

## **MASTER THESIS**

# **URBAN ISSUES ON THE LAYOUT OF THE NEW LIGHT RAIL SYSTEMS**

**ANALYSIS IN THE EUROPEAN SPACE**

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To my Parents and Sister



## **ACKNOWLEDGMENTS**

The first words go to the ones who are responsible for the person I am today, my parents, which through these years provide me with all their love, support and sacrifice. To them, nothing I can say is enough to show how grateful I am.

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## **ABSTRACT**

This work aims to study urban issues on the layout of the new light rail systems. From the beginning, several objectives emerged as guides lines for the work. The search for a clearer perception of how these transport systems contribute not only to the promotion of urban structure, but also to the quality of the spaces for those served.

However, due to the vast range of issues that this theme encompasses, it was necessary to create a focus of study more restricted. Therefore, the present study proposed to examine a notion developed by French authors, named “urbanité”. Combining this idea to the main theme, it was purpose of this research work, to understand how the insertion of a light rail system in an urban environment, influences its urban sense. The main purpose of this thesis then became to be the understanding of the type of relationships that exist between a new light rail systems and urbanity of the urban environment of a city.

This subject has shown a tremendous interest in being object of study. Above all, it relates a new variable, like this kind of public transport, to a perception of urbanity that it is in constant evolution in time. This notion initially developed mainly by French authors, does not have a universal definition, so it was necessary to consider the different literature implied. Subsequently, the author proposed to develop its own definition and interpretation of this notion, which was used in all the cases studies that have been analyzed.

Through this work, an unexpected dilemma has emerged as one of the most interesting questions. It concerns to what kind of approach should be used in studies that seek to understand the multiplicity of phenomenon of the urban environment of a city. Thoughts brought forth around this topic were essential to identify the different ways to address the overall theme of the thesis.

This study proposes to understand the extent of influence that a light rail system has in the urbanity of a place. To achieve this main goal, this essay goes through analyzing the "urbanité" levels before and after the construction of the light rail system. Hopefully with this acquirements will be possible to comprehend in which way the public transport network was responsible for the possible fluctuation of the urbanity values. This in order to understand what is the nature of the relationship between the urban environment of a city and this important transport system and all that is intrinsic to it. In order to find an answer to characterize the city in the past, before the arrival of the light rail system, all kinds of information were taken into account. Maps, photographs, books and informal interviews with the local population, served as the basis for the author to create his own image of the past. To characterize the current situation, i.e., after the introduction of the light rail system, in addition to the elements mentioned above, was also very important the various observations made in all the places studied.

Five different locations served as base for case studies, three of them in the city of Porto, in Portugal, and two in the city of Tours, France. These particular places were chosen in order to obtain the most varied range of results, thus allowing embracing all the different kinds of

influences that a light rail system could have in a city. Comparisons between the various case studies did not compose a relevant part in this study. A detailed observation of these heterogeneous cases, has confirmed the hypothesis raised by the author at the beginning of the work, which he defended that there is a complexity of relationships between light rail systems and the urbanity of a certain urban area.

Throughout this essay, the word “urbanity” is used as a synonym of the French word “urbanité”.

To conclude this summary, it should be noted that this study seeks to help better understand the urban phenomena, so that we can act in the cities in a more effective way, always with the ultimate goal of turning the lives of its citizens better.

## RESUMO

Este trabalho procura estudar questões urbanas no traçado dos novos metros ligeiros de superfície. Desde o começo, vários objectivos surgiram como guias para o trabalho. A procura por uma percepção mais clara de como estes sistemas de transporte contribuem não só para a promoção da estrutura urbana, mas também para a qualidade dos espaços por estes servidos.

No entanto, devido ao vasto leque de assuntos que este tema engloba, foi necessário um foco de estudo mais restrito. Posto isto, o presente trabalho propôs-se a estudar o conceito de “urbanité”, por outras palavras, o sentido do urbano. Associando este conceito ao tema principal, foi propósito deste trabalho de investigação, tentar perceber o modo como a inserção de um metro ligeiro de superfície num ambiente citadino, influencia o seu sentido urbano. O principal intuito desta tese passou então a ser compreender o tipo de relações que existem entre os novos metros ligeiros de superfície e o sentido urbanístico do meio urbano de uma cidade.

Este tema mostrou imenso o interesse em ser estudado, pois relaciona uma nova variável como este meio de transporte público, a um conceito de “urbanité” que está em constante evolução no tempo. Isto para além de toda a riquíssima experiência adquirida pelo autor, no que se refere ao estudo e análise do ritmo e movimento de um meio urbano. Este conceito desenvolvido essencialmente por autores franceses, não tem uma definição universal, pelo que foi necessário estudar a diferente literatura implícita. Posteriormente, o autor propôs-se a desenvolver a sua própria definição e interpretação deste conceito, que foi usada nos casos de estudos analisados.

Deste trabalho surgiu também um inesperado e interessante dilema sobre a forma como se estuda o meio urbano de uma cidade. Visto que este apresenta tanto variáveis dimensionais, onde são exemplo as suas infraestruturas e a densidade populacional, como variáveis não dimensionais, caso das interações e relações entre pessoas e espaço. Esta questão constituiu uma das principais barreiras e desafios deste trabalho. Os pensamentos gerados em torno deste tópico foram essenciais para determinar as formas de abordar o tema geral da tese. Através desta análise entre uma abordagem “soft” ou “hard” do problema, surgiram algumas conclusões. Avaliações e caracterizações de conceitos não físicos como é este de “urbanité”, não final de contas, acabam sempre por ser feitas de uma forma aproximada, enublada e fortemente dependentes de cada autor. No entanto, esta forma bastante teórica de definição, deve ser baseada tendo em consideração todas as dimensões que possam ser alvo de equação e exactidão. Assim, neste estudo foi percebido o sentido urbano de cada local, adoptando uma abordagem “soft”, ou seja, uma definição aproximada da realidade. Todavia, todas as dimensões possíveis de medição exacta, como por exemplo a quantidade de equipamentos presentes num determinado local, foram alvo de uma abordagem exacta e precisa, ou seja, uma abordagem “hard”. Podemos assim dizer que ambas foram importantes neste estudo, complementando-se entre si.

Este estudo propôs-se a analisar os níveis de “urbanité” antes e depois da construção do metro ligeiro de superfície, e tentar perceber em que medida este influenciou uma possível variância

dos valores. Isto com o intuito de perceber que tipo de relação existe entre o sentido urbano da cidade e este importante meio de transporte e a tudo o que a ele está inerente. No sentido de encontrar uma resposta para caracterizar a cidade no passado, ou seja, antes da chegada do metro, recorreu-se a vários tipos de informações. Mapas, fotografias, livros e entrevistas informais com a população local, serviram de base para o autor criar a sua própria imagem do passado. Para caracterizar a situação actual, ou seja, após a introdução do metro, além dos elementos anteriormente referidos, foi também muito importante as várias observações efectuadas nos diversos locais estudados.

Cinco diferentes locais serviram de casos de estudo, três deles na cidade do Porto, em Portugal, e dois na cidade de Tours, em França. Estes locais foram escolhidos de modo a obter o mais variado leque de resultados, permitindo assim perceber até que ponto o metro influencia a cidade ao nível do seu sentido urbano. Comparações entre os diversos casos de estudo não constituíram parte relevante neste estudo. Uma observação pormenorizada destes vários casos, veio corroborar a hipótese levantado pelo autor no início do trabalho, que defendia existir uma complexidade de relações entre a “urbanité” e metro ligeiro de superfície de um determinado local.

Importa destacar que durante todo este trabalho, a palavra “urbanity” foi usada como sinónimo do termo francês “urbanité”.

Para finalizar este resumo, importa referir que este estudo procura ajudar a entender melhor os fenómenos urbanos, de modo a podermos actuar nas cidades de um modo mais eficaz, sempre o intuito final de melhorar a vida dos seus cidadãos.

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## INTRODUCTION

A city doesn't just happen. And they don't necessarily live on forever. Someone must envision it, plan it, build it, and then maintain it or it will die out. Many cities have grown old and died, while others keep on ticking. (Tocco, 2010)

Through the ages, humans always have tried to find the best way to move from a place to another. Although, people had often been seen as static entities tied to specific places, or as nomadic and placeless in frenetic and globalized existence. Currently people understand mobility as at movements and the forces that drive constrain and are produced by the daily basis movements. The importance of the systematic movements of people for work and family life, for leisure and pleasure, has never been as high as it is nowadays. This continuous change of how people look to this social science, has transformed dramatically the urban areas of the cities.

One of the most impressive and constant evolutions as a European society, regards to the way we move in urban areas, especially with public transportation. It was first developed with the need to link the center of the city, place for commerce and business, with its suburbs, the preferred place for the population to dwell. This concept of public transportation as evolved a long way and nowadays it is seen as an active and imperative actor on the developed urban city. At the same time, the rhythm that urban areas embrace nowadays has never been so high. Our society evolved in a way where everything moves so fast and so unpredictably, where the interactions between citizens and the urban space are constantly digging into a more complex, deeper and unknown level. Both this observations composed a unique motivation to go along with this research, through these last few months.

The wide theme of this research aims to explore how the urban structure is changed by the new light rail systems. As expected, this theme is too broad and covers a huge range of different topics. So, having in mind what motivates the author, a clear path was chosen to carry on through this master thesis. After a deep thought, the concept of urbanity was brought out. This new approach of looking at the urban space has been developed mainly by French authors. All the previous decisions, led us to reach the following research question: *What kind of relationships exists between the tram and the concept of urbanity?*

With a short look into the literature that addresses this matter, the following hypothesis was built to later be object of verification: *A complexity of relationships*

It should be noted that this work has focused all the attention on European space. Thus, a deep study into the European cities and how their urban space evolved seems like the first thing to deal with. The European cities, "the old cities", are complexes fields of study. They are known by given to its citizens a full and rich experience in every possible sense. Adding to it, they are located in a short extension, which make them dense. This makes the European cities, the best places to find high levels of urbanity, persistent in time.

“Urbanité” is a word with no definition. It is something that we can find in urban places, where people and space interact, affect each other and act reciprocally through time. It is what makes the city move. The urbanity of a city is constantly changing, because it is based on fickle dimensions. Thus, as a universal truth about this concept did not exist, each researcher has its own view and interpretation.

A public transport network, like the layouts of light rail system, plays a huge part of what a city is about. As we seen in innumerable examples, it can shape a city and be the ultimate responsible for its development. It is absolutely important that the reader can see and understand the magnitude of the impact that we are staring. In a way to confront the theoretical framework, five places were object of a deep analysis. Porto and Tours, in Portugal and France respectively, were the cities where these studies ensue.

This research program had as main objective understand how the light rail systems change the urbanity of the urban space. It is also an objective of this research work add some knowledge to this evolving process of urbanity.

