METROPOLITAN ARTICULATION vs. LOCAL DISCONNECTION

THE DUALITY OF GREEN CORRIDORS IN FRAGMENTED URBAN STRUCTURES
M E T R O P O L I T A N  A R T I C U L A T I O N  vs.  
L O C A L  D I S C O N N E C T I O N

DUALITY OF GREEN CORRIDORS IN FRAGMENTED URBAN STRUCTURES

KEY WORDS
static urban systems, fragmented cities, lineal elements and urban fragments, deductive and inductive urban development, duality of green corridors, macro and micro urban scales, linearity and transversality

ABSTRACT
This thesis focuses on analyzing the role that green corridors have in the structure of urban areas in fragmented cities. The pathology we observe is found in the relationship between built zones and lineal elements. The dual interpretation of green corridors (articulation/segregation of urban fragments) causes physical disconnection and visual discontinuity between adjacent urban fragments. Due to this, the following question emerges: if urban continuity is one of the keys to achieve a certain level of urbanity, in which way can segregation, triggered by green corridors, be reversed and converted into an element of urban articulation?

The analysis is based on an observation of one of the paradigmatic examples of the fragmented urban structure, the city of Minsk, Belarus, which was completely destroyed after World War II and rebuilt according to Soviet Urban Planning ideologies. Conforming to the new general plan, a new urban model was established, which illustrates the functioning of the fragmented urban structure and the duality of continuous green elements.
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I. PRESENTATION

HYPOTHESIS, OBJECTIVE, PRESENTATION AND JUSTIFICATION OF THE SELECTED STUDY CASE, WORK PHASES, METHODOLOGY, STUDY OUTPUT, INSPIRATION AND BACKGROUND
I. PRESENTATION

The issue of segregation between urban fragments is mainly observed in the fragmented urban model, which is characterized by a strict hierarchy of elements, urban zoning and functional segregation. As a product of the Modern Movement the fragmented city presents a closed urban system which enables neither natural evolution, nor artificial transformation. Notwithstanding, this type of urban organization does not correspond to the current social needs, still it can be found in a large number of cities. According to C. Alexander’s (1966) definition of urban structures, a fragmented city can be presented as a tree system, in which the elements do not interrelate between each other, producing the appearance of empty and useless gaps. In other words, the fragmented urban structure can be interpreted as a creator of static systems, where the solid artificial urban structure dictates the inhabitant’s behavior. In this way, instead of enabling the mobility of social flows, urban elements become artificial boundaries that prevent further development of the three primary qualities of urban areas: mobility, accessibility and habitability.

In a certain way, a fragmented structure can be presented as a closed urban system, which consists of continuous elements (road system and green corridors) which define the configuration of urban fragments. In turn, the fragments are self-sufficient urban pieces that have a fractal-like structure which can be explained in the following way: the city is composed of urban areas that present a group of sectors configured by urban fragments, which in turn, are organized by urban units arranged in groups. The fractal nature of the fragmented city consists of the possibility of each element of this scheme be divided into a smaller unit with similar properties to the previous one (Anikin 1987).

During the analysis of the relationship which is produced between green corridors and urban areas in the fragmented urban structure, it was observed that the continuous green elements could have a dual interpretation within the urban context. The role they play at a macro scale is not the same they have at a micro scale. If at a metropolitan level, the green corridors articulate the development of urban areas and define their geometrical configuration and, as a consequence, their urban functioning; at a user scale the same green elements are converting into dysfunctional components within the urban structure, which provoke segregation between developed fragments. In this case, the green/empty axes maintain their metropolitan characteristics, whereas the urban fragments present elements of local significance. Due to this, boundaries appear and produce the functional segregation of two physically adjacent areas.

The reason behind the duality of green areas can be found in the way in which fragmented cities are constructed. In analyzing the case of Minsk, it was observed that the city was built in two different ways: via the deductive or inductive method. The application of one developing mechanism, or another, depends on the scale at which the city is observed. At the macro scale the deductive method is applied, in which the

1 See the concept of tree and semi-lattice systems by C. Alexander (1966).

2 See G. West’s concepts about city allometry and urban metabolism (West 2011).
geometrically larger elements define the configuration of the smaller ones, e.g. the road and green corridor systems construct the urban areas, and then the urban areas arrange the sectors. In turn, at the micro scale the growth of the city starts from the urban item represented by a residential block, which, together with other items (blocks), arranges into a group creating an urban unit. Groups of units then arrange into urban fragments that form an urban sector by gathering with adjacent fragments. Thus, in this case the method of urban development is a product of the inductive approach (Anikin 1987).

