

ACCESSIBILITY AS A CRITICAL FACTOR OF URBAN GROWTH IN AMAZON – BRAZIL: AN APPLICATION OF PLAN-PROCESS THEORY LOURENÇO’S MODEL

A acessibilidade como um fator crítico do crescimento urbano na Amazônia – Brasil: uma aplicação do Modelo de Lourenço da Teoria do Plano-Processo

La accesibilidad como un factor crítico del crecimiento urbano en la Amazonia - Brasil: una aplicación del modelo de Lourenço de la Teoría del Plan-Proceso

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Abstract

Urban growth analysis and territorial plans made by different levels of government in the Amazon brings Santarém as urban center of reference, with strategic location. The evaluation of plans developed in this article is an application of Plan-Process Theory Lourenço’s Model, which deals the implementation of plans between the phases of decision-making and the acts of investment. The methodology starts from the historical analysis of urban development determinants, from the perspective of plans implemented in the place, highlighting the critical factors of results from these planning actions. Among the key findings, lack of planning policies for local needs, absence of problems such as social inequality and poor accessibility. Therefore, system innovation for a modal network does not yet reflect, through the plans, as an opportunity to improve accessibility in the urban areas of the Amazon.

Keywords: Transport Policy. Planning. Urban Growth. Plan-Process. Accessibility.

Resumo

A análise do crescimento urbano e os planos territoriais feitos por diferentes níveis de governo na Amazônia traz a cidade de Santarém como um centro urbano de referência, de localização estratégica. A avaliação de planos desenvolvida neste artigo é uma aplicação do modelo de Lourenço, da Teoria do Plano-Processo, que trata da implementação de planos entre as fases de tomada de decisões e os atos de investimento. A metodologia parte da análise histórica de fatores determinantes do desenvolvimento urbano, na perspectiva dos planos implementados no local, destacando os fatores críticos dos resultados dessas ações de planejamento. Entre as principais descobertas do estudo de caso, a falta de políticas de planejamento para as necessidades locais; a ausência de solução de problemas como a desigualdade social e acessibilidade ruim. Portanto, a inovação de sistemas para uma rede modal não reflete ainda, através dos planos, como uma oportunidade para melhorar a acessibilidade nas áreas urbanas da Amazônia.

Palavras-chave: Política de Transporte. Planejamento. Crescimento urbano. Plano-Processo. Acessibilidade.

Resumen

El análisis del crecimiento urbano y los planes territoriales hechos por diferentes niveles de gobierno en la Amazonia trae la ciudad de Santarém como un centro urbano de referencia, de localización estratégica. La evaluación de planes desarrollada en este artículo es una aplicación del modelo de Lourenço da Teoría del Plan-Proceso, que trata de la implementación de planes entre las fases de toma de decisiones y los actos de inversión. La metodología parte del análisis histórico de los factores determinantes del desarrollo urbano, en la perspectiva de los planes implementados en el local, destacando los factores críticos de los resultados de esas acciones de planificación. Entre los principales descubrimientos del estudio de caso, la falta de políticas de planificación para las necesidades locales; la ausencia de solución de problemas como la desigualdad social y la mala accesibilidad. Por lo tanto, la innovación de sistemas para una red modal no refleja, a través de los planes, como una oportunidad para mejorar la accesibilidad en las áreas urbanas de la Amazonía.

Palabras-clave: Política de Transporte. Planificación. Crecimiento urbano. Plan-Proceso. Accesibilidad.

Introduction

Life cycle, seen as the progression of different stages of development in a certain period, is relevant tool to monitor many areas of knowledge. Modeling life cycles emerged in the sixties, specifically in the area of economic production and expanded into many areas. One of the advantages of life cycles is that they allow low costs of monitoring processes and products, by allowing greater control of performance during the different phases. However, one of the specific problems encountered by all fields of knowledge is the lack of statistical series.

The model is concerned with considering the inherent complexity of the activity, so that the variables of the model encompass dimensions in a sustainable perspective: economic, social, ecological, spatial, plus administrative and political as well as cultural (SACHS, 2002). This paper presents a regional situation that is susceptible to this type of study, because it is a border region and with great statistical difficulties of its development process, the Amazon.