## EUROPEAN SPACE

Max Webber, about the European cities, “These tall houses packed together on others, these winding streets, these unlikely places, but also this promiscuity of different social groups in the evening of an heavily hierarchical society. This unexpected encounters between professions, yet strictly separated by a corporate logic such are fundamental and enduring features of the European city. “

The cities of Europe were born with Europe and, in a certain direction, were confined about it. It were one of the factors - the main thing, perhaps - emergence as a distinct historical entity; they continued to characterize the European civilization when this one acquired a dominant position in the world, and they marked of their print - positive or negative, but in any case dominating - the contemporary cities of all the continents. The history of the European cities and the history of Europe are, on the whole, only one and even ventures. (Benevolo, 1993)

Historically, in all aspects of the European city is revealed quickly and sustainably as a privileged place for social innovation. In the medieval town, due to the constant presence of war there was a tendency to keep the important things in protected stocks. The cities were equipped with various defense systems, including the construction of walls that lined the perimeter of the city. This meant that all the activity of the city was concentrated within its walls. They therefore had a high density of urban space. Nowadays European cities are not the largest in the world, but they are the most "urban", the richest in urbanity.

According to Italo Calvino, in his novel *Le città invisibili*, “the city is a product of society at least as it is produced by it”. Thus, the city is not only the result of the development of capitalism. It is also a productive configuration which plays an active part in this dynamics. In a world that is urbanizing at full speed and often with a strong bias in some points, Europe and its dense network of medium-sized cities worldwide appear increasingly trivialized. However, it's about the quality of urban environment that Europe's originality is clearly distinct from other continents.

## URBANITÉ

The city, as Mumford writes, is “a theater of social action,” and everything else – art, politics, education, commerce – only serves to make the “social drama...more richly significant, as a stage-set, well-designed, intensifies and underlines the gestures of the actors and the action of the play.”

According to Jacques Lévy, in his movie called *Urbanité*, we can look at a city in as utopian ideal to extend some thoughts. Assuming this, the city is seen as a point, with zero dimensions and all in it boils down to points separated by distance. It is the interaction between the various different points that allows us to have a sustainable city and to protect its natural environment. To reach this ideal city, we have to work with several techniques to be able of manage the distance, as in mobility or telecommunications. (Lévy, *Urbanité*, 2013)

“Outres monde di, une ville est toujours davantage habitable, qui ne est habitée”. A big part of a city is anti-technique, anti-programmable. In order to multiply the information that go through us in a city, our senses assemble and combine each other's. Cities are the main stage of what the most evolved exists in the world, both politic, economic, cultural, sociologic, etc. There, everything happens and takes place. (Lévy, *Urbanité*, 2013)

As mentioned already in this essay, urbanity derives from the French concept of “urbanité”. It has been developed for several years and does not have a universal definition. The reason is simple: it is not possible to define something that is constantly in a process of change. Urbanity flows in a place, where the composition of different systems, together, makes it an ecosystem. It is a concept that goes along Aristotle's holistic theory, that “The whole is greater than the sum of its parts”. It refers to the life and rhythm of a place.

Although the lack of definition, the urbanity of the place is based in two main features: density and diversity. Found logic, operation and urban dynamics, made of a maximum concentration of actors and objects to the minimum extent, this combination of density and diversity makes urbanity. It is an evolving process, defined by different dimensions. Urbanity could increase, decrease or maintain after something that breaks the rhythm. It is a concept that gets its peak in the center of the cities. There is where we usually can find the most quantity and of variety of people and space offer. That is why urbanity can only be found in urban spaces.

Density is so important in many dimensions for the growth of urbanity. In human societies, an increase in numbers when area is held constant (i.e., an increase in density) tends to produce differentiation and specialization, since only in this way can the area support increased numbers. Density reinforces the effect of numbers in diversifying men and their activities and in increasing the complexity of the social structure. We are exposed to glaring contrasts between splendor and squalor, between riches and poverty, intelligence and ignorance, order and chaos. The competition for space is great, so that each generally tends to be put to the use which yields the greatest economic return. (Wirth, 1938)

In other hand, the level of heterogeneity is also a huge part in what urbanity is based on. As Jane Jacobs argues in her book *"The Death and Life of Great American Cities"*, believing that diversity causes traffic congestion and creates bad habits, helped to rationalize the urbanism, transforming a city in a sterile, hard and empty thing. The multiple combinations between different uses of the land in a city are not a form of chaos. On the contrary, they represent a way of complex and highly developed organization. The social interaction among such a variety of personality types in the urban milieu tends to break down the rigidity of caste lines and to complicate the class structure, and thus induces a more ramified and differentiated framework of social stratification than is found in more integrated societies. The heightened mobility of the individual, which brings him tithing the range of stimulation by a great number of diverse individuals and subjects him to fluctuating status in the differentiated social groups that compose the social structure of the city, tends toward the acceptance of instability and insecurity in the world at large as a norm. This fact helps to account, too, for the sophistication and cosmopolitanism of the urbanity. (Wirth, 1938)

According to Corrêa, in *O Espaço Urbano*, the urban space is "fragmented and articulated, reflection and social condition, a set of symbols and battle field. This is how society itself in one of its dimensions, that more apparent intrinsic to spatial forms." Overall, it is the number of different uses of juxtaposed to each other land. Such uses define areas such as: the city center, the local concentration of commercial activities, and service management; industrial and residential areas, different areas in terms of form and social content; recreational areas; and, among others, those reserves for future expansion. This ensemble of land uses is the spatial organization of the city or just the fragmented urban space.

We believe it is helpful to recover and rethink the concept of spatial processes due to their usefulness in human connection between time-space-change. It should be clear that these processes and spatial forms are not mutually exclusive and can occur simultaneously in the same city or even neighborhood. In this sense, it can be stated that spatial processes are complementary. (Corrêa, 1995)

In fact, according to Lefebvre, the reproduction of social relations of production constitutes the most important role that the spatial organization in the city is destined to fulfill. In the present study, it is considered the city as an urban space that can be analyzed as a set of points, lines and areas. It can be approached from the perception that its inhabitants or some of its parts have of the urban space. Another possible way of analysis considers the spatial form as its connections with social structure, processes and urban functions.

Most of our housing and city planning has been handicapped because those who have undertaken the work have had no clear notion of the social functions of the city. They sought to derive these functions from a cursory survey of the activities and interests of the contemporary urban scene. And they did not, apparently, suspect that there might be gross deficiencies, misdirected efforts, mistaken expenditures here that would not be set straight by merely building sanitary tenements or straightening out and widening irregular streets.

The city is a related collection of primary groups and purposive associations: the first, like family and neighborhood, are common to all communities, while the second are especially characteristic of city life. These varied groups support themselves through economic

organizations that are likewise of a more or less corporate, or at least publicly regulated, character; and they are all housed in permanent structures, within a relatively limited area. The essential physical means of a city's existence are fixed site, the durable shelter, the permanent facilities for assembly, interchange, and storage; the essential social means are the social division of labor, which serves not merely the economics organization, an institutional process, a theater of social action, and an aesthetic symbol of collective unity. The city fosters art and is art; the city creates the theater and is the theater. It is in the city, the city as theater, that man's more purposive activities are focused, and work out, through conflicting and cooperating personalities, events, groups, into more significant culminations. (Mumford, 1937)

Without the social drama that comes into existence neither through the focusing and intensification neither of group activity there is not a single function performed – and has nor in fact been performed – in the open country. The physical organization of the city may deflate this drama or make it frustrate; or it may, through the deliberate efforts of art, politics, and education, make the drama more richly significant, as a stage-set, well designed, intensifies and underlines the gestures of the actors and the action of the play. It is not for nothing that men have dwelt so often on the beauty or the ugliness of cities: these attributes qualify men's social activities. And if there is a deep reluctance on the part of the true city dweller to leave his cramped quarters for the physically more benign environment of a suburb – even a model garden suburb – his instincts are usually justified: in its very opportunities for social disharmony and conflict, the city creates drama; the suburb lacks it. (Mumford, 1937)

One may describe the city, in its social aspect, as a special framework directed toward the creation of differentiated opportunities for a common life and a significant collective drama. As indirect forms of association, with the aid of signs and symbols and specialized organizations, supplement direct face-to-face intercourse, the personalities of the citizens themselves become many-faceted: they reflect their specialized interests, their more intensively trained aptitudes, their finer discriminations and selections: the personality no longer presents a more or less unbroken traditional face to reality as a whole. Here lies the possibility of personal disintegration; and here lies the need for reintegration through wider participation in a concrete and visible collective whole. What men cannot imagine as a vague formless society, they can live through and experience as citizens in a city. Their unified plans and buildings become a symbol of their social relatedness; and when the physical environment itself becomes disordered and incoherent, the social functions that it harbors become more difficult to express. (Mumford, 1937)

The great capitalist city is the privileged place of occurrence of a number of social processes, among which there are capital accumulations and social reproduction has basic importance. These processes create space forms and functions, or activities and create its embodiments, whose spatial distribution is the actual urban spatial organization. The economic structure of the contexts of an urban environment is different from what can be seen in the context of rurality. In many places with historical centers in decline, cities are taking measures to encourage tourism, culture and arts activities to reinvent these sites and making them into attractive spaces from the touristic point of view and private investment. Other cities clearly are betting on giving a new image to the city, a new identity, thus renewing interest in the same. The investment of local government in the image of the city and urban hygiene as well

as the conservation and rehabilitation of the historical heritage of cities should therefore also be read from the perspective of a reconfiguration of strategies against the demand of public and private capital and their growing expectations facing the city. These measures are designed so that there are more investments and social and economic revitalization, with the consequent restoration of their social and urban texture. These are all examples of success, of how the state has influence to increase levels of urbanity in certain locations.

Urbanity is a non-scientific concept, is dynamic and there's not a universal definition of it. After a long period of research, observation and inner thoughts, it was possible for the author to provide his own view of urbanity. This was a major step in this work, because it is based on that view that the work can move forward. So, from the author point of view, urbanity can be simplified in three different dimensions. These dimensions together, accomplish the concept of urbanity.

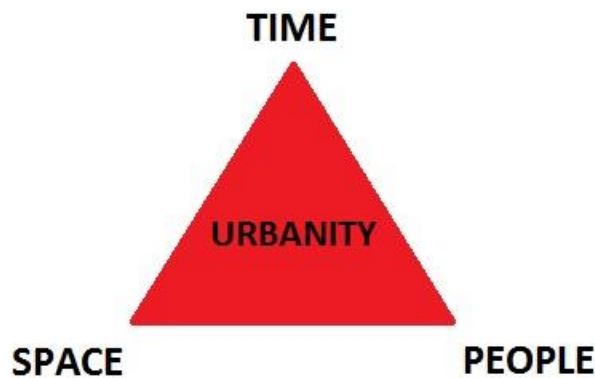


Figure 1: Diagram of urbanity dimensions (Design by the author)

The author holds to the theory that through these dimensions it is possible to understand the notion of urbanity. The process of creating urbanity takes time to root in an urban center. Buildings and equipment take time to rise and people need time to comprehend the place and embrace it. When people find themselves in a new or a reordered place, first they look around and analyze it. Then starts a process where people, step-by-step, start to find functional activities to do in the place. Go to the bank, go to work, cross the place as a way to go somewhere else are examples of functional activities that people use the place for in their daily routines. While doing these activities which have a specific functions and objectives, people encounter unexpected things on their way. Whether is other people or different uses and offers of the place, people start right there to be a part of a social environment. So social activities take place, since talking or taking a coffee, buying a newspaper or even just sit in urban furniture bench, all these events are the ones how give life the a place. So we can say that urbanity is life, the life of a place.