1. HYPOTHESIS

The problem with the kind of urban construction presented above, is the lack of links between the two types of urban development. Those deductively developed areas do not communicate with the elements that were arranged via the inductive approach. Based on this observation, the following hypothesis emerge:

- The disconnection between macro and micro scale in the fragmented urban structures is considered a crucial point at which green corridors switch their role from being articulation elements and become segregation elements.
- The green corridors occupy a gap that appears between two development methods (inductive and deductive); hence they may play a key role in the transformation of urban fragments connecting previously disconnected urban areas in one unified functional system.
- Connection of two previously segregated areas, green corridors and urban fragments, causes an overlapping of the properties of each element that leads to a mixture of functions and uses, currently missing in the fragmented structure. In other words, a new relationship between two different urban zones causes a penetration of one urban area’s characteristics by another, which may revive few functional or dysfunctional green corridors which, in turn, could lead to an activation of the residential fragments (Alexander 1966).
- The physical segregation is not the only pathology of the studied urban developments. The lack of identity influences the residents' perception of urban forms. Thus, the introduction of "personality" to the currently extinct elements and areas may generate an activation of the urban fragments.

2. OBJECTIVE

The definition of the research hypotheses shows that the duality of green corridors and the closed nature of urban fragments are revolving around the continuity and contiguity issues. Thus, the main question of this work is: if the urban continuity is one of the keys to achieve a certain level of urbanity, in which way can the segregation, provoked by green corridors, be reversed and turned into an element of urban articulation?

3. PRESENTATION AND JUSTIFICATION OF THE SELECTED STUDY CASE

The analysis is based on the observation of one of the paradigmatic examples of fragmented urban structure presented by the city of Minsk, Belarus. This city was totally destroyed...
after World War II and rebuilt according to the Soviet Urban Planning ideas, which are based on Modern Movement concepts. Conforming to the general plan of 1946, a new urban model was established, founded on a radio-central system with high functional road hierarchy and strict zoning. The process of urban reconstruction of Minsk has an important role in its current configuration. The radical changes in its urban structure, which were developed during the after-war period, transform the city into a unique case of the soviet urban development. The transition between a historic and contemporary city, as well as the description of the implemented urban model and its main features help explain the functional particularities of fragmented urban structures and the duality of continuous green urban elements.

Currently, the urban structure of Minsk consists of three road rings, which establish urban areas in a hierarchical order depending on their distance from the city center. At the same time, the development of a continuous green system that is configured by the fluvial corridors is one major concern. The urban self-sufficient fragments are composed according to the road and green systems and are based on the “microrayon” urban scheme built by residential blocks. In other words, the city structure is organized according to a pyramidal structure: all urban elements are hierarchically organized in agreement with the role that they play in the city’s structure. This prioritizing of elements in accordance with their role in the city can be observed in (I) the predominant role of lineal elements (road and green corridor systems) and the subordinate nature of urban fragments at a macro scale and (II) the segregation properties of the same lineal elements at a micro scale.

The selection of this case can be justified by the emblematic nature of the city of Minsk. The fact of its complete destruction during the World War II “facilitated” the implementation of a new urban scheme, in this way creating a Soviet Urban Planning model. The new urban structure of Minsk was created according to the Soviet Urban Planning ideologies, which have almost equal roots to those of the Modern Movement. As we have mentioned, the fragmented cities are products of the Modern Movement. The strict functional zoning, elaborated road hierarchy and segregation of urban areas in accordance to their function, are typical characteristics of modernist urban planning. Therefore, as a consequence of the same urban planning concept, the soviet city has identical features to fragmented cities. In other words, the Soviet City has a fragmented urban structure which is reflected in its development, urban organization and later functioning.

As Minsk was presented as an emblematic model of the Soviet Urban Planning ideology, and it has all principal properties of the fragmented structure, we believe that it is opportune to study the case of Minsk in order to illustrate the functioning of fragmented cities and their pathologies related with the dual interpretation of the green corridors.

