population only expanded by 14% (BALESTRINI, 2016).

The dynamics of land occupation in Araraquara brought challenges for the development of its Master Plans after the City Statute. The PDPUA originated from a democratic and participatory process that commenced in 2001 and was approved in October 2005 after public hearings and consultations with civil society. The inclusion of "Environmental" in its title underscores the significance accorded to environmental and water resource considerations in the plan's directives. An attempt to revise the plan in 2009 was halted by the Public Prosecutor, citing a lack of sufficient public engagement to validate the revision (ARARAQUARA, 2011).

In 2014, the PDDPA was ratified as an outcome of the revision process for the PDPUA. Launched in 2010, this updated plan retained the PDPUA's environmental focus while revising its guidelines and objectives after eight years of application. It also integrated new demands and suggestions from the citizenry.

To facilitate the analysis of urban management, a review of the planning instruments included in both master plans was conducted. The findings are arranged in the subsequent comparative table, which emphasizes the referential points in the master plans and delineates the various zones in the attached maps.

Table 2 - Urban instruments in Araraquara's master plans of 2005 and 2014

Instrument	PDPUA 2005	Delimited area	PDDPA 2014	Delimited area
Compulsory Parceling, Building or Utilization; Progressive Property Tax over Time, and Expropriation with Payment in Bonds ( <i>Parcelamento, Edificação ou Utilização Compulsórias, IPTU Progressivo e Desapropriação com Pagamento em Títulos</i> )	Ch. III Sect. II e III	Maps 6 and 14B Annex XII	Ch. III Sect. II e III	Map 14
Surface Right ( <i>Direito de Superfície</i> )	Ch. III Sect. IV	-	Ch. III Sect. IV	-
Pre-emptive Right ( <i>Direito de Preempção</i> )	Ch. III Sect. V	Maps 3 and 14A, Annex V	Ch. III Sect. V	Map 14
Charge for Development Right and Change use ( <i>Outorga Onerosa do Direito de Construir e de Alteração de Uso</i> )	Ch. III Sect. VI	Map 13	Ch. III Sect. VI	Map 14
Transferable Development Right ( <i>Transferência do Direito de Construir</i> )	Ch. III Sect. VII	-	Ch. III Sect. VIII	-
Special Areas for Urban Intervention ( <i>Áreas Especiais de Intervenção Urbana</i> )	Ch. III Sect. VIII	Maps 2,3,5,7 and 8, Annex VI	Ch. III Sect. VIII	Maps 2, 3, 7 e 8
Special Urban Operation ( <i>Operação Urbana Consorciada</i> )	Ch. III Sect. IX	Art. 111, Map 6, Annex XII	Ch. III Sect. VII	Art. 124
Property Consortium ( <i>Consórcio Imobiliário</i> )	Ch. III Sect. X	-	Ch. III Sect. X	-
Special Zones of Social Interest ( <i>Zonas Especiais de Interesse Social</i> )	Art. 172	Maps 6 and 14A, Annex XII	Ch. III Sect. XII	Map 6

Neighborhood Impact Study (Relatório de Impacto Ambiental e de Viabilidade Urbanística)	Ch. IV Sect. I	-	Ch. IV Sect. I	-
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Source: Adapted from Araraquara (2005, 2014a).

Three instruments were selected for analysis based on the content outlined in the PDPUA and PDDPA. The analysis examined advancements in implementation in Araraquara and the potentialities and limitations of the application process, considering the strengths and weaknesses. These instruments are Compulsory Parceling, Building or Utilization (*Parcelamento, Edificação ou Utilização Compulsórios* – PEUC), Neighborhood Impact Study (*Estudo de Impacto de Vizinhança* – EIV), and Charge of Development Right (*Outorga Onerosa do Direito de Construir* – OODC).

## 4 RESULTS AND DISCUSSION

### 4.1 Urban planning instruments: the PEUC

The presence of vacant or idle land within urban boundaries, maintained for future valuation benefiting solely the landowners, diminishes the availability of areas for housing and key economic activities vital for societal development. This is particularly detrimental for economically vulnerable groups. Such a situation also results in underutilizing existing urban infrastructure and service resources (CARVALHO; ROSSBACH, 2010).