## DIMENSIONS OF URBANITÉ

### PEOPLE

As multiple authors argue, a city is more than a sum of its physical components like roads and buildings. The people are the ones how make the city. Thus, it makes no sense to exclude this social part of cities, in their analysis. Obviously, people are probably the most important dimension of urbanity. Without people and citizens nothing can happen. Nevertheless this universal truths, in the study of urbanity of a place, the density of the people plays the mainly role. The denser a city's population allocate, the more interactions between them will probably take place. Also in a dense urban area, a more wide range of people have access to the commerce, services and equipment that the city can offer. This will certainly increase not only the number of encounters, but also its diversity. Therefore, with more people using the urban facilities, probably the number of different ethnicities, religions, and age extension will certainly rise. Consequently this will lead us to a more diversity of interactions between people and space. Under these circumstances, the way people distribute themselves through space is crucial to reach an urban environment where people can relish a full sense experience. This is what makes the urbanity of a place growth.

A small example can easily show us how important this dimension is, in order to plan a high urban quality city. The following figure represents at the same scale, the density and extent of two cities, Atlanta (USA) and Barcelona (Spain). This is also a good demonstration of the differences between American cities and the European ones, regarding to urban sprawl.

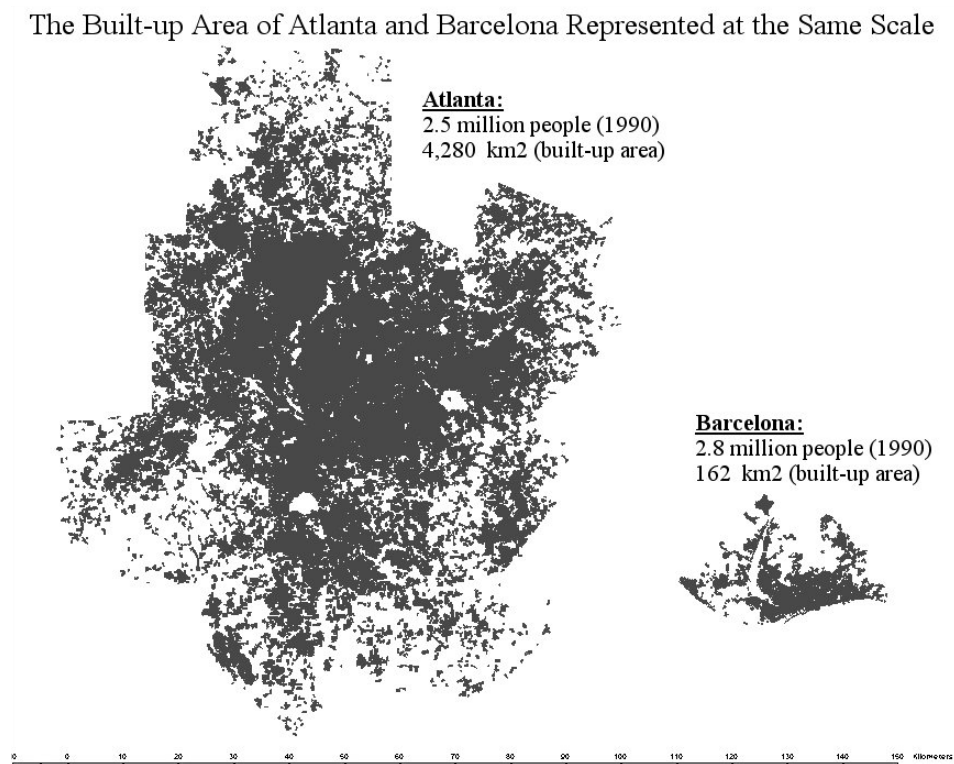


Figure 2: Density and extension comparison between Atlanta and Barcelona (Bertaud, 2010)

The map above shows Atlanta and Barcelona built-up areas at the same scale. Barcelona with 2.8 million had a slightly higher population than Atlanta in 1990, with 2.5 million people. This graphic illustrates the importance of densities in making transit possible. To provide a 12 minutes' walk access time to transit stops for all of its population, Atlanta will have to develop and operate 4280 kilometers of transit line while Barcelona could provide the same service with 163 kilometers only. If Atlanta wants to maintain a frequency of 5 minutes between buses during rush hour it would have to use at least 2800 buses while Barcelona could provide the same service with a minimum of 108 buses. In spite of this enormous advantage the % of de by public transportation in Barcelona is only 30% of total trips, versus about 4 % for Atlanta.

This simple example show us pretty clear, how high should be our concern about people. Planning a city, including its public transport systems, should have has primary care how people change through time and how they embrace the space.

## SPACE

The public space is where all the diversity of a city is. It is the space of reference for assessing the diversity of a city. Mobility is required for advertising space, is the connection with the rest of the world. This connection is only possible due to mobility. The individual car privatized space, while public transport flame and produces public spaces. There is a contract in public areas of civilization, accept an interaction and a vulnerability to society, with one condition, we assume that we are safe and that you cannot betray this trust. The public space is a place of commitment and freedom. (Lévy, Urbanité, 2013)

A space can have three different patterns of conception. First, it can be used as a network, a space to cross to go from one point to another. Secondly, space can just be a place, like a stage for the performance of the actors. Finally space can be seen as territory, when someone feels that certain space, although public, belongs to it. Actually, the same space can have different meanings, depending in each person perspective.

Accordingly on *How to turn a place around: a handbook for creating successful public spaces* (2001), a public place can present four different roles:

- Places as symbols of the identity of cities;
- Places as a factor of local economic development;
- Places as promoters of environmental balance;
- Places as stages for venues and cultural events.

There are a several things to have in minded that make a good public space. The importance of ordinary people in creating good public spaces is most of the time underrated. Mobilization of local knowledge is an invaluable asset. A good public space might depend more on good current management than on a good project. The interaction between elements of one place to reinforce each other's use should be a bottom up priority, the effect of functional complementarity and spatial continuity. A public place should seek to promote synergies and activities that encourage the connections between people and places.

It is important to understand that space is made by history and changed by a lot of different actor, such as the tram. Public spaces are an integral part of urban space and its transformation. Public spaces are considered crucial vehicles for overcoming slow decline or fast-paced phases of shock.

The offer of the place is obviously very important to it. It depends on what kind of equipment the place gives to the population, but also on business companies, commercial stores, public services or events. As mentioned before, to have a high level of urbanity, the offer of the place should be dense in space and as diverse as possible. Diverse offer means diversity in the people who use or live the space and that fact turns into a richer place in relationships. Tram has an obvious influence in the equipment and equipment also influences the tram. The equipment can also be permanent or ephemeral.

One thing that makes all the difference between places with high and low grades of urbanity is the way people use the place. In a place with high standards of urbanity, we can see that the people actually live place and don't just use it. These two concepts are completely different and can make all the distinction. And again, it depends in a big percentage of the offer of the place. Usually the urbanity goes where place can accommodate people who use it for functional and also social activities.

## TIME

In the world of astrophysics, the unbreakable connection between space and time is known and studied for a long time. So probably in the studies of the urban space, the variable of time cannot be forgotten as well. The correlation is not the same in both cases, but they share the same idea that one needs the other to exist.

The urbanity is not a static event, it occurs in time. Time and rhythm compose a non-physical dimension of urbanity. According to Louis Wright (1938), "As long as we identify urbanism with the physical entity of the city, viewing it merely as rigidly delimited in space, and process as if urban attributes abruptly ceased to be manifested beyond an arbitrary boundary line, we are not likely to arrive at any adequate conception of urbanism as a mode of life." Urbanity is phenomenon that occurs at every second and constitutes a major part of what an urban environment is. So, assuming this as the right way of thinking, the notion of urbanity has to go further than only the physical part of a city.

A complex change in a city, like a construction of a new public transport network, breaks a rhythm of the city and of its citizens. This kind of changes, lead us to a new period of time where the city is adapting itself. The level of urbanity of a place not only needs rhythm to develop in its daily basis, but also needs time to recover of a traumatic situation.

Public spaces have to be understood in all their magnitude, as spatial catalysts for social change. The focus on the rhythm of an urban environment helps to emphasize and foster the integration of everyday life patterns. Time patterns that allow everyday life to flourish in a playful and absent-minded way are hardly graspable when following the dominant linear conception of time.

Lefebvre's rhythm analysis revealed crucial ambivalences of time conceptions in understanding everyday life under conditions of capitalism. *Le quotidien*, the everyday, *der Alltag* – all three terms, taken from French, English and German respectively, employ at least a dual meaning, one related to the mundane and ordinary minutiae of everyday life, the other referring to repetition and the repetitive character of spatial practice, connecting in a more abstract sense to a different reading of space, time and history. (Degros, Knierbein, & Madanipour, 2014)

On a more palpable scale, rhythms play a major role regarding acts and practices of civil resistance and struggles of appropriation. Through rhythm, civil, and therefore social, time seeks to and succeeds in withdrawing itself from linear, mono-rhythmic, measured time. Thus, public space spontaneously becomes a place for walks and encounters, intrigues, diplomacy, deals and negotiations. That way, the time and the rhythms of the people who occupy this space are linked back to space. Through rhythm considered as a lens or a filter to rethink different themes related to public space, alternative ways of investigating the robustness of spaces can be practiced, conceptualized and discussed. In that respect, rhythm rather serves as a tool than as a mere object of analysis; ranging from an enquiry of the spatiality of the body, over the mechanical repetition of cycles of social (re)production in capitalist societies, to the local time patterns of global urbanization processes. Whereas a focus on resilience in understanding the potential robustness of public space might suggest an emphasis on duration and continuity, and thus a sort of linear balance over time. It is a cyclic reading of a place's robustness. (Degros, Knierbein, & Madanipour, 2014)

Places are able to deal with particular times and situations when existing orthodoxies are open to challenge, when things have the potential to be overturned or radically altered. These are the moments when rhythms are broken, and may disappear or reemerge with a new beat. These moments of space are condensed into new rhythms and their modes can be analyzed by using rhythm as a tool. As far as rhythm analysis concerns the everyday rites, ceremonies, fetes, rules and laws, there is always something new, different and unforeseen that introduces itself into the repetitive cycle.