Historically, urbanization in the Amazon has been happening for centuries near the banks of rivers in a slow continuous process. But change occurred in the last sixty years urban settlements, when they have been built near roads without the implementation of an urban planning capable of preventing the emergence of serious problems such as disruptive urban lay-outs, crime, property speculation, occupancy of marine areas and lack of sanitation. As an example, Para, one of the Amazon states, remained in 2008 (PNSB) among the worst in Brazil in terms of sanitation, with 1.7% of towns with sewage system and 4.2% of towns with sewage treatment.

From the dynamics of spatial occupation in the Amazon territory, especially since the second half of the twentieth century as well as the urban and regional planning for this vast area, the city of Santarem emerged as a regional pole whose territory stills needs to be structured in order to meet the needs of the population.

The enabling of basic conditions such as sanitation, health, transportation, healthy environment, among other rights guaranteed by law but not implemented, are crucial for a better quality of life. More than an urban planning that excluded the poor as planning approaches and systems are currently seen many times as part of the problem (WATSON, 2009).

Therefore, this paper aims to present an analysis of the determining and critical factors of the urban expansion process from a typical city in the Amazon basin, with a riverbank location further improved by road accessibility. The focus is on spatial plans prepared for the region, on infrastructure investments, applying the perspective of the Plan-Process Theory based on Lourenço's model (LOURENÇO, 2003), particularly, since the second half of last century. They are discussed actions and plans throughout its implementation and direct consequences on the urban space under study and the adherence of Lourenço's model to Amazon reality.

Theoretical framework

Models related to the product life cycle are essentially similar, with real variations to the number of phases and denominations. One of the first established models was composed of five phases: pre-marketing, introduction, growth, maturity and decline (FOX, 1973). Recently, other model with the same number of phases and different nomenclature: gestation, growth, maturity and decline (HILL and JONES, 1998). In the 1960s and 1970s theories derived from market, product and industry analyzes were developed and adapted by tourism scholars. The denomination tourist area life cycle - TALC, appeared in the 60s and, one of the pioneers to develop TALC was Christaller (1963), followed by Fox (1973), Fuster (1975) and Butler (1980).

Plan-Process Theory involves a continuous process of planning, through which the plans are seen as an essential element. According to this method, each plan, later approved and implemented is drafted, accompanied by an evaluation of the process of planning. By establishing a new radically different plan, a new cycle of the plan-process begins (LOURENÇO, 2003).

The model of Lourenço (2003) is based on the Holton quasi - model (HOLTON, 2009). Lourenço's model allows understanding the processes of urban expansion, with a model designed for assessment and monitoring of the plan-process, which contributes to the management of urban areas and, therefore, to the plan-process analysis on territory. The curves established by Lourenço (2003) are exponential, as shown in equation (1) and logistic, according to equation (2); where S represents the expansion area and t, a period, associated to three curves relative to the planning cycles, actions and experience.

$$S(t) = a + b e^{ct} \quad (1)$$

Where:

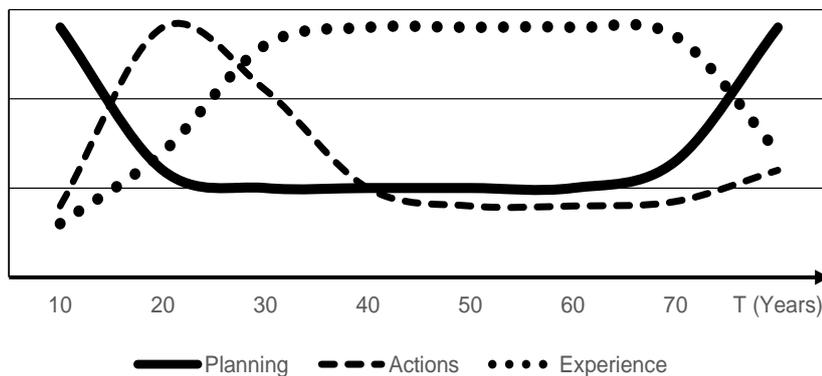
$$260 \leq a \leq 700 ; 0,002 \leq b \leq 0,16; 0,08 \leq c \leq 0,14.$$

$$S(t) = K / (1 + e^{a-bt}) \quad (2)$$

Where:

$$1400 \leq K \leq 2000 ; 32 \leq a \leq 103; 0,016 \leq b \leq 0,05 .$$

According to this model, the cycle of urban growth sprawl is 70 years with parameterized intensity at three levels: Low (I), Medium (II) and Maximum (III). Thus, this model shows that on the ideal behavior of a cycle of urbanization after 10 years of production planning, the intensity of planning decreases significantly, reaching a minimum level, after 20 years of the beginning of the cycle. After 40 years, it is observed on the model that ideal behavior of life cycle reaches a peak and it decrease after 70 years. Graphic 1 shows the ideal plan-process of Lorenços's behavior model for urban growth areas.