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3 See 16 Principals of Soviet Urban Planning (Scheer et al. 2000).

4 Microdistrict, or microraiion is a residential complex—a primary structural element of the residential area construction in the Soviet Union and in some post-Soviet and former Communist states. The structural scheme of the “microrayon system” will be presented further (Anikin 1987).
4. WORK PHASES

The structure of the present work is based on the idea of different approaches to urban analysis. According to J. Busquets, there are three ways to understand the city: from the urban history perspective, the geographical perspective and from the social processes involved. In other words, the history deals with time or chronology issues, the geography represents spatial and morphological particularities and the social processes reflect the way in which the city is lived.

Therefore, we construct the present work by connecting these three ways of city representation with the issues that this study deals with. The idea is to create a continuous narrative that, with the help of the three approaches mentioned above, may explain a transitional process from macro to micro development.

4.1 Theoretical framework: static vs. dynamic

The first section presents a theoretical framework of the research. In this part a primordial issue is to establish general categories, which would act as a foundation for the following development of the thesis. In the theoretical framework we present two urban structures, static and dynamic, which are both related to the fragmented cities we are interested in. The main goal is to compare two urban models in order to define some pathologies of the static model which represent a fragmented functional scheme. In order to explain the principal features of two compared urban models, in the first part of the theoretical frame we discuss the issue of urban evolution, arguing that a city is not a living organism but rather an ecosystem (Batty, M; Marshall 2009). Due to this, we speculate that dynamic cities are open structures which, in condition of some external or inner interference, are able to adapt and transform. By comparison, the static models are absolute structures that do not adjust to the environmental changes but reject any inner or external modification. Due to this, they have a low resilience level. The inability to respond to changes and the absence of flexibility properties of fragmented structures, which have a static urban organization, convert them into an interesting case from the urban studies perspective (Sennett 2006).

4.2 References of static urban development

In this section, we will present some references of static urban development that help us to show the idea of rigid urban structures in a more illustrative way. We are arguing that the static scheme could be applied to two sorts of cities: capital cities and residential new developments (cities). By capital city, we are referring to the cities constructed in a very short period, in order to satisfy a political demand of the period, by creating representative governmental centers. As examples of this kind of development, we introduce two similar cases: the capital cities Brasilia and Canberra.

The next type of the static model is newly-constructed residential areas or entire cities - in the case of Minsk - in which the principal function and the main objective is to respond to the social demand which emerged because of the lack of dwellings. The reason for the residential deficit can vary from one case to another: (i) from the destruction due to war conflict (in the case of Minsk) or a natural disaster (ii) to the local or global social changes that influence life...
style and require a new type of residential settlements (New Town developments). As examples of residential cities, we will present the probably most emblematic cases of New Town movement in England - Harlow, Cumbernauld and Milton Keynes; New Urbanism ideas are reflected in their purest form in the construction of Seaside city.

With the explanation of circumstances of the selected examples regarding construction and main structural and urban features, we are attempting to connect the theoretical idea of static urban development with the real life examples.

4.3 Fragmented city

After the brief comparative analysis of static and dynamic urban models we next address one of the interpretations of the static model, which is fragmented, urban organization. In this section, we focus on different aspects of the fragmented development giving some examples leading to a main issue of the present work: the ambiguity of green corridors and the repercussion that it has on the function of residential areas.

We are starting with the general structure of the fragmented structure which is reflected in the combination of two dominant elements: the lineal continuous networks and the urban fragments. Then, in order to exemplify a general fragmented model, we compare our study case, the city of Minsk, with three previously presented cases of New Town movement; Harlow, Cumbernauld and Milton Keynes. With the help of the quantitative observation of the changes that occurred in the urban development of the selected cases, from the moment they are established to their current organization, we are attempting to define the elements and areas that have a major importance within the cities’ structure.

4.4 Duality of the green corridor in a fragmented urban structure

Once we establish predominant elements in the fragmented urban model we will address the main topic of the present work, which is the issue of dual interpretation of green corridors and the influence that this phenomenon has on adjacent residential development.

Nevertheless, we are convinced that the best way to explain a certain urban aspect is focusing on a concrete example. That is why, before the demonstration of particularities of the green corridors functioning in the case of fragmented cities, we are presenting a study case, the city of Minsk. In this chapter, we will expose not only the process of its urban development, but also aspects that could have had an influence on the phenomenon which is of interest to us, the duality of Green corridors.