This expands the conception of rhythm from everyday life practices in the present to different presents that a place has witnessed over decades of decay and top-down interventions, up until social practices and different uses appropriated the place again with their own diverse rhythms. The conception of time has of crucial importance in many urban studies or projects. Thus, it is impossible not to see that it has in itself one big dimension in urbanity.

Rhythm of a location may also occur in the movements of people directionally, socially, daily, and seasonally. These are all usually very much a part of nearly every location and a designer might want to be aware of them so as to uniquely play off of them through design. As unique characteristics overlap in a location, it makes that site all the more valued. (Tveter, 2009)

## PROTOCOL

Finished the literature review, two major questions were immediately faced:

- How to measure urbanity?

This kind of research is not so easy of being proceeded since it presents both dimensional and non-dimensional variables. We easily understand that for example the total number of infrastructure or the density of a certain population has an obvious manner of being analyzed, but the non-dimensional properties of a city, like the interactions and relationships between people and space, raises an all new kind of perspectives. This issue was constituted one of the main barriers and challenges of this work.

Through this analysis between a "soft" or "hard" of the problem, there have been a few conclusions. Conclusions, assessments and characterizations of non-physical idea like "urbanité", in the end, always end up being made of a rough estimate, hazy back and heavily dependent on each author. However, this very theoretical definition must be based and taking into account all the dimensions that can be object of equation and accuracy. Thus, this study tried to perceive the urban sense of each place adopting a soft approach, creating a definition as close as possible of reality. Nevertheless, all the possible shots of accurate measurement, such as the quantity of equipment present in a given location, has been focus of a precise and accurate analysis, using so a hard approach to this kind of situation. Therefore, we can say that both were important in this process, complementing each other.

As mentioned before, urbanity is not a concept that can be the result of some type of calculation or value. It is not possible to study urbanity as a method based in a hard approach. A hard protocol can be conceived in cases when we can reach a determine definition of a something and when its components can be measure. In the other hand, a soft protocol is relative to a fuzzy or an approximate definition of some object of study. However, a soft approach can be based in certain aspects that can be assessed by a hard approach. In the study of such a controversial concept, as urbanity, it is really difficult to find the right approach to carry this research. That is what makes this debate so interesting.

An idea like urbanity cannot be calculated or estimated. In this case, it can only compare to what was in the past and what it is nowadays. However, to conceive the perception of urbanity in a urban place, it was possible to measure certain patterns which are important components to the development of urbanity. Since people are one of the big dimensions of urbanity, it is possible through *in situ* observation, perceive and estimate the number of people using the place, you can measure ethnic or age diversity of people who visit a particular area. Similarly, with regard to the dimension of space, we are possible to measure several variables that influence the urbanity, including the number of the existent equipment, services, and places to practice commerce, its variety and how they evolved in time.

Although very useful, these measurements are only aids in a deeper study of what actually happens in a particular place. The study of local urbanity is fundamentally immaterial and non-

sensible study. The relationship between people, space and the rhythm at which these occur are dimensions that can only be evaluated using a soft approach. This approach is largely due to depending on the evaluator. That is what makes it one incredibly, interesting and unpredictable task. Although, susceptible to innumerable reviews and contrary ratings studies. The fact that urbanity is depending on multiple unpredictable actions in space and time, makes it impossible to be studied mathematically. Not a value, an equation or a number likely to be discovered there. The correct way to approach not only this concept, but several within the study of urban space, is through an abstract and soft interpretation, observing and feeling the very breath of each place.

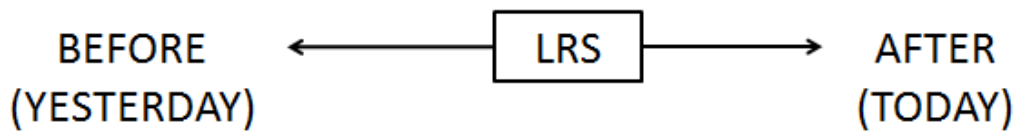


Figure 3: Protocol mindset (Designed by the author)

It is clear that the only way to progress with this research, in a practical way, is making a comparison between the urbanity levels before and after the light rail system construction. So this turns out into another main question of the protocol that was used.

- How can the past be evaluated?

The only possible answer to this problem, the author had to create and establish his own image of the past. This vision had to be grounded in all the documents available and possible information. From old pictures, until informal interviews with people how experience the city before the tram arrival. The author is aware that the view developed probably is an uncertain and not one-hundred percent accurate one. Yet, it is the only and better way to move forward on this research.

## **IMPACT OF LIGHT RAIL SYSTEMS IN A CITY**

The implementation of this kind of public transport has a massive impact in a city, and for the better or for the worst, changes the city forever in time. Environment, land use, social and economic, are the four main fields where a light rail system bumps the city.

Urban space is a precious commodity and public transport utilizes it more efficiently than a car dominant society, allowing cities to be built more compactly than if they were dependent on automobile transport. If public transport planning is at the core of urban planning, it will also force cities to be built more compactly to create efficient feeds into the stations and stops of transport. This will at the same time allow the creation of centers around the hubs, serving passengers' daily commercial needs and public services. This approach significantly reduces urban sprawl.

An important social role played by public transport is to ensure that all members of society are able to travel, not just those with a driving license and access to an automobile—which include groups such as the young, the old, the poor, those with medical conditions, and people banned from driving. Above that, public transportation opens to its users the possibility of meeting other people, as no concentration is diverted from interacting with fellow-travelers due to any steering activities. Adding to the above-said, public transport becomes a location of inter-social encounters across all boundaries of social, ethnic and other types of affiliation.

Studies have shown that there is a strong inverse correlation between urban population density and energy consumption per capita, and that public transport could facilitate increased urban population densities, and thus reduce travel distances and fossil fuel consumption. Furthermore, with a good network of light rail systems we are creating conditions for a significant decrease of the private vehicles driven on the streets. Consequently, less quantities of carbon monoxide, volatile organic compounds and carbon dioxide will finish in the atmosphere. This creates automatically a better environment in the city and it means that more citizens will feel well walking around the street in open public spaces. So, ultimately, better conditions to the growth of urbanity will be accomplished.

In economic terms, public transport allows transport at an economy of scale not available through private transport. Advocates of public transport claim that investing in mass transit will ultimately reduce the total transport cost for the public. Time saved can also be significant, as fewer cars can translate to less congestion, and faster speeds for remaining motorists. Transit-oriented development can both improve the usefulness and efficiency of the public transit system as well as result in increased business for commercial developments.

Accessibility of public space plays vital role in integration of citizens, who have problems with moving around urban area. Public objects in cities, such as buildings, squares or even multilevel intersections, may constrict possibility to travel for many users, who are unable to use specific places, due to their inaccessibility. Inadequate design of space excludes certain groups of users from full access to city resources and conducts social exclusion. (Zajac, 2013)

When tram arrives as a new component of public space, changes it in a physical and social way. Changes the composition of the place and changes the social system. It breaks the harmony, the rhythm, the dynamic of the city and is the urban actors that will reorganize themselves to a new kind of equilibrium.

In all major spatial processes that can serve as urban policy, the different public transportations represent a variable of extreme importance. With the arrival of this kind of public transportation, the city changes immediately in very different dimensions. The tram, through its stations, becomes the owner of the place where those stations are located. They are responsible in many cases for an all new public space around them and that creates new dynamics and movements. If well done, those new places will attract people and so they act like a magnet to an all new kind of players to the space. Stores will open, services will be created, new equipment to the citizens, so we can say that the tram and his inherent stations have an agglomerative effect on the space. These new light rail systems, obviously work as a network, connecting two points. The line used for these models of transportation can also work as a line of development, as a guide line of the city's growth.

The physical components of urban transport and urban utilities are constituted by spatial networks. These networks collect and distribute people, water, sewerage, storm water and solid waste across metropolitan areas. Engineers can optimize the design of networks to maximize their efficiency. However, in the course of optimizing urban network it is necessary to define the type of urban land use that will allow the optimum network. For instance, for a given target water consumption, water engineers can calculate the optimum population density that would minimize the input costs of the network. Urban transport engineers have more difficulties in optimizing their network because of the various potential mix of transport mode. However, if they define a dominant mode, a tram network for instance, they can also define, for a given level of service, the type of land use and street pattern that would allow to minimize capital and operation cost.

In practice, land use, or more generally an urban spatial structure, is the product of the interaction between land markets and regulations. Economists would normally assume that land is better allocated by markets than by transport engineers. Besides, the real estate market would normally reflect the various network costs (it should be noted that optimizing a water network would result in a type of land use significantly different from the one obtained by optimizing a tram network). Network specialists feel justified in recommending an optimum land use that would by-pass market signals because the cost of a primary infrastructure network is practically never directly related to the price of land as its financing comes either from general taxation or from a financial pool generated by tariffs. The fact that the land market fails to integrate the cost of primary networks appears to demonstrate an obvious market failure which then justifies a heavy dose of regulatory intervention.

Increasingly, urban transport is considered one of the major unresolved problems in large cities because of the pollution and congestion it generates. In Europe and in North America there is an increasing demand for what has been called "Transit Oriented Development" (TOD). TOD is nothing but a partial administrative allocation of land through regulations. This allocation would allow an optimization of transit networks and as a consequence a significant

decrease in both congestions and air pollution. To make land use more compatible with an efficient transit network, TOD advocates are proposing regulatory measures which would significantly alter the spatial fabric of existing cities. The main features of TOD are the creation of high density transport corridors, and the setting of urban growth boundaries. Urban growth boundaries would limit the supply of land available for development and therefore force higher densities and more contiguous development easier to service with transit.

The major example that could be presented, to provide a clear idea of this theoretical framework, is the Curitiba experience.

### Curitiba

This south Brazilian city was developed under the following basic concept: *A city is a place of encounter, encounter of people achieving together what they couldn't achieve alone.*

Curitiba remains as a tremendous example of how a city has structure itself through the public transportation. This city is the ultimate paradigm, regarding to the sustainable urban development. In Curitiba, we don't have the casa of a light rail system, instead the built a BRT (bus rapid transit) system network. This public transport reaches such a magnitude, that in 2010, it had 2.7 million passengers per day. This represents more than the number of the population that the city has.



Figure 4: Curitiba's BRT network (Source: Wikipedia)

With the appearance of this mode of transport, the urban structure of the city began to develop along the transport corridors, instead of developing around its center, as was the case until then. It was also very important for the revitalization of certain areas of the city, which can be transformed into urban areas, which is essential for the sustainability of the city. This network of public transport is a fundamental flow structure of the population, which keeps the city from becoming a madness chaos, like other Brazilian cities. Through this example, we realized easily that by public transport it is possible to improve the population quality of life. In

the next image, we can understand how a public transport line, transformed into a complex network that roles and integrates the entire city.