Graphic 1: Ideal plan-process of Lorenços's behavior model

Source: Lourenço, 2003.

Lourenço's model allows a greater apprehension of the urban expansion processes, which contributes to a better monitoring of the process plans and its possible threats. It should be emphasized that the model is not intended to make predictions, but rather to be an instrument that contributes to the management of these areas. On this assumption, the main instrument is the establishment of plans between the decision and the act of investing as well as between the planned action and its implementation. Plan-Process Theory depends on analysis of determining and critical factors that Lourenço (2003, p. 236) defines as *persistence on aims, that is political commitment and cultural acceptance, as well as the perception of innovations*.

The analytical base requires a historical analysis of urban growth to highlight the determining factors in the plans and the identification of the urban development cycle in this territory. The result will allow the analysis of the process-plan and its critical factors. In this paper, the case is Santarem, a reference city of Amazon urbanization. In general, the effort to rebuild the historical process of occupation and development of Santarem, is necessary to understand the dynamics of this area and its peculiarities. Especially, with regard to the role of accessibility in urban development.

So the following results are structured in the analytical perspective as follows:

- i. Historical analysis of determinants factors on planning process: object of a qualitative historical description of cycles of life ;
- ii. Analysis of the development cycles, in light of the historical planning process, in the place;
- iii. Identification of the critical factors on Plan-Process

Based on this model, it has been hypothesized that urban planning in the Amazon can be guided by Lourenço's model (Graphic 1), for understanding the critical factors that are decisive for the current stage of urban network and management of area, having Santarem as a case study.

Results

Santarem is located in a prime area, at the meeting of the Tapajos and Amazonas Rivers, in the middle of the lower Amazon region, 435 miles from Belem, capital of Para State (see Figure 1). It is surrounded by ten cities along its boundaries: in the north, Obidos, Alenquer and Monte Alegre; in the south, Aveiro, Ruropolis, Placas and Belterra; in the east, Prainha and Uruara and; in the west, Juruti. This enables an intense articulation of relations with all these towns that somehow depend on Santarem.

Determining Factors

The analysis of the determinants was carried out using the methodology of Plan-Process Theory from Lourenço's model to explore the perspectives of planning as well as the practical results on the dynamics of urbanization in the municipality of Santarem (see Chart 1). From Chart 1, we conclude that the determining factors of the Plan-Process in the town of Santarem portray a reality that it is permeated by the action of Brazilian Government in the city, which over the last six decades has created many programs and development land plans to Amazon region.

An historical analysis of the territory formation, as well as the development of the urbanization process of Santarem considered the timeline ranging from the prehistoric period to the present, highlighting key points in the territorial configuration (ROOSEVELT, 1992;

RAMOS, 2004). Since prehistoric times, from 15,000 to 10,000 BC, there are archaeological remains found in excavations, followed by findings from the prehistoric period Archaic (10,000 to 2,500 BC), fragments of ceramics and other artifacts (axes, blades, bows and arrows). Finally, in the prehistoric period of Formation, (2,500 BC until the arrival of settlers) the lower Amazon region began to show characteristics relating to several communities with different dynamics and more developed agricultural techniques.