After the presentation of the case, we will go on to explain the phenomenon of green corridor duality in fragmented urban structures. In order to understand the reason behind the ambiguity of lineal elements, we are dividing this section into the following subsections.

Introduction to the development of green urban areas

The first aspect that we would like to present is the history of the development of green areas within the urban structure. In this subsection, we are dealing with changes which occurred
in the perception of green areas that provoke an appearance of public and open-for-everyone green areas within the cities. In addition, we will show the transformation of traditional mono-functional green areas to a more complex and multi-utilitarian contemporary interpretation of the green urban function.

**Duality of the green areas in fragmented cities**

The next step of the present research is to explain the duality of the green corridors in fragmented urban structure which is of interest to us. This section deals with (i) possible reasons for this ambiguity, (ii) scale and development methods applied in the urban development and (iii) the influence of the duality phenomenon on the functioning of the city. In other words, the issues discussed in this subsection present a central part of the research. Thus, we consider that this part of the work deserves the most attention.

**The case of Minsk**

In this subsection, we are connecting the characteristics of the duality of green corridors established in the previous chapter, with a real live example. In other words, we are investigating how the ideas of the fragmented model development have been applied to Minsk’s reconstruction and in which way they function today in a studied district, Zelyoniy Lug, Minsk. We also use the case of Minsk to prove the hypothesis established at the beginning of the work and show how theoretical concepts could be executed in real urban construction.

**4.5 Micro scale as approach of action**

After the detailed explanation of the function of green corridor duality in the fragmented city, we will move into the final section of the research, which deals with social and perception aspects of the macro/micro phenomenon. We are arguing that in order to achieve changes in urban functioning, it is not necessary to deal with big-scale elements and areas. The bottom-up micro intervention could have a greater importance in order to induce urban changes. At the same time, we return to the issue presented in the chapter on static and dynamic models, which deals with the relationship between solid urban structures and mobile social flows. We argue that the perception of the urban form is an essential factor in order to achieve a greater level of urbanity in certain urban areas. In this section, we are attempting to connect the idea of intervention at the micro scale, and the importance of perception of urban forms, basing the analysis on the fieldwork performed in the sleeping district of Minsk, Zelyoniy Lug. As a final product, we aim to perform a critical map which does not only deal with spatial analysis of the district, but also includes a perceptual and psycho-geographical interpretation of the place.

**5. METHODOLOGY**

The selected methodologies are based on different approaches to the understanding of the city and the exploration of the duality phenomenon.

When we are talking about different approaches to the city, we are referring to those presented in the theoretical section method as the three representations of urbanized areas, which are time, place/location and society. An introduction to the mapping process and critical map issues will be performed in the section on the micro scale actuation.
Connecting this idea with the present work, we will link the time aspect with the chronology of Minsk’s urban (re)development referring to the particularities that influenced upon the current organization of the city. In turn, this approach is connected with the space aspect that deals with the geography and morphology of the place. Nevertheless, as we have established previously, the physical interpretation of the city cannot exist without a social factor. The human aspect has a huge importance on urban studies. That is to say, that the political, economic, social development and psychological aspects play an important role in the urban development and the following function and perception of urban areas. Nevertheless, due to the focus of the present work, the geographical approach receives a central place in the analysis. Despite this, the first and the third aspects of the city understanding are still considered as an important factors of urban life and should been taken into account.

Thus, in order to understand the issue of the dual interpretation of green corridors in fragmented cities we are basing our work on the case of Minsk. To investigate the reasons behind the appearance of this phenomenon we are using a zoom-in and zoom-out method, approaching the city from different scales. Therefore, we have divided the structure of the city into two scales – a macro and a micro scale. Each of these scales has its own sub-scales. In the case of the macro scale, there are metropolitan and urban sector sub-scales; and the micro scale is composed of the urban fragment and user scales. Decomposition of the city structure into different scales helps explain the function and the role of green corridors and residential areas in a clear and detailed way. In this manner, we can observe changes that occur in the attributed elements which are of interest to us when switching from one scale to another.