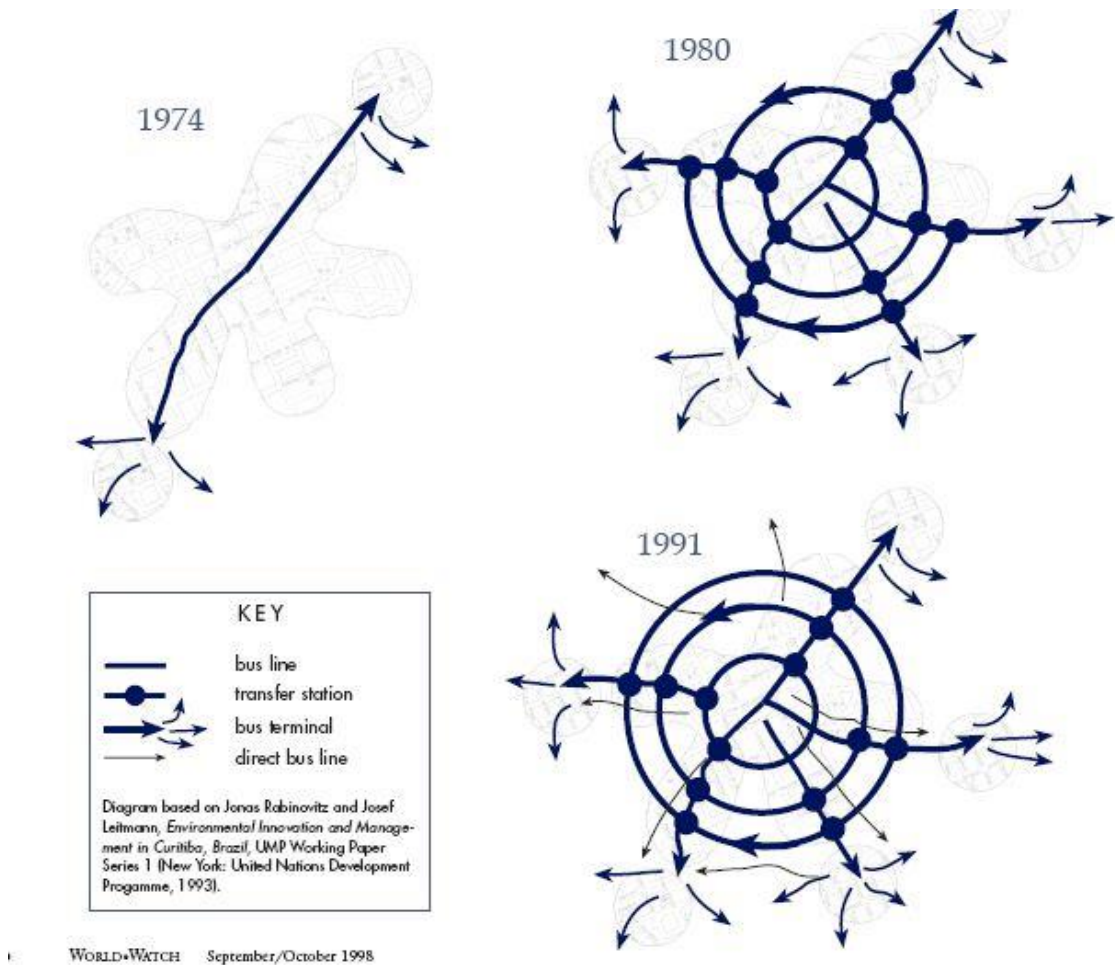


Figure 5: Evolution of Curitiba's BRT network system (Source: <http://boiseplanning.wordpress.com>)

The bus transport system of Curitiba is often given as an example of successful integration of transport and land use. The transport solution selected (bus corridors) has dictated land use. It confirms the danger of ignoring land markets, even to optimize transit operations. The spatial outcome is a city where trips are much longer than they would have been if land use had been mainly generated by the market. The large high density areas at the periphery, not even directly connected to the transport corridor shows the difficulty in adapting a "command land use" to normal city expansion and changing economic base.

That would be tied to communication, in that case public transportation. You cannot do that with private owner mobile. They built high density development along the transportation routes, using open spaces as another major space of encountering.

They built this concept on simple ideas around humans and their problems and potentials, like for example:

- How people get together;
- Who do they get to know;
- What are the social connections;
- Planning on a human scale;
- Each one has to feel a part of the city/community;
- Understand the history.

They think how the transportation can improve the safety and the health of people. One of the secrets of the city is you don't think of the pieces as an isolation, you think how they relate to each other, how they complement each other, how they reinforce each other. We have to imagine cities that incorporate physical public space and the virtual public spaces and the two have to work together in a complementary way.

## CASE STUDIES

For this study, five places were focus of a deep analysis. The first two chosen sets are located in Tours, a city in the center of France. The area around Gare de Tours, Rue Charllés Giles and Rue the Bordeaux compose the Set 1 and the Set 2 is located in the north part of the city. The other three case studies belong to the tram network of Porto, the Portuguese second biggest city. Part of the historical street Rua de Brito de Capelo in Matosinhos, part of the Avenida da República in Vila Nova de Gaia and area around Hospital São João, known as Asprela. The different places were chosen with the objective of pursue the most variety of situations, experiences and conclusions, not with the goal of comparison between the two different cities.

### TOURS

#### TRAM ARRIVAL

After some decades of debating this idea of taking a light rail system to the city of Tours, only three years ago it becomes a reality with the start of the construction. After those three years, in September of 2013, Tours has finally their so desired tram line.

According to the *Cahier de préconisations et de recommandations*, a document developed for compiling the major ideas of the tram, we can see how and what were the big concerns of this project. The following topics, taken from this document, resume the idea behind this huge investment:

*The city is the tram and the tram is the city*

The line does not arise on the town without the build. Its stations, its inter-stations and vehicles (which are true mobile sites) are generators spaces. The urban integration is the fabric of the city by the arrival of the tram.

*Line gives access to places*

Stations make the place that is to say, the space for which prevails proximity and not distance. The station is a door that opens onto the space that surrounds it. It must not be empty, but also dense and diverse as possible. The station must contribute to increase the quality of the space to which it gives access.

*The line connects*

The interstation is space travel. With surface transportation, open to its environment, the space of the interstation should not be understood as a space that must quickly pass or forget. Although it should go as soon as possible, this area should contribute to intensify the "city view" from the mobile place that is the tram. The interstation must be designed as an urban landscape. That said, the manufacture of the city by tram is defined at three levels. The first is

the urban space as a whole. The second concerns the medium traversed by the line, the inter-station. The third relates to urban locations that each of its dessert stations.

*The tram line carries urbanity*

A good location of stations, the line should lead to heart strategic locations transportation. The line connects the associates, the united. It should not stay in a remote place first. And if there is not another solution to be in the access, the urban insertion of the line will amount making come the place to the station or extend urban space towards it.

*Generator of centralities*

By creating centers of centrality in the urban areas uncertain line led to the choice of location of stations that enhance existing support points and ensure good urban insertion. By strengthening the urbanity in the downtown core, the tram must emerge places that recover Tours in the city scale.

*Opened on the river*

Line renews the relation of space to the river by bringing more river in the city and the city near the river.

*A monument moving of urban scale*

Putting places together into a whole, the line plays their difference, their complementarity and their neighborhood. With the line, each of these places is present in each other.

*An urban centrality*

The line is a shared urban centrality which nourishes centers of served districts. And to make space on this scale, it is to reinforce this shared centrality, by the architecture and the landscape quality of the places, by the architecture of the frame, the functions present of each one of them.

*Similar and different places*

The line is a network of central places which must be at the same time similar and different. Different by the functions, different by their density and their diversity, different by their history, but similar by the research of the same architectural and landscape quality. It is as many places as there are stations. The station exists fully only by its relation with the place. It connects places and makes the place.

*An exchange enters the place and the station*

The station it's an element of composition of the place. One arrives there of some share and to go some share. It is an entry, an exit, an interface which connects public space to private spaces. It is a space of the parking and circulation. To conceive a station, it is to conceive all its relations with its environment, all its relations with the components of the place which is formed by relations of proximity. That is to say integration is automatic because the station is in a zone with strong urbanity. In this case, the station and its accesses bring more urbanity

than it is necessary to articulate with the others. That is to say the station is a point of support to develop the urbanity of the place and it is then advisable to work two elements, the reinforcement of the station like pole of services (trade, equipment), the bond with the preexistent elements of urbanity. From the station, the place is recomposed, structured to mark the proximity between this station and the places principal which it serves, its perimeter of attractively. The line is at the same time a ribbon and a whole of re-structured places, as well for the comfort of urban as to increase the urbanity of space.

*There is no place without centrality*

The centrality is a relation and not a position. The centrality of the stations places is not defined by their geometrical position within the line. It is defined by the density and the diversity of the material and immaterial components of each one of its station places and by the diversity of the multimode exchanges which give access other distant places. New urban centrality, the line should not be made up of places without centrality, in particular its ends. It is probably there that the centrality of the line is played and not in its medium which corresponds to the traditional center town, where the multimode exchange will be reinforced with arrived of the tram.

*Landscapes to run through*

The line is also a sequence of interstations, spaces of the voyage. It must be as many landscapes to traverse (as fast as possible) to see the nature of the city and nature downtown. There are the patrimonial landscapes of the Loire and the Cher, of the street Nationale, the Tranchée, the rise on Joué les Tours, etc. And then, there are those to qualify, as the space which goes from the place of the belfry to the Maginot Avenue or that between the center of Played the Turns and the last station.

The next image shows us the impact that the tram, even before it is working, had in the city of Tours. This image represents the localizations of new buildings, since the tram starts to be built in 2007. We can immediately see how determinant it was, mainly in the north part of the city.