To address these urban voids' persistence and maximize public investments' efficiency, the City Statute prescribes the local public authority's responsibility to enact specific legislation. This legislation mandates Compulsory Parceling (or subdivision), Building, or Utilization of undeveloped, underutilized, or unused lands. These requirements align with the master plan, define the area to which they apply, and stipulate the conditions and time frames for their execution (BRASIL, 2001).

Consequently, federal law positions the PEUC as a pivotal instrument for municipalities strategically managing urban development. The local government is to identify priority areas for development that meet the criteria for urbanization, conform to land use as per local urban planning guidelines, and are suitably equipped with the necessary infrastructure. Furthermore, these areas must have a demonstrable demand for development (MONTEIRO, 2006). Table 3 enumerates the opportunities and threats associated with the PEUC instrument and the strengths and weaknesses tied to its implementation in the municipality of Araraquara.

Table 3 - Synthesis of the inverted SWOT matrix for the PEUC

	OPPORTUNITIES (O)	THREATS (T)
PEUC	O1. It enables the optimization of public investment resources (CARVALHO; ROSSBACH, 2010); O2. It prevents the speculative retention of real estate (DENALDI et al., 2015b); O3. Promoting the occupation of abandoned properties, especially in central areas (COSTA; SANTORO, 2019); O4. Revitalizing abandoned areas for residential use (COSTA; SANTORO, 2019); O5. It slows down real estate speculation (DENALDI et al., 2015b); O6. Inducing the occupation of priority	T1. It requires an updated land registration system (DENALDI et al., 2015b); T2. The municipality must have an adequate monitoring and collection system (DENALDI et al., 2017); T3. The Federal Senate has yet to approve the possibility of issuing payments in public debt securities (Resolution no. 43/2001); T4. The inability of the real estate market to absorb (DENALDI et al., 2015b); T5. Applicable only to speculative urban voids that have the available infrastructure (DENALDI et al., 2015a);

	areas (DENALDI et al., 2017); O7. Controlling the process of urban expansion and development (DENALDI et al., 2015a); . Expanding access to urbanized areas; O9. The minimum content of the master plan (BRASIL, 2001).	T6. Requires prior definition in the PD of zones subject to application and property characteristics (e.g., minimum footage, the existence of improvements, etc.) (DENALDI et al., 2015a).
	STRENGTHS (S)	WEAKNESSES (W)
ARARAQUARA	S1. Delimited areas in different regions of the city (MAP 14B and MAP 14) (ARARAQUARA, 2005; ARARAQUARA, 2014a); S2. Land values updated through the Revision of the Property Assessment Schedule (Complementary Law No. 882/2017); S3. The existence of several academic studies on the history of the speculative process of urban land in Araraquara: BALESTRINI (2016), CINTRÃO (2004), GONÇALVES (2010), MENZORI (2018), PERES (2012), and PIERINI (2020).	W1. Alteration and reduction between the delimited areas in the PDPUA (2005) and the PDDPA (2014); W2. Incorrect demarcation of an environmentally fragile area: in 2014, a plot was demarcated near the water collection dam; W3. In the PDPUA (2005), only 2 out of 19 of the delimited areas are outside the Compact City and Priority Occupation Area; W4. In the PDDPA (2014), only 5 out of 15 of the delimited areas fall within the Compact City and Priority Occupation Area; W5. Lack of real estate dynamics and interest from the real estate market in occupying the delimited areas in the master plans.

Source: Adapted from Medeiros, 2021.

The content of the articles discussing the PEUC in both master plans is similar to the text found in the City Statute. Despite this alignment, no regulation was enacted through a specific law until the plan's revision, and the process of notifying properties had yet to commence. During this revision period, the areas earmarked for PEUC application in Map 14B of the PDPUA (2005) were reduced and later presented in Map 14 of the PDDPA (2014). This led to the conclusion that implementing the PEUC effectively reduced the scope of urban intervention and demarcation areas.