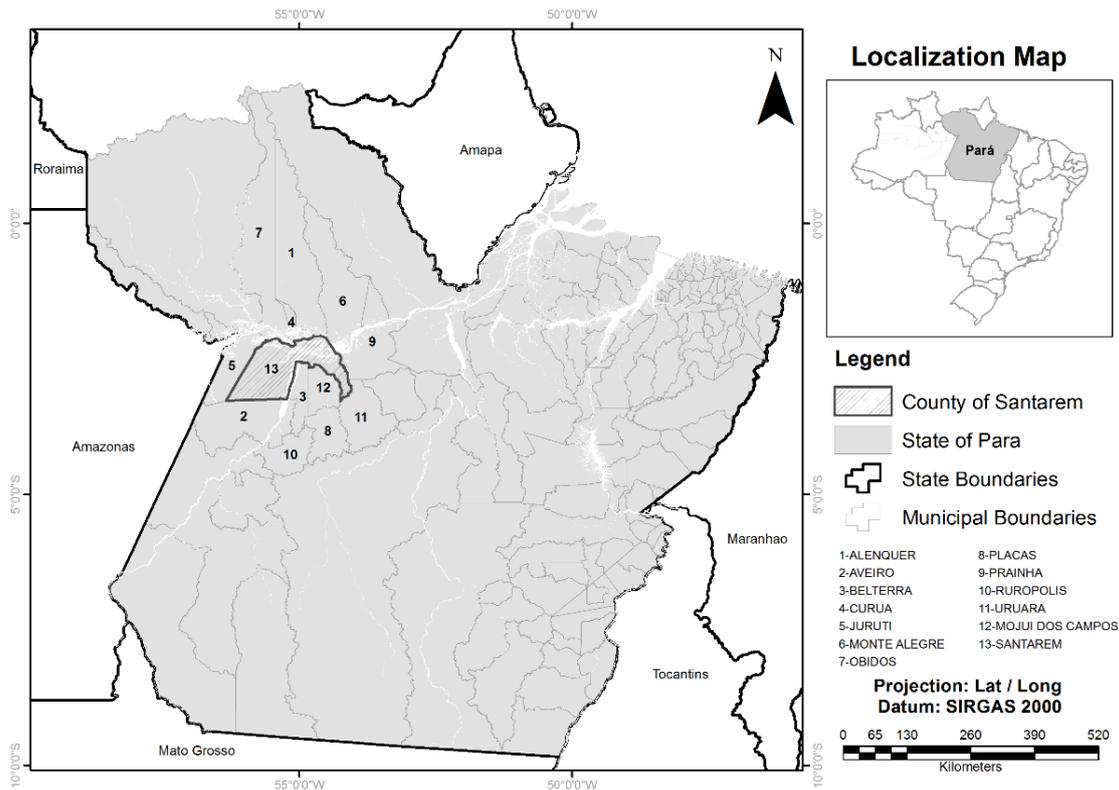


Figure 1: Regional Location of Santarém-Pará

Source: self-made.

Regarding the formation of urban space and the reasons of population migration, there are as crucial phases of occupation the territory where the city of Santarém it is located: Colonial Period, with the religious missions and the hinterland drugs; Cycle of Rubber, Gold Cycle, Military Period and the Agribusiness Cycle. Chart 2 portrays a summary of characteristics from regional cycles: Colonial period; Rubber and Gold. In these cycles, the role of accessibility is crucial for the conquest of territory, linked to economic exploitation. See on the description of each cycle.

Chart 3 presents cycles that are more recent: Military and Democratic (KAMPEL et al., 2001), with characteristics of regional geopolitical occupation, government plans at the federal level aimed at the implementation of large economic projects, and regional economic integration.

Accessibility is geopolitical instrument of an urban network model formed by cities of rivers and cities of roads.

After these periods, the current cycle is that of soybean, with reference to the last decades of the twentieth century and the role of the Amazon territory as the new agricultural and economic frontier. A new economic reality linked to the soybean production in Santarem and the state of Mato Grosso, whose main export routes are BR 163 road and the harbor of Santarem.

Chart 1: Determining factors for land plans in the Amazon territory

Bio-Physical	Technical	Cultural
Land use: predominantly occupied by forest and water. In mainland areas strongly influenced by the appropriation of land for economic exploitation of natural resources.	Proposed plans: only elaborated for the region over the past century, due to the development and exploitation on Amazon territory.	Public participation: public involvement of different actors in decision-making processes. It was decade of popular participation in the Master Plan of the city.
Physical constraints: with the geological structure of sedimentary soils from the late and recent Quaternary period. It allows various land uses and stocks of natural resources and minerals.	Viability studies: the plans have always put forward some general indications of technical capacity and economic profitability, but these did not include actions for cities specifically.	Policy measures: the city still lacks both public policies as well as regulatory, distributive and redistributive guidelines despite the master plan approved under law.
Accessibility: it was fostered initially by its numerous rivers, making it possible to navigate throughout the territory. Roads were built in the last century to improve regional accessibility.	Urban management: in Santarem, they came forth only in the 21 th century. The municipality itself does not have adequate institutional capacity for the complex urban reality that it has to be faced.	Land policies: municipal government in the role of regulators and coordinators of the consumption or use of land still need to take action, produce norms, instruments and mechanisms to occupation of land.
Ownership patterns: An agency fostering regional development (SUDAM) and the initial making of government studies are primary causes.	Fines: in rural areas, governmental agencies acting at the Federal and State levels are fairly presents, but absent on the urban areas.	Institutional Arrangements: there are only isolated initiatives, with public and private partnerships originated in utilities and investments largely absent.