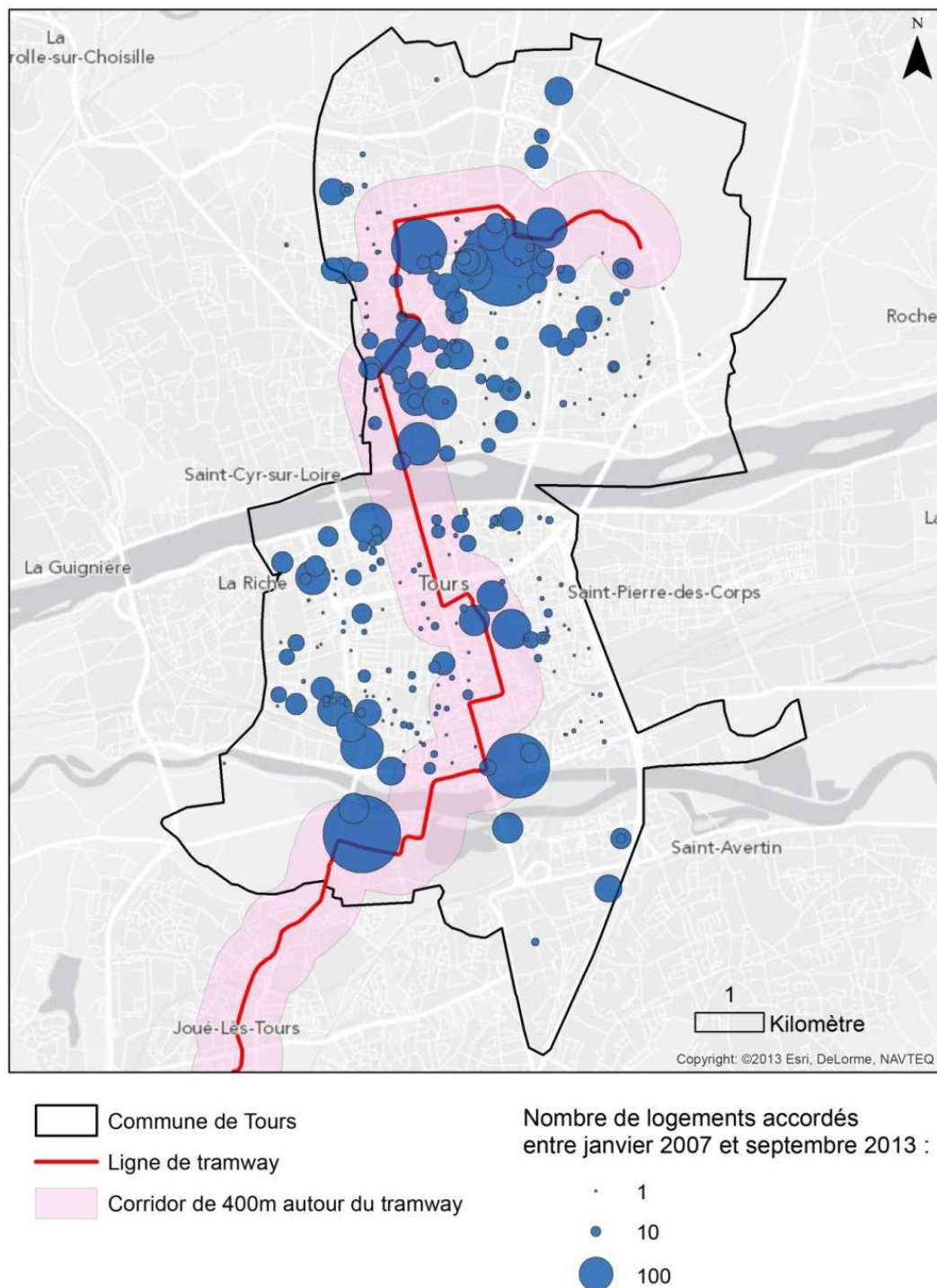


Figure 6: Evolution of houses, between 2007 and 2013, in Tours (Angel, Offredo, Navarre, Poly, & Pruche, 2013)

As mentioned before, two places were object of analyses. The first one, named Set 1, is composed by the areas around Gare de Tours, with more attention for Rue de Bordeaux and Rue Charles Giles. The second set refers to the north part of Tours.

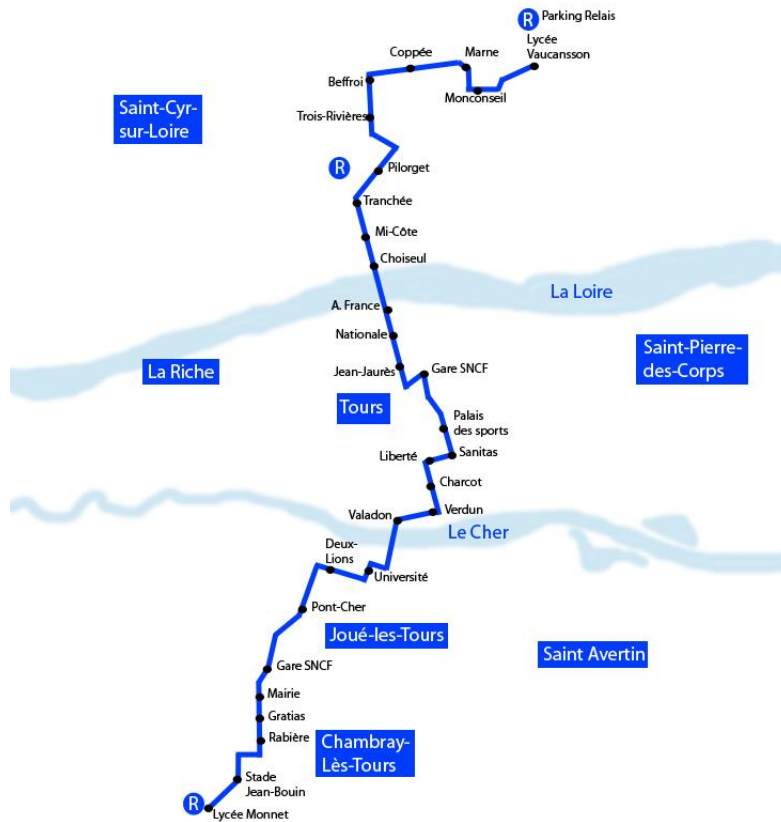


Figure 7: Tour's tram network (Source: Wikipedia)

## SET 1 – GARE/RUE CHARLLES GILES/RUE BORDEAUX

From the oldest to the most contemporary cities, railway stations are allocated in central places. Usually surrounded by easy accesses, namely for the cars. However, the urban space around these important stations was always planned to the cars and not to the people. Always have been taken as points of departure and arrival and never as places where people actually could live and stay comfortably.

Previously, some 50 years ago, the space that surrounds the Gare was dedicated to cars. Since then we have been witnessing many changes in this space that is so important in the city. These transformations have been made carrying a path to return this space to people. The inclusion of the tram in this equation was the last change in the city of Tours, allowing the tram and his station to take over the space from one side of Gare. This led to the demolition of some buildings as mentioned above, creating a wider space, idealized and design for individuals and the soft ways they move. The tram came thus create conditions for increased local urbanity, which is taking place now. Achieved by the reports of several people, this area was never before so frequented by the population.



Figure 8: Gare of Tours, 50 years ago (Source: Wikipedia)

As shown in the previous figure, dating back to the 60s, the public space around the station is reserved almost exclusively to the automobile. Nowadays, instead of a parking lot, we see a large public square where many people use it daily for a variety of tasks. To serve as crossing place, as a place of interaction, or to be stage of one-off events that place fits to energize the city. In order to give this space to people, various works have been performed at this place along the last decades. That said the installation of the tram station and its transit corridor, are the latest measure taken in this path to remove the cars from this area of the city. Thus, over several years, conditions for the urbanity of the place grow, have been created.

The block around Gare is an example of how the tram has created public space, with highest level of security, thus increasing the levels of urbanity. The tram was used to clean the area leaving it more exposed and therefore more secure, allowing greater variety and quantity of people and relationships that are conducted in this important area of the city. Tram worked as a creator of quality public space, as can also be found in the northern part of the city. The fact that some buildings have to be demolished to allow the passage of the tram, enable the area to become more exposed and open to the population, therefore less favorable to crime and illicit activities.

Rue Charles Giles presents the same coefficients of urbanity, before and after the arrival of the tram. The urbanity in this particular street is very poor, with a lot of spaces on the ground floor of the buildings empty. We also can see some houses and garages entrances, public services (police, filbleu) and a restaurant. People seem to use this street, only as a fast way to go from Avenue Grandmont to Gare and the other way around, without any interaction with

the place and his offers. The bigger percentage of the street width is used by the tram, the pedestrian path is short and has some obstacles to a comfortable walk and there is also a single lane for cars.

Rue de Bordeaux was been ever known by one of the main points of the movement of the city of Tours. Assuming a crucial role in the commercial circle of this urban environment, this feature has persisted over time. Like we can see in the following figure, this pedestrian street has seen high levels of urbanity for several years.

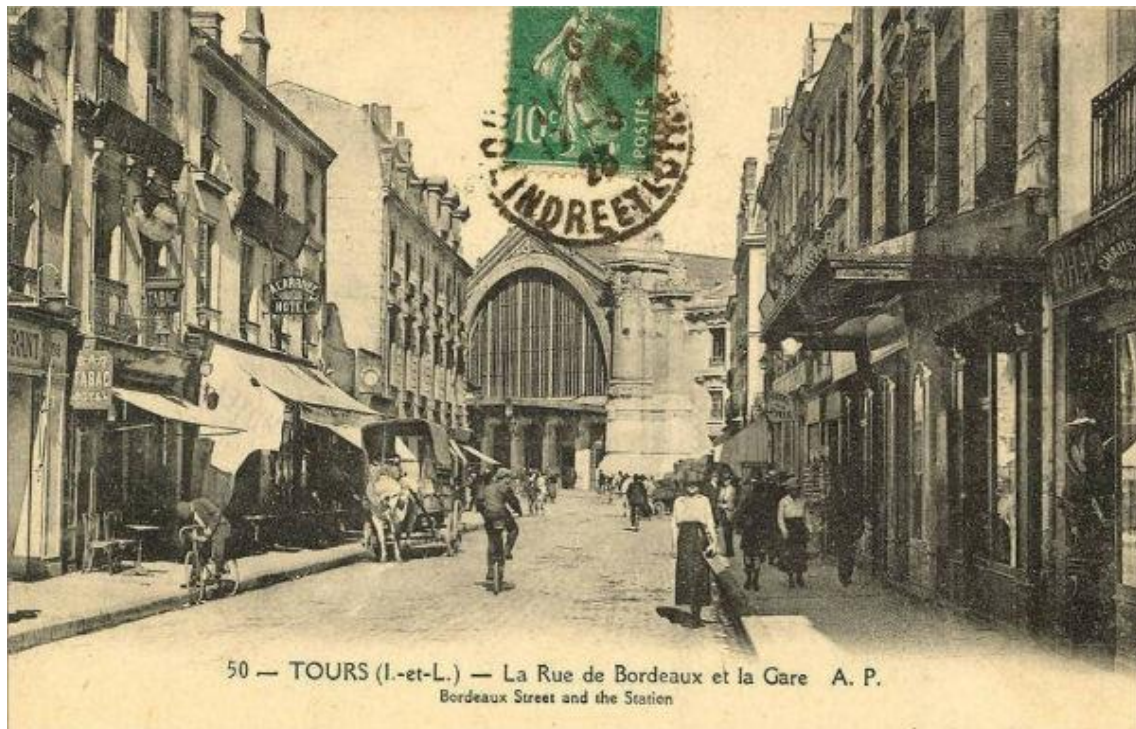


Figure 9: Rue de Bordeaux, several decades ago (Source: <http://letramdetours.blogspot.pt>)

Perhaps it is here, in the Rue de Bordeaux, that levels of urbanity take the maximum values in the city of Tours. This pedestrian street links the Gare to the Jean Jaures, one of the main squares of the city. Largely occupied by shops and restaurants, it is daily invaded by people of all ages and from all social status. During office hours, the interrelationships between people and between people and space are rich in diversity and quantity. As this is a street with a reduced length, this shows not only a high density of different uses in buildings, as people who attend to them. This high density associated with the great diversity of local supply, makes this street an example of a place with extremely high standards of urbanity.