6. STUDY OUTPUT

As we have pointed out in the justification of the case selection, the fragmented urban structure presented in the city of Minsk can be found in a large amount of urban developments within different social, geographical and political contexts. Therefore, we hope that the present work may contribute some knowledge towards the understanding of the fragmented urban model and its main particularities such as urban element duality. Furthermore, we expect that the final part of the work, which deals with micro scale intervention strategies and their impact on the entire urban structure, awake an interest in continuing the present research. Thus, the main focus of the future PhD thesis may lie in the discovery of a “good urban experience” that may help to find a proper approach to the fragmented urban model by taking advantage of the duality of lineal elements.

7. INSPIRATION AND BACKGROUND

Each part of the present work is based on different resources and references. This depends on the issues which the sections deal with. In the presentation we are not going to talk about all sources used in this work, but we would like to highlight some references that have had a main influence on the thesis development.

First of all the famous work by C. Alexander City Is Not A Tree (1966), which has given us a first impulse and has made us think about static and dynamic development. Despite of the prob-
ably excessive quotation of this work and some critique towards it (Harary F., Rockey J. (1976) “A city is not a semi-lattice either”) we still consider it as a great contribution to the understanding of a city. R. Sennett’s (2006) work about closed and open cities has also had a great influence on the developing of the present thesis. Thus, in terms of the initial and theoretical inputs, we consider these two references as the most important sources.

In addition and in order to understand the physical particularities and laws of the duality of green corridors, we have used M. Batty’s texts on Growth, Scale and Size of Cities (2012) and the Evolution of Cities (Batty, M; Marshall 2009).

In the section of the case presentation, our main sources were published in the 1952 book about the urban history of Minsk - The Practise of the Soviet Urban Planning on the Example of Minsk (Osmolovsky 1952); and in a book by a Belorussian architect, A. Klinov Minsk – a Guide Trough the Sun City (2013), in which he performed a new perspective on the urban history of Minsk that is reflected in its comparison with Campanella’s City of the Sun. Other work that has provided us with huge input is C. Itraigo’s PhD thesis About Copies, Transformations and Omissions: The Recomposition of the Devastated Cities (2006). This exhaustive PhD thesis has helped us define a method applied to Minsk’s after-war reconstruction which, in turn, has had a huge impact on the current function of the city.

Dealing with the duality of green areas, we have used the PhD thesis of J. Florit The Metropolitan Park: A Critical Definition which in a very comprehensible way explains the history of the green urban areas and the evolutionary process of their urban functions. From the other hand, in the historical part, the articles about a green corridor system of Minsk published by a blogger Darius (2012) has helped us to understand the chronology of its development.

Finally, in the last chapter dealing with the urban form perception and the micro scale approach, we have based our investigation on the Lynchian analytical methods and an encyclopaedic Francis D. K. Ching’s book Architecture - Form, Space and Order, 3rd Edition (2012). Nevertheless, the main source in the user scale analysis of the selected case was that performed in the June 2014 fieldwork research.
THEORETICAL FRAMEWORK
STATIC VS. DYNAMIC URBAN SYSTEMS

THREE APPROACHES IN ANALYSIS OF URBAN STRUCTURES
- HISTORY
  - TIME
  - URBAN MORPHOLOGY: continuous, fragmented
  - URBAN SOCIETY: accessible, blocked
- GEOPGRAPHY
  - SPACE/PLACE
- SOCIOLOGY
  - PERSONS/USERS

RESEARCH TOPIC
THE DUALITY OF GREEN CORRIDORS IN FRAGMENTED URBAN STRUCTURES

MODERN MOVEMENT | ATHENS CHARTER:
- URBAN ZONIFICATION
- FUNCTIONAL SEGREGATION
- ROAD HIERARCHY

MODERN MOVEMENT PRODUCT
FRAGMENTED STRUCTURES
WHERE?
- New developed cities
- Reconstructed cities
- (post-)socialist cities

TWO URBAN MODELS
STATIC AND DYNAMIC

COMPARATIVE ANALYSIS OF TWO URBAN MODELS

URBAN CONTINUITY & CONTIGUITY > FRAGMENTED STRUCTURES?