It is important to highlight the potential impact on land values in Araraquara due to the update of the Property Assessment Schedule (*Planta Genérica de Valores*), as per Complementary Law No. 882, dated December 6, 2017. The last update took place in 2006, and it was necessary to rectify distortions in the fiscal value of properties and address tax disparities. Moreover, changes in the real estate landscape, such as the construction of multiple gated communities and ventures, have polarized neighborhood values.

Property values were higher in the historic downtown area and along the urban perimeter, fueled by new investments in gated communities. The area designated as a Priority Occupation Area by the master plans of Araraquara is the zone between these two high-value regions, where the taxable value remains moderate. In the city's northern part, rising property values are attributed to a dynamic process of expansion and development marked by large housing complexes and subdivisions (ARARAQUARA, 2017; MENZORI, 2018).

Despite these developments, the lack of effective implementation of the PEUC and its subsequent versions in Araraquara has led to the persistence of urban voids. If the PEUC had been implemented following the PDPUA in 2005, an increase in the Urban Property Tax rate would have served as a deterrent to the cycle of real estate speculation and uncontrolled growth in urban land stock.

#### 4.3 Urban planning instruments: the EIV

The Neighborhood Impact Study is a tool for analyzing and assessing the negative and positive consequences of introducing new developments and activities, whether public or private, in urban areas. Acquiring a construction, expansion, or operation permit necessitates the completion of an EIV, as mandated by municipal law (BRASIL, 2001). Besides the interaction between the municipality and the property owner undertaking the development, each alteration in the utilization of a specific urban parcel influences its immediate surroundings and the broader urban dynamics.

As specified in Article 37 of the City Statute, the EIV should address a range of factors, at the minimum. These include population density, urban and community infrastructure, land use and occupancy, real estate valuation, traffic and public transportation demands, ventilation and lighting, urban landscape, and natural and cultural heritage preservation. This instrument is invaluable for the diagnostic assessment of developments, directing public policy decisions, facilitating civil society participation, and ensuring the transparency of the documents that constitute the EIV.

The EIV documentation can either lead to the approval or rejection of the proposed development or activity, and it often sets specific conditions and charges for its execution. These compensatory measures can vary based on the type and scale of the impact. For instance, the EIV might stipulate requirements like designated green areas or community facilities in high-density populations. Additionally, the EIV can propose alterations to the project, such as increasing parking availability, reducing the built-up area, earmarking green spaces, or regulating advertising spaces (ROLNIK; SAULE JUNIOR, 2001).

It is crucial to note the challenges concerning the Public Authority’s legitimacy in requiring mitigative and compensatory actions for developments that already adhere to existing zoning and land use regulations. The EIV aims to ensure balanced territorial occupation by evaluating land use and occupancy and verifying their compatibility with the existing zoning regulations and the master plan. Given the trend of increasing density in mixed-use zones coupled with overburdened infrastructure, the EIV emerges as a strategic tool for scrutinizing these complexities (SCHVASRBERG et al., 2016).

Table 4 - Synthesis of the inverted SWOT matrix for the EIV

	OPPORTUNITIES (O)	THREATS (T)
EIV	O1. Social participation in the authorization of projects (BRASIL, 2001); O2. Support tool in the urban licensing process (BRASIL, 2001); O3. The possibility of predicting the impact before the project is executed (BRASIL, 2001); O4. Publicizing the reports for popular consultation (BRASIL, 2001).	T1. The inability of the municipality to monitor compliance with mitigation measures (SCHVASRBERG et al., 2016); T2. Lack of publicity of the reports for civil society; T3. Lack of prior definition of the types of development required for the EIV, with management policies being responsible for this decision (SCHVASRBERG et al., 2016); T4. Lack of training for the municipality’s technical team (ROLNIK; SAULE JR., 2001).
	STRENGTHS (S)	WEAKNESSES (W)
ARARAQUARA	S1. Both master plans contain the minimum content required by the City Statute; S2. Establishment of GAPROARA in Normative Act 002/2006; S3. Complementary Law No. 919/2019 requires EIV for residential subdivisions and vertical and horizontal condominiums; S4. Procedure for municipality licensing projects;	W1. Unapproved bill regulating the EIV; W2. Missing annex with EIV requirements in PDDPA (2014), but added later by Law No. 858/2014 W3. Oscillation in the performance of GAPROARA. Later instituted by Laws No. 9.714/2019 and No. 10.252/2021;



	S5. A guideline template on the municipality website; S6. Creation of the Municipal Urban Development Fund by Law No. 9.059/2017.	W4. Lack of transparency about information and publishing reports on the municipality website.
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Source: Adapted from Medeiros, 2021.