As we can see in the following image, on the right side Rue de Bourdeaux stages an immense flow of pedestrians. On the left side of the picture, we can see the Rue Charles Giles, where we see a car and the tram taking care of almost all of the space, making it not used by pedestrians.



Figure 10: Rue de Bordeaux and Rue Charles Giles, 2014 (Photography taken by the author)

Mostly on Rue Charles Gille, tram brought no consequences in terms of urbanity. The street has no tram station and is only used as stepping stones link from Gare and Jean Jaures. Moreover, the tram came to occupy almost the entire width of the street, which together with the line dedicated to cars, leaves very little space to be used by pedestrians.

However, even before the tram this street had the same characteristics, little pedestrian traffic, short offer of uses and a limited range of equipment and services. Historically and until the present day, all the commercial supply and movement of people is preferentially given to the Rue de Bordeaux. This one, almost parallel to Rue Charles Gilles, exclusively pedestrian street is probably the busiest street in town and where the higher levels of population density can be seen. Though to the short distance separating the two streets and both of them responsible for the connection of the same points of the city, there is no reason why this trend will change, as the Rue Charles Gilles offers no advantage over the Rue de Bordeaux.

It makes sense that the tram stop at Gare, for various reasons, and considering all the possible solutions to follow the line of the tram towards the city center, the solution created was undoubtedly the best one. The task to find the ideal solution in order not to decrease the levels of urbanity of this crucial area of the city, were accomplished.

Another interesting inference of this study, involves the perception that many people come to use this part of town with much greater frequency than in the past. Also another kind of use is given to this space, due to different environment it offers. The tram came undoubtedly bring a

plus access to this area of Tours and came to reorganize the space around the Gare in a more legible way. This space which today allows the organization of several events, such as the Wine Festival recently held. With no doubt, events of this kind give a new life to public space and generate new positive relationships, between people and space.



Figure 11: Wine event at the front of Gare de Tours (Photography taken by the author)

This new arrangement of space, headed to the people and not for cars, makes the degree of urbanity in this area growing. This development is the result of a cycle between people and space. Positive changes in space mean that more people will use it, which means that there is a greater supply of forms of use, which in turn attracts more people. This positive cycle exists as a particular location is a rediscovery of new dynamics and relationships, usually induced by changes in the process space. This whole procedure needs time to develop and it is through these relationships between person-space-time that a particular place gets new life, in other words, acquires urbanity.

## SET 2 - NORTH PART OF TOURS

The north part of the city of Tours, served as base for the second case study. Here we can find a very different situation from the first example. This part of the town is characterized by small standards of urbanity. We can see that it is mostly used for residence activities and some small commerce and services.

First of all, it is amazing how well the tram crosses the part of the city. Sharing his lines with cars and buses and outlining perfectly the shape of the city is beautiful to see. Of course a person without background in urban planning couldn't see with the space same insight. However, all the people can understand and feel if a place is comfortable and moves into the population needs. As in the district of Gare, a lot of new urban places were created along the tram line and around his stations. The next picture shows us the renewed *Place de la Tranchée*, where we can see that the tram had a huge influence in the public space. An all new kind of relations can now be notice in this renovated place. For example, we can now see little kids using this new public furniture to practice their skating skills. The development of this kind of relationships between people and space is what makes the urbanity increase.



Figure 12: Place de la Tranchée, Tours, 2014 (Photography taken by the author)

This area of Tours lives with the strong stigma of being located in “the other side” of the river. This creates a huge mental barrier in the minds of the population. Although it is more near to the center than other parts of the city, the river creates the illusion that a lot is needed to cross it. So in this case, the tram has a tremendously importance in breaking the idea. We can say that must of all, here the tram fulfils is primary objective of filling the gap between two places separated by distance. This giant improvement in the accessibility of the place, invites people to start using this area more often. Through this upgraded mobility, the citizens feel more comfortable of living this north district of Tours and that brings more commerce, more economic institutions and more life.

In an informal interview with a person who works in the field of construction, we could confirm that almost of the new constructions for three years, when the tram starts to be implemented, were located in this north part of town along the tram line. We can even see today a lot of constructions in this area, as it is shown by the following picture. Probably, as it happened in Porto, this occurrence will extend some more years in the same direction.



Figure 13: Street in the north part of the city of Tours, 2014 (Photography taken by the author)

## PORTO

### TRAM ARRIVAL

The Porto's light rail network is considered to be one case of huge success. The first line was inaugurated in 2002 and in the next four, five more were built. This public transportation system covers all the Porto's metropolitan area, which includes seven different cities. The network is composed by an electrified underground railway network in the center of Porto and in the periphery it roles in the surface. For this research, three cases were chosen. All of them with different narratives and characteristics, have provided a terrific level of experience. The historical street Rua Brito Capelo in Matosinhos, Asprela district in Porto and Avenida da República in Vila Nova de Gaia were the chosen places to go through this study, which are spotted in the nest map.

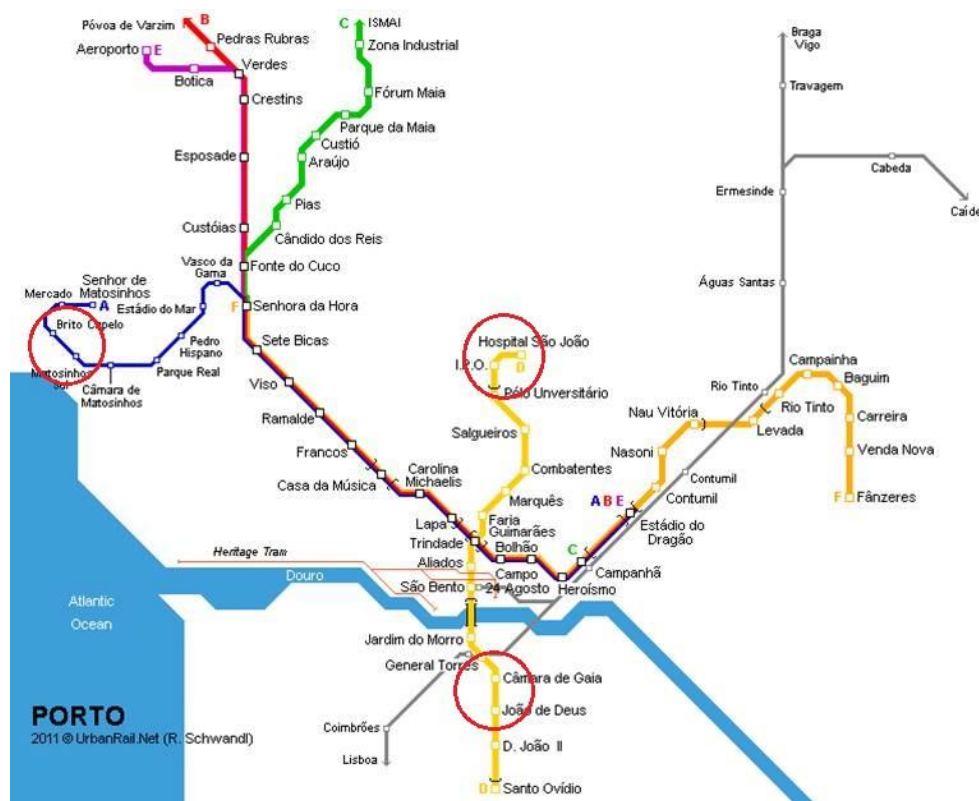


Figure 14: Porto's tram network (Source: <http://www.urbanrail.net>)

### MATOSINHOS - RUA BRITO CAPELO

Rua de Brito Capelo, is an historical street of Matosinhos, known for their tradition in local commerce. This is a paradigmatic and one of the most interesting examples. In the last decades this street used to have a huge power in terms of commerce and daily life interactions. However in the last decade, it has been losing its brightness and liveliness. Nowadays it is full of empty stores and messy rules where in the past was the prime space of the city of Matosinhos. Although the time of this decline matches with the arrival of the tram, the author is not so sure that it is the only responsible for this loss of urbanity.



Figure 15: Rua Brito Capelo, Matosinhos, 2014 (Photography taken by the author)

Responsible or not, the truth is that the tram couldn't bring any benefit to this street. The power to attract business and activities or even to re-order the urban space in a better way, passed completely out of this street. One possible explanation, observed in situ, is that the cars are allowed to park along the tram line. This situation withdraws all the space to people walk comfortably. However, more reasons not identified with this research, have to exist to justify this situation. Ten years ago everyone would said that this street would be perfectly adapted to the tram, because it has everything to achieve it. The fact is that ten years passed with the arrival of the tram and the street lost all its urbanity and no one can be sure of the reasons. This shows how unpredictable and variable these subjects are.



Figure 16: Rua Brito Capelo, Matosinhos, 2014 (Photography taken by the author)

## VILA NOVA DE GAIA – AVENIDA DA REPÚBLICA

Vila Nova de Gaia (often known by the syncopated form of Gaia) is a Portuguese municipality, which still belongs to the Greater Metropolitan Area of Porto. Currently it is the third most populated municipality of Portugal.

The Republic Avenue is the most important motor city of Vila Nova de Gaia. With a total length of 2550 meters, starts in the *Rotunda de Santo Ovídio*, in Mafamude, and ends in the upper deck of the bridge Luis I, near the *Serra do Pilar*, in Santa Marinha.

The fact that Luis I bridge, inaugurated on October 31, 1886, have a board to an upper bound, forced the opening at the southern margin of a new access road. The installation of a tram line, in 1905, coming from Porto, labored to tear a trench in the middle of the hill known by *Serra do Pilar*. This sequence of events led to the creation of the current avenue, although at the time it was called by *Avenida de Campos Henriques*. This old tram permit easy access to the city of Porto, which valued the avenue, making it gradually an urbanized area and a new center of Vila Nova de Gaia, away from the waterfront where so far focused all the services, trade and political power in the county.

The Avenida de Campos Henriques was being extended through time to the south and suffering successive improvements. The growing importance of the site lead that in 1914, the city council has decided to transfer from the old place, to the corner of the avenue and street

Alvares Cabral, inaugurating a new town hall in 1925, right in the middle of Campos Henriques avenue.



Figure 17: Town hall, Vila Nova de Gaia, 2014 (Photography taken by the author)

The real estate value of the land that surrounded the avenue was growing steadily, leading to the construction of numerous manor houses surrounded by gardens, especially in the northern part of the boulevard closest to the city of Porto.

After April 25<sup>th</sup> of 1974, the day of the Portuguese revolution, the avenue adopted its current name, *Avenida da República*. The economic dynamism that, over the past decades, is generated along this axis, caused profound changes in its urban structure. The palatial family homes gave way to tall buildings, the residential function, combined with other functions of the tertiary sector.