Source: Self-made.

Although not completely paved, the BR163 develops a role in present times, that is importance for the agribusiness in Brazil with the international market; as a facilitator for the enlargement of agricultural frontier in northern Mato Grosso state toward the lower Amazon region.

Santarem harbor, has as well a major role in the regional dynamics. Several studies demonstrated how big the business and the capital have become to the Amazon territory (COSTA, 1992; HÉBETTE, 1981; IANNI, 1978; MARTINS, 1996; VELHO, 1979).

Chart 2: Cycles and land origins of urban space in the Amazon territory – the first cycles

Period / Chronology	Features	Migration and Mobility
Colonial Period - Religious Missions and Hinterland Drug: sixteenth to nineteenth century.	Achievements of religious expansion, and later, the expulsion of the Jesuits order; embedded in a religious-political-strategic logistics.	Mobility by rivers (Amazon and tributaries), and the establishment of the first settlers in river towns.
Independent Brazil - Rubber Cycle: the late nineteenth and early twentieth century	Rubber economy of the Lower Amazon unleashed a dynamic economy, with many enterprises; decline of the rubber in the first decades of the twentieth century.	The exploitation of rubber gave the appearance of settlements; increase in population and influences on urban development.
Independent Brazil – Gold Cycle: 1950's and 1960's century.	Gold mining in the region, continued until the early nineties, and when it ended, it generated an unprecedented crisis in the gold economy of the region.	Migration toward the Tapajos River, which 1950 - 1960 migration rate of 52.98 % of Northeastern, Ramos (2004); creating population pressure on resources.

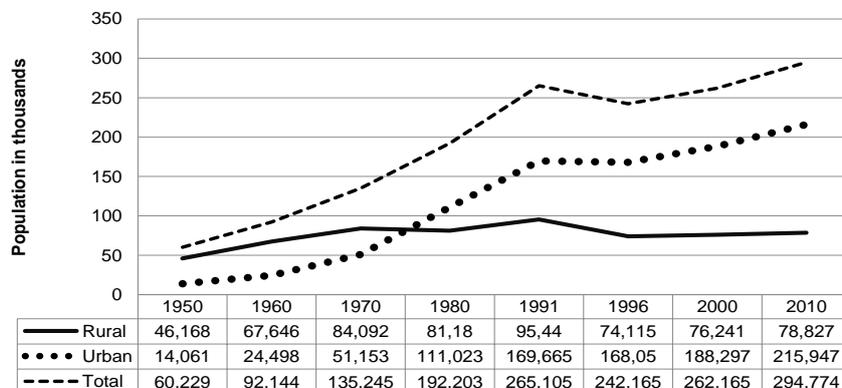
Source: Self-made.

Chart 3: Cycles and land origins of urban space in the Amazon territory – recent cycles

Period / Chronology	Features	Migration and Mobility
Independent Brazil - Military Period: from 1964 to 1985.	Location of Santarem, in confluence with Amazonas and Tapajos rivers, bore an extremely important role in the reality of preserving national sovereignty in the Amazon area. Regional economy has benefited from the investments of the military in the region, with increase economic activities.	It is the cycle of major infrastructure investments in Santarem region: the construction of hydroelectric Curua-Una and major highways: BR-163 connected to the central highlands of Brazil, BR-230; in addition, the construction of the airport and the harbor of Santarem took place.
Democratic Period – Dominance of agribusiness, soy, tropical fruits, cacao, fisheries, animal production: from 1986 - 2010.	The role of Santarem as services pole has been strengthened. There was a big leap in population growth and the urban population exceeded the rural population. See Graphic 2. The soybeans arrived in the	Santarem has major role in regional dynamics. The investment in its harbor was vital to the strategy of the agribusiness in regional, therefore, established themselves as facilitators for expanding the agricultural

	region from the 80's, generating changes in the relations of production (PEREIRA <i>apud</i> OLIVEIRA, 2008).	frontier in northern Mato Grosso state toward the lower Amazon region (BECKER, 1982, 1991; PARRÉ AND GHILHOTO, 2001).
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Source: Self-made.