Ordinary Law No. 6045, enacted on September 4, 2003, laid the foundation for the Municipal Urban Development Fund of Araraquara (*Fundo Municipal de Desenvolvimento Urbano de Araraquara* — FUMDU). This law underwent amendments through Ordinary Law No. 7727 on June 20, 2010, and was further revised by Ordinary Law No. 9059 on August 31, 2017. According to clause II of Article 9, the FUMDU is designated to receive funds and revenue generated from Neighborhood Impact Studies, Traffic Generator Poles, and Charges of Development Rights. Nonetheless, there is an absence of transparent information concerning the allocation, monitoring, and utilization of revenues collected by FUMDU, an issue paralleled by the Municipal Traffic Fund (*Fundo Municipal de Trânsito*) as evidenced on the Transparency Portal.

Law No. 5831, issued on June 5, 2002, introduced a significant shift in the urban policy of Araraquara by instituting the Municipal Council of Planning and Urban Environmental Policy (*Conselho Municipal de Planejamento e Política Urbana Ambiental*). Its duties include reviewing Neighborhood Impact Studies and other urban planning control instruments stipulated in the City Statute. The Araraquara Project Analysis and Approval and Urban Planning Guidelines Group (*Grupo de Análise e Aprovação de Projetos e Diretrizes Urbanísticas de Araraquara* — GRAPROARA) is vested with the authority to deliberate on EIV and OODC applications within the municipality. This group recently underwent restructuring via Ordinary Law No. 10,252, dated July 1, 2021, leading to the formation of a multidisciplinary technical team.

A guideline template for drafting the EIV is accessible on the municipal website. The parameters scrutinized in this template encompass the identification of the property owner, a detailed characterization of the development, including the number of employees, zoning classification, and the level of interference as per the PDDPA (2014). The template also characterizes the construction in terms of building height, permeability rate, total developed area, and the surrounding context delineated through road system maps and land use and occupation status. This report template is a comprehensive and practical guide for determining the scale of generated impacts and quantifying the requisite mitigative and/or compensatory actions.

However, there remains a significant gap in disseminating reports and compensations approved by the municipality and carried out by property owners. The recent reorganization and strengthening of the GRAPROARA team indicate a commitment from the local administration to fortify the technical committee responsible for the licensing processes aligned with current urban and environmental regulations.

#### 4.4 Urban planning instruments: the OODC

The Charge of Development Right (*Outorga Onerosa do Direito de Construir - OODC*) is an urban development tool stipulated in Articles 28–31 of the City Statute. The dialogue surrounding the OODC in Brazil originated in conjunction with discussions about the concept of “Solo Criado” (Created Land), especially prevalent during the “*Seminário sobre o Solo Criado*”

held in 1976, organized by the São Paulo-based Center for Municipal Administration Research (*Centro de Pesquisa da Administração Municipal*) (FURTADO; BIASOTTO; MALERONKA, 2012; FURTADO; RABELLO; BACELLAR, 2017).

The culmination of this seminar was the Carta de Embu, a document generated through intensive technical dialogues among urban planners and legal experts. “*Solo Criado*” refers to the built-up area in a construction that surpasses the available land area. In simpler terms, local authorities grant the right to additional construction indices by setting a basic floor area ratio (FAR), which serves as a uniform standard for all urban plots. This helps to equalize opportunities for urban development among different property owners (FURTADO; RABELLO; BACELLAR, 2017; ROLNIK; SAULE JUNIOR, 2001).