Nowadays, the *Avenida da República* remains as the most important avenue of the city and is the home for the big part of financial activity generated in Vila Nova de Gaia. The recent installation of a unit *El Corte Inglés* has further strengthened the commercial function of this area, emphasizing the centrality of the avenue in this city.



Figure 18: El Corte Inglés, Vila Nova de Gaia, 2014 (Photography taken by the author)

Throughout this process of development, the tram has its share of the responsibility. Before the arrival of the tram, the movement of this street essentially ended where the town hall of Gaia is located. After this institutional symbol, the following space of the avenue was not any kind of attractiveness for the population. This ends in a great extension of the most important avenue of the city empty of life, without any use or usefulness. This changed with the arrival of a large Spanish commercial unit, *El Corte Inglés*. It is here that the light rail system acquires an extraordinary importance. This big commercial network chose this location to install their next infrastructure, just when they knew that this would be served by the tram. It was implemented in this area of the avenue, due the fact of having a metro station across the street. This situation obviously provides better accessible to a larger number of potential users. Thus the tram was responsible for attracting new businesses and new investments, which led to the urbanity of the avenue is extend to new spaces and new dynamics were created in places that were not previously desirable.

The implementation of this business unit has brought a new dimension to this part of the avenue, which now its constant motion and movement of people does not end in the town hall. The construction of the metro line and its stations were fundamental to elevate the levels of urbanity in this part of the avenue. New small shops and businesses have mushroomed in recent years, thereby increasing both the density and diversity of uses. This leads to an increase of the numbers of relationships between people and space and so the urbanity raise.



Figure 19: Avenida da República, Vila Nova de Gaia, 2014 (Photography taken by the author)

## PORTO – ASPRELA

Asprela district spreads over an area of 100 acres, in the parish of Paranhos. Presents itself constrained by VCI, the Estrada da Circunvalação and the highway A3, which currently concentrates a large number of institutions, agencies, and public and private services, from the Hospital de S.João, the Portuguese Oncology Institute and some of the larger units of the University of Porto, Polytechnic Institute of Porto and private Universities, Centre for Research & Development, business incubators, among others. It is estimated that every day, more than 45 thousand people use this area of the city of Porto.

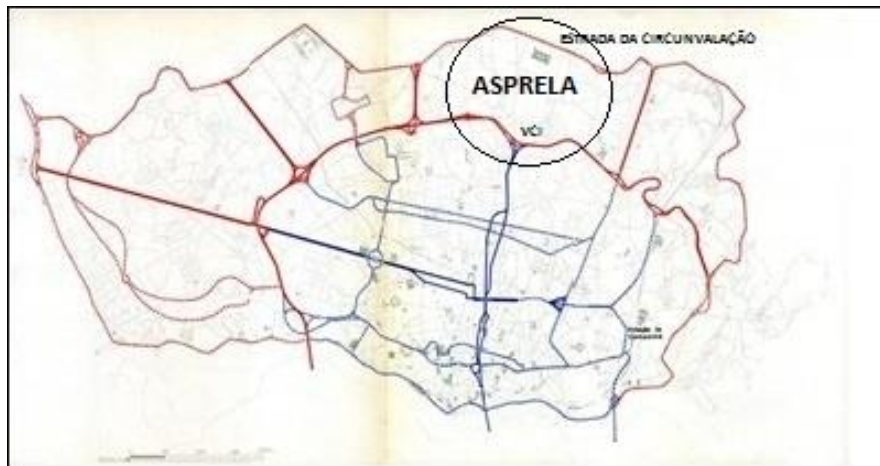


Figure 20: Location of Asprela in Porto (design by the author)

This area of the city of Porto constitutes an interesting case study and is an perfect example of how a public transport, as a light rail system, can be decisive in the development of a city strategy.

For more than a century ago, Porto saw its city limits being surrounded by National Highway 12, better known as Circunvalação. This extensive urban road, built between 1889 and 1896 came to stamp a physical boundary in the city of Porto and the municipalities of Maia, Vila Nova de Gaia and Matosinhos. By this time, the ring road constituted the reference demarcating urban city outskirts.

Some years past, is through the mind of Anthony de Almeida Garrett that first appeared the idea of building an avenue that would bypass the city center. This avenue initially thought of as urban would encircle "the neuralgic region of the city, the seat of commerce, offices, banks, cafes, cinemas, theaters, hotels, restaurants" is present in the *Plano Geral de Urbanização da Cidade do Porto*, an urban plan designed by Almeida Garrett in 1947. Later, in 1962, Robert Auzelle in its plan for the city incorporates some of the previous designs, trying to tackle the rampant car traffic. It outlined the major highway of Porto, the *Via de Cintura Interna (VCI)*, which assumed a profile of a highway and no longer an urban boulevard.

The construction of the VCI, officially named IC23, has created a very strong barrier in the city of Porto. This highway became the boundary between the urbanized center and rural periphery. This idea took root so deep the mind of society, which more than a physical barrier, the VCI was a mental barrier that lived at the head of the population. This led to a path where all the development of the city of Porto was within this ring. Consequently, the city that lies between VCI and Circunvalação was completely forgotten, as is the case of the area of Asprela. While the city center was the target of constant infrastructural and social development, these forgotten areas of the city gave way, particular in the study area, to huge abandoned fields where only some agricultural activity was developed.



Figure 21: Example of land use of Asprela district years ago, Porto (Photography taken by the author)

Behold, in 2004, the underground network of the Porto is opened and the whole dynamic of the city undergoes profound changes. However, only over a year, more precisely on September 18, 2005, appears to open the Line D (yellow). This line connects the center of Vila Nova de Gaia to the extreme north of Porto municipality, ie the Asprela district, crossing through the historical center of Porto. This transport network was responsible for the break down of the huge barrier mentioned before, which until then seemed to limit the areas of urban development of the city. The tram line extended the city radius, leading to a new view by the population of the zones between the VCI and the road Circunvalação. These areas were no longer seen as peripheral. The physical and mental barrier was reduced due to the implementation of this public transport system, enabling a previously "long" distance between the Asprela district and the downtown was shortened. Since then the two areas are linked by a ten-minute drive.



Figure 22: Tram station at Asprela, Porto, 2014 (Photography taken by the author)

As a result of this urban intervention came a huge paradigm shift in the way this part of town was experienced. From year to year, these areas were subject to innumerable interventions. Since an abrupt growth of the housing market, the emergence of the largest teaching and research center of Porto, until the construction of multiple equipment and services. The tram was in fact, although it has passed unnoticed for many older residents, largely responsible for the dynamism and movement that Asprela acquired in the last decade. This study case comes also show that it takes a long time for an intervention of this volume give all its fruits, because even today we see new developments in this growing area. This light rail system has brought mobility to the population and accessibility to a forgotten part of town, which attracted investment and private capital. This quantitative and qualitative development in the range of diversity of the space, attracted many people who are responsible for given to this district a level of urbanity incredibly higher than ten years ago, at the inauguration of the tram line.



Figure 23: Environment around tram line, Porto, 2014 (Photography taken by the author)

Finally, the development was such in this area, that a new metro line was projected, although it is still on paper for lack of funds.

## CASE STUDIES NOTES

Both cases of Tours present indications that their urbanity will raise in the next years, although they start in different levels of urbanity and different increasing speeds. Set 1 is likely that over time develops to find their new equilibrium point, this surely with a higher state of urbanity than was found until the arrival of the tram. This can also apply to the set 2, with the difference that probably it will take more time in the process.

We can identify some similarity between the case and the case of the Asprela and Tours North. Both had a barrier, physical and mental, to separate the city center and the periphery. In the case of Porto this barrier was strongly expressed by the VCI, a highway which cuts across the city, while in the case of Tours the barrier is the Loire River. In both cases the tram was responsible for breaking up this mental barrier from the people. Mental, in the sense that nothing physically prevents people from crossing this short distance. This led to a situation where the imaginary line that traces the peripheral radius of the city increased and with it there was a large growth of infrastructure and conditions for the urbanity grow in these sites. Probably as the same as the case of Asprela district, the north part of the city of Tours will verify an increase of urbanity from each year that passes.

The places chosen for the analysis were quite interesting and different. All gave different results and experiences which enriched this work and helped get a more accurate analysis. It is also relevant to realize the importance of the tram stations created. The most part of them not only help to create better quality public space, but also have the ability to attract new urban movements around him.

In the study of the Porto cases, the author thought that would be interesting to understand what kind of lessons and improvements were taken between the construction of the first line until the last. This became to be an impossible exercise, due to the fact that all the existing lines were created and planned at the same time, with the same ideas and presuppositions. While the construction of one line was not completed, the next one was already started to be build. So there was not a time to evaluate the impacts of the first lines, before the construction of the last ones.

## CONCLUSIONS

The research was attempted to conclude that the hypothesis formulated at the beginning was correct, it was proven that the relationships between urbanity and the tram are complex and innumerable.

Through this essay we had opportunity to study the city as a social institution. One conclusion achieved from this concept of the city is that social facts are primary, and the physical organization of a city, its industries and its markets, its lines of communication and traffic, must be subservient to its social needs. Whereas in the development of the city during the last century we expanded the physical plant recklessly and treated the essential social nucleus, the organs of government and education and social service, as were afterthought, today we must treat the social nucleus as the essential element in every valid city plan. The spotting and inter-relationship of schools, libraries, theaters, and community centers is the first task in defining the urban neighborhood and laying down the outlines of an integrated city.

Along this months of work, a lot of huge question stand up. The debate between the kinds of approach that should be taken on the study of urban social concepts, like urbanity, was a really interesting one. It is not easily answered and it depends from each research. Although it was possible to conclude that different approaches, like a soft and a hard one, can be used simultaneously and can complement each other. This can make a research more rich and complete.

From the study of the impact of a light rail system in a city, it should be noted that the impact of this mode of transport in the city is so large and extended in time, that it have to be planned with great care and caution. Although, as noted previously, it is impossible to accurately predict the impact this will have on the city and its population.

The denser a city is, denser its population lives in space. Thus the easier it is to make the installation of a transport network to succeed and make gains. So density should be one of the main goals to plan a sustainable and urban city. We can also conclude on the capacity of public spaces to serve as a robust pillar in constantly changing urban societies, where different generations of users bring along different conceptions of time and rhythm.

Through the case studies, a very large range of experiences were taking in. Probably one of the biggest acknowledgements achieved is that just the implementation of the tram by itself is not a guaranty of success. Each place has its own rhythm and movement. Each place is particular and different from each other, so it should be studied and understood at its own way. If we want to increase the urbanity of a city or a particular urban area, we have to sense and apprehend is personality. There cannot be pre-defined solutions or prototype models. Adding to this, all the rich experience gained by the author, referring to the study and analysis of rhythm and movement of an urban environment.

New possibilities in city life, which come to us not merely through better technical organization but through acuter sociological understanding, and to dramatize the activities themselves in appropriate individual and urban structures, forms the task of the coming generation of a city.

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