Graphic 2: Population growth from 1950 to 2010 (population versus years)

Source: data extracted from IBGE, 2000; 2010.

This current cycle is drawing to Santarem a large demographic contingent constituted, mainly, by southern capitalists from agricultural activities. They see that a new economic cycle will be able to progress economically to a life with better conditions. Santarem is currently fairly spread out, with problems of periphery, i.e., with poor urban infrastructure, as well as poor housing. Depending on the skirting process, the urban area of Santarem concentrates the best infrastructure and is home to people of higher income differentiating itself from the periphery, lacking of infrastructure and inhabited by low-income population

The urbanization process originated in the nineteenth century enabled the development of an urban network with dendrite-like shape (Figure 2). The commerce of the rubber economy triggered a hierarchy urban agglomeration, which promoted the rise of cities of great importance in the region, such as the case of Santarem, with the development of a primate urban structure (KAMPEL *et al.*, 2001) highlighting the differences between larger cities and smaller.

The disintegration of the dendrite-like urban network model occurred with the rubber economic crisis, along with the policies developed by Brazilian government in order to occupy the Amazon region, and the opening of major highways. These facts led to the emergence of a new model of urban network, more complex, in which seeing the emergence of urban centers near these major highways that come to re-structure the space with new production and activities, a new fact that completely modified the dynamics of the regional economy.

Regional roads, which complement the traditional occupation along the rivers, that still has an important role in the urban network, with a more complex configuration, where relations between regional centers appear in network settings and not in a linear fashion which, for centuries, it was the circulation configuration because of regional rivers.

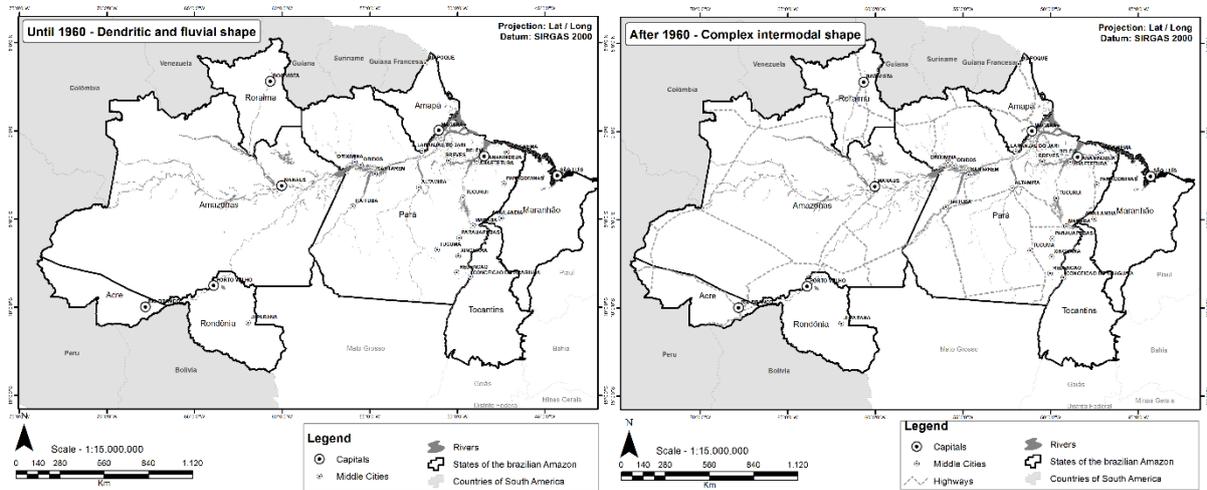


Figure 2: Urban Amazon network based on river transportation – dendrite-like form

Source: self-made.

A Review of Plan-Process in Santarem

In the retrospective analysis of events related to the urbanization process of Santarem and its dynamics of urban expansion, it was possible to understand the direct or indirect influence of development all plans proposed to territorial occupation of Amazonian area, since the second half of last century. In this sense, one can consider the existence of a plan-process in Santarem early in the second half of the twentieth century, a time of implementation to large infrastructure works in the city.

The investment were concomitant with the plans created for regional and economic dynamism that have had a significant importance for urban development, with special attention to construction of Santarem harbor, the opening of major roads and the airport, which contributed to the expansion of the urban area and improve the accessibilities.