The City Statute unambiguously sets forth the legal duties of municipalities with regard to implementing the OODC. According to Article 28 of the City Statute, the master plan is responsible for identifying specific urban zones where building rights can be exercised for a fee, setting obligations for the benefiting party. In this process, it is crucial to consider existing infrastructure and the level of occupancy created in the designated area (BRASIL, 2001). The opportunities and threats linked to the OODC and the strengths and weaknesses tied to its deployment in the municipality of Araraquara are detailed in Table 5 below.

Table 5 - Synthesis of the inverted SWOT matrix for the OODC

	OPPORTUNITIES (O)	THREATS (T)
OODC/OOAU	O1. It enables regulation of the urban land market (ROLNIK; SAULE JUNIOR, 2001); O2. The resources from charges are applied to specific uses in categories predefined in the MP (BRASIL, 2001); O3. It makes it possible to raise funds for investment in poorer areas other than the project generating the funds (FURTADO; BIASOTTO; MALERONKA, 2012); O4. Greater control of urban density (FURTADO; BIASOTTO; MALERONKA, 2012); O5. It allows for slowing real estate speculation (ROLNIK; SAULE JUNIOR, 2001).	T1. Dependence on prior diagnosis to avoid encouraging the expansion of building potential in areas that do not support the proposed density (BRASIL, 2001); T2. It requires an analysis and control structure formalized in a specific law (BRASIL, 2001); T3. Deviation from the application of the instrument in the interest of collection rather than urban planning (FURTADO; BIASOTTO; MALERONKA, 2012); T4. Promoting building density does not imply population density (ROLNIK; SAULE JUNIOR, 2001).
	STRENGTHS (S)	WEAKNESSES (W)
ARARAQUARA	S1. Enforcement carried out directly by the urban licensing sector through rules and decrees instituted by COMPUA/Municipality (FALCOSKI, 2013); S2. Regulated OODC by Decree No. 10.358/2013, Law No. 852/2014, Law No. 858/2014, Law No. 8.229/2014; S3. Regulation of the FUMDU by Laws No. 6045/2003, No. 7727/2010, No. 9059/2017; S4. Planning routine with successive regulated master plans; S5. Existence of a historical process of urban land speculation and urban voids; S6. Law No. 901/2019 regulated the Land Use Change in rural areas.	W1. A total absence of information on the municipality website about OODC transactions; W2. Lack of information on the municipality website about the submitted projects and approved conditions, financial value, or compensation defined; W3. There is a lack of transparency regarding the allocation and use of FUMDU funds; W4. Pending revision of the PD to update the zones subject to expansion of building potential.

Source: Adapted from Medeiros, 2021.

Articles 201–204 of the PDPUA (2005) and 165–168 of the PDDPA (2014) delineate the OODC, the change of land use, and the utilization of the subsurface and airspace. Paragraph 3 of Article 202 of the PDPUA (2005) outlines the method for calculating the stock of development

rights subject to OODC. The focus is on fostering a compact urban development model, taking into account the existing regional infrastructure .

Art. 202 [...]§ 3º The method for calculating the building stock that can be granted by the Executive Power to entrepreneurial agents must consider at least the following elements:

I - Urban density standard of 600 inhabitants per hectare, or 170 economies per hectare, by zones or Neighborhood Planning (RPB), as spatial units of neighborhood and urban structuring, considering a benchmark standard of sustainable urban development, compact city and performance of the installed capacity of urban infrastructure;

II - Considering 1 (one) economy equivalent to 3.5 inhabitants;

III - Net land area per economy equal to 125 m<sup>2</sup> (square meters);

IV - Corrected and average Floor Area Ratio, practiced by private enterprises in the central and intermediate urban structure of the city, equal to 1.5;

V - Considering the urban block of 1 ha (one hectare) or 10,000 m<sup>2</sup> (ten thousand square meters) as a referential net area of private land, as a spatial unit of performance for gauging the relationship between density and soil buildability;

VI - Calculation of the Reference Floor Area Ratio by RPB - Neighborhood Planning Region:  $IAR = 170 \text{ eco/ha} \times 125 \text{ m}^2 \times 1.5 / 10000 = 3.0$  (ARARAQUARA, 2005).