The development process occurred in different planning cycles, expanding the urban area from the riverbanks towards the interior (Figure 3 and Table 1). These periods can be established until 1940; the second around 1941-1950; the third moment 1951-1977 and, the last period from 1978-actual. Table 2 presents the regression performed and the best correlation is with an exponential curve of the 4th order to explain de relation between growth and area.

Until 1940, it was noted the absence of action of local and state authorities, since decisions and plans created for the Amazon area were approved and implemented under Federal Level. Then, all the plans were directed towards policies of national integration. In this sense, plans, although they affected urban territorial, economic and demographic, dynamics of the several Amazon cities, they were not specifically designed for any of them.

This fact did not prevent the targeting of investments and activities to areas strategic interests or location, namely where the presence of natural resources in the territory that could somehow return the Amazon integration initiatives to national and international economy.



Figure 3: Urban growth in Santarem (1940 - 2011)

Source: self-made.

Table 1: Urban area growth in Santarem from 1940 to 2011

Period (p)	≤ 1940	$1940 \leq p \leq 1950$	$1950 \leq p \leq 1977$	$1977 \leq p < 2011$
Urban Area (km ²)	1,09	2,81	12,63	28,21

Source: Self-made.

Table 2: Regression Results

Order Type	Regression
Polynomial order	1
4	

Polynomial order 3	0,9994
Polynomial order 2	0,9994
Linear	0,8959
Power	0,9511
Exponential	0,9859

Source: Self-made.

The macro or national/federal and somehow in a certain degree meso or regional/state levels were taken into account but not the micro level that is the urban or local/municipal level. In the case of Santarem, despite of economy and urban growth, the various plans aimed at the region and did not prevent the emergence of major urban problems.

Thus, there was an increase in social inequality in distribution of basic public services and disorderly growth, with areas of irregular occupation, which triggered other demands on public authorities such as those related to the environment and the population needs for new services and housing, street paving circulation, sanitation, among others.

Planning cycles in the Amazon area and in Santarem, too, suffered several breaks that they are revealed in a succession of different governments; its own set of interests associated to territorial politics in the region, often without implementation of actions. Furthermore, while living increases relatively, because it is endorsed by the quality of life and the attractiveness present in Santarem city, more and more new economic interests arise from its potential, yet not fully explored.

In Santarem, master plan city was began in 2005, approved in 2006, with anticipating federal investments for the first stage of the sewage system in downtown area, in the order of \$ 31.6 million to \$ 45.9 million, in development of settlements and neighborhoods of Mapiri and Uruara, apart from other civil works under the Federal and State governments.

Master Plan city occurred due to a national law of 2005 that stated that all towns with over 20,000 inhabitants had to approve a Master Plan otherwise they would not receive funds (BRASIL, 2001). Therefore, it was not derived from the mayor's commitment to open decision-making and transparent governance but much more to a central regulation issued for all Brazilian townships. Unlike many cities, Santarem did its Master Plan with a team from the township helped by a consultant hired from private practice outside Para.

This local base allowed for extra time in public participation and several meetings took place within a ten stages process where society awareness was fostered through workshops and public audiences in the first stage.

Critical factors analysis of plan- process

Conceptually, the factors considered critical in the Plan-Process are the persistence on the aims and perception of innovations (LOURENÇO, 2003). The persistence in the plan is a vital factor for the continuation of any process whether the plan is strategic it is directly related to political commitment and cultural understanding.

The perception of innovations is the critical factor in a plan-process that translates into the ability to perceive where one can innovate to make the difference between the successes of a plan in the process of urbanization in a zone.

Therefore, it appears as the factor that allows, especially in exceptional situations, which marks the difference between a routine that will no longer be able to take the process forward and a new way of designing the existing operation or proposed action, promoting cultural acceptance.

In assessing the process of expanding the urban area that has developed in the city of Santarem, it was observed both persistence and perception of innovations, since the second half of last century. The improvement of urban facilities relevant mainly to factors related to accessibility, thereby favoring the interrelationship between economic development and quality of life. Despite efforts of federal, state and municipal powers grew precariously failing to reach a satisfactory level, to meet the economic needs of the town and the wishes of the population.

Persistence on Aims

The planning process in Santarem stems mainly from the Brazilian government's actions in the Amazon, due to Santarem' prime strategic location at the northern end of the BR-163; that comes from the Midwest of country, major production area of grains, soybeans, in particular. Strategic location as a new border area of economy expansion at the confluence of Amazonas and Tapajos rivers is a fact that favors the development of harbor activities, which are very important for Brazilian state interests in preserving national sovereignty and the achievement strategies of domination and occupation of Amazon region.

In this context, from the period occupation of the Amazon region, from the period of military rule in Brazil until the present times. Several economic development plans have been carried out and they have a territorial impact directly or indirectly upon Santarem.

Persistence of the Innovations

Plan assessment

The assessment of plans is new to the reality of public policies for land use planning in Brazil, dating back to early 1990. It is supported by the 1988 Constitution, which claimed monitoring and assessment plans to be mandatory, which was first implemented in the Multiannual Plans (1995-1999, 2000-2003, 2004-2007) and the Growth Acceleration Program – PAC, still running. In this plan the vast majority of the investments comes from financial resources for the region as such. It is notorious the role of transport infrastructure projects in the region, at all plans, to ensure accessibility of penetration and occupation of territory and national sovereignty.

Decentralization of Administration

Since the period of military rule until the beginning of the 1990s all of the decisions about the dynamics of development, especially in the Amazon region, were linked to and dependent upon the hands of Federal government, which determined all the strategies to be developed for effective domination and occupation of Amazon area. In the early 1990's the dynamic of public administration is changed, under the Constitution of 1988 that created the status of the city, giving powers to municipalities manage, control and better target public funds.

Public Participation

Social movements were invited to participate in discussions, at the onset of Santarem Master Plan by the mayor of the municipality. Despite the innovations, with the possibility of major public participation, social movements question the transparency of the process and several of the schedule meetings did not occur, a fact that jeopardized several excluded communities, which had no other way to express their anxieties (HOLANDA, 2009). The questioning of these communities on how the discussions about the development of the Santarem Master Plan occurred and how it was approved led, in late 2007, to a session at City Council. In this session, city council extended the deadline for implementation of urban regulations in 24 months, enforcing discussions with local communities. Among the results of these discussions, several regulations have been passed as the parceling of land use and the buildings code.

Conclusions

In general, an effort to rebuild the historical process of occupation and development of Santarem be necessary to understand the dynamics of this area and its peculiarities. Understanding plans and development programs and character of public policies on Amazon region, being Santarem a major element of this space, made it possible to identify the critical factors in considering the plan-process inherent to the space under study. In the analysis of the Santarem plan-process, the role of accessibility in transportation as a factor of sovereignty over the territory and of economic conquest is evidenced.

The innovative shift from rivers to roads in terms of accessibility of the lower Amazon was not perceived as such by political powers at federal and state levels. Competition existing between rivers and roads and the complementarities between the two systems were not exploited and fully profited.

The idea behind opening major roads was the human occupation on Amazon territory so that sovereignty was not lost. Another reason was giving employment to people from northeast Brazil as they suffered from consecutive droughts. Opening roads made it possible for them to enter the Amazon forest without dying from forest diseases.

Operational planning from the military period with plans running for a maximum period of five years was called strategic planning to Amazon area, but it actually lacked long-term vision. The necessary urban schemes for the population settlements were not sketched. As such, linear extensions along major roads and chaotic urban centers developed.

The forthcoming investment in locks for the existing dams, for the new hydroelectric dam and the new roads interlinking the roads and the rivers implemented can be seen as a complementary unitary accessibility network for the first time to be planned and implemented.

Lourenço's model showed an analytical tool capable of promoting the understanding dynamics of development in an area and the role of various actors, from historical analysis of determinants and critical factors. From a methodological point of view, the applied theory proved to be very suitable for this region, with great statistical difficulties about its development process. The border area characteristic of Amazon makes it conducive to a development process along time permeated by the dynamism, accelerated by contrast with moments of stagnation.

The persistence of aims points to the crucial role of accessibility to the occupation and urban growth, validating the initial hypothesis of this paper. Such evidence shows the importance of investment in accessibility infrastructures to ensure the continuity of urban development in the region and, consequently, quality of life for population.

On the other hand, popular participation that becomes imperative, presents itself as an innovation and opportunity of people to talk about the plans for the region, considering the endogenous interest of local development. Therefore, regional actors begin to contribute greatly on planning, and its control, and decision-making on regional future.

Compared with the ideal plan-process of Lorenços's behavior model, adherence in the behavior of the plans implemented in Santarem was observed: they started very strong and with several actions. Over time, the plans and actions lose their dynamism, however, the experience is extended and new plans come improved by incorporating aspects of local reality.

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