The OODC has been incorporated into urban planning culture with its implementation in the successive Master Plans regulated in the post-City Statute period. Its application is carried out directly by the urban planning licensing sector, through practices and is managed by the Municipal Council for Urban and Environmental Planning and Policy and the municipality of Araraquara.

Alongside the approval of the PDDPA (2014), the supplementary Law No. 852 of February 11, 2014, which regulates the application of OODC in Araraquara, was enacted. According to Article 3 of this law, the regulatory charge required for the grant of the OODC is calculated using the following formula:

$$VOODC = FP \times ALote \times VVm^2 \times (IAProjetado - IAB)$$

In which:

VOODC = Value of Charge of Development Right

FP – Planning Factor

ALote – Land area

VVm<sup>2</sup> - Property Value per square meter

IAB – Basic Floor Area Ratio

IAProjetado – Floor Area Ratio of land use (ARARAQUARA, 2014b).

The formula for calculating the OODC's regulatory charge illustrates that it is directly proportional to the Planning Factor (FP). In essence, a higher FP results in a more significant regulatory charge.

Decree No. 11,955, enacted on May 14, 2019, initiated the latest amendment to the FP values. This revision led to a decrease in FP for certain special urban zones to priority occupation, now ranging between 0.2 and 0.6, as opposed to the previous range of 0.5 to 1.0. This adjustment encourages property owners in these zones to utilize the maximum FAR at a reduced charge, thereby promoting development in these areas.

Complementary Law No. 901, dated February 27, 2019, regulates the conversion of rural lands for urban objectives, specifically for creating recreational farm communities. Article 27 of this law underscores the regulation governing Change of Land Use (*Outorga Onerosa de Alteração de Uso do Solo*). The law specifies that the percentage of land value appreciation increases in tandem with the distance from the urban center, with the increase calculated in

radial ranges between 3, 6, 9, and 12 km. This stratagem aims to inhibit urban sprawl by imposing higher charges on property owners who opt for more distant, lower-density locations, as seen in the case of recreational farms.

However, despite the widespread use of the OODC as a planning tool in Araraquara, there remains a pressing need for enhanced transparency in its application. Currently, the municipal website lacks comprehensive information on various aspects such as transactions, revenue collection, fund allocation from the FUMDU towards public works, and the conditions under which projects have been approved. This absence of transparent data undermines public understanding and complicates the assessment of the OODC's effectiveness within the municipality.

## **5 CONCLUSIONS**

The municipality of Araraquara has made strides in utilizing urban planning instruments outlined in the City Statute, although it has yet to fully harness their potential in both conceptualization and execution. This developmental phase is informed largely by the experiences drawn from the PDPUA (2005). It is noteworthy that several of these tools have either not been implemented, were inadequately applied, or were subject to changes due to supplementary laws enacted after the plan's 2014 revision. The revision failed to offer an occasion to reevaluate the city's urban development or to adjust the existing planning tools. Likewise, it did not lead to a critical examination of the progress and challenges faced in deploying these instruments.

To enhance governance, the municipal administration should improve transparency regarding the revenues accrued from these planning instruments and utilizing municipal funds. Communicating this data to the public can foster a better understanding of these mechanisms and their communal advantages, potentially boosting citizen participation in Public Hearings and Municipal Conferences.

For this study, a SWOT analysis was beneficial in facilitating discussions about the adoption and practical application of urban instruments contained in the City Statute and the latest two iterations of the Araraquara master plan.

The study evaluated three tools deemed to be implementable, given the specific circumstances of the municipality. However, it is crucial to highlight the need for a comprehensive review of all other instruments outlined in the master plan. In the forthcoming update to the Araraquara master plan, the following aspects warrant close attention:

- Elaboration of the multipurpose land registration system for PEUC applicability;
- Facilitating more inclusive dialogues while curbing the influence of unilateral interests, particularly from the real estate sector, as seen in the case of PEUC;
- Reevaluation of the maximum floor area ratio for each zone affected by the OODC;
- Fine-tuning the criteria for existing instruments integrated into the municipality's project licensing procedures. This encompasses the OODC and EIV and entails revising areas subject to increased building potential, enhancing transparency in reporting information, and clearer accounting of revenues and compensatory public works undertaken.

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