GREEN CORRIDORS

RESEARCH METHODS
TWO SCALE APPROACH

MACRO SCALE
- METROPOLITAN SCALE
- URBAN SECTOR SCALE
- LINEAL ELEMENTS + URBAN FRAGMENTS
- ARTICULATION + SUBORDINATION
- GREEN CORRIDORS + RESIDENTIAL FRAGMENTS

MICRO SCALE
- USER SCALE
  - URBAN ELEMENTS
  - URBAN THINGS

LINK BETWEEN THEORY & TOPIC
HYPOTHESIS
- CONTINUITY
- URBANITY
- SEGREGATION

GREEN CORRIDORS

LINK BETWEEN TOPIC & METHODS
STUDY CASE
- MINSK
  - FRAGMENTED STRUCTURE MODEL
  - HISTORY-INCOMPLETE
  - GEOGRAPHY-SEGREGATED
  - SOCIOLOGY-CITY WITHOUT MEMORY

GENERAL STRUCTURE OF FRAGMENTED CITIES

FIELDWORK MAPPING TOOL
- SPATIAL ANALYSIS
- COMPOSITIONAL ANALYSIS
- PSYCHO-GEOPHYSICAL ANALYSIS

OVERLAPPING OF THE COLLECTED DATA

FIELDWORK PRODUCT
CRITICAL SPATIAL MAP
II. THEORETICAL FRAMEWORK

City as an organism | Artificial object | Environment, Dynamic and Static Cities, Examples of Static Urban Structures
Canberra, Brasilia, New Towns Movement, New Urbanism Movement
II. THEORETICAL FRAMEWORK

1. CITY AS AN ORGANISM | ARTIFICIAL OBJECT | ENVIRONMENT

There are many different approaches to the definition and comprehension of the city organization in contemporary urban studies. The urban structure could be presented as an artificial simplified model of static artefacts, or as a complex system of networks and connections between the elements, which do not perform only static and non-changeable objects, but also include mobile flows and phenomenon that are able to evolve through the time. Based on the second definition, we can argue that a city is a living organism\(^1\) that replies to the external irritants or stimulus that produce internal changes and modifications in its structure and spatial organization.

...to detect a beginning... of the comparative study of cities...arising like a living being, in constant relation to its environment; ... like the living being it is, a city also reacts upon its environment, and in ever-widening circles evolution of the cities... (Batty, M; Marshall 2009, p. 556).

In this way, speaking metaphorically, the cities have the same behaviour as the human body: it responds to the environmental changes, it ages through the time and finally, it dies. Accepting the idea that cities are organisms and can evolve and change through the time, we can also argue that cities have different systems and networks that should interrelate and communicate with one another in the same way in which internal processes within the human body affect its entire function. Therefore, they may have an impact on one another. For instance, if the cardiovascular system does not work well, the entire human organism suffers repercussions. Similar to this, we can find examples of interrelating elements and systems within the city “organism”. Thus, if cities are like an organism, soon or later they should die (see Im. 1). With this argument, can we speculate how many centuries cities live? In other words, can we define what an average age of cities is? This kind of question seems to be very exiting in terms of theoretical research and thinking. However, in real urban planning, does this have any practical input? If we calculate the average age of cities, should we perform “urban surgeries” in order to help them survive? These kinds of theoretical approaches to cities are too metaphorical and, from our point of view, have a huge psychological impact. This being said, with the ambition to understand complex and rapid urban development processes, which, in many cases, are difficult to control and maintain in the way that we want them to happen, we try to compare them with a reality that we already know about. In this case, the idea to present the city as a completely organic phenomenon, helps us understand how to act in order to improve or to change the urban function. We already have a lot of knowledge in the biology and biological evolution fields. Nevertheless, urban studies still do not have a considerable background. Thus, applying the experience that we already have to a field that is still covered by darkness may help us explain phenomenon that we still cannot understand.

Another point that one can argue with the

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\(^1\) The idea was presented in the Geddes’s book *City evolution* (2009)
evolutionary and cities are an organism theory can be the globalization urban process, the erasing of frontiers between countries and the increasing impact of cities on global economy (see Im. 2). As Mumford (1938) argues, defending the urban evolution theory, cities, as well as living organisms, should have clear defined boundaries and limits (Batty, M; Marshall 2009). Thus, based on this theory, we can observe an incongruity between current processes of global urban development. The cities are expanding over their artificial or natural boundaries creating enormous agglomerations; the frontiers between countries are disappearing; cities get more and more influence from global development in almost every field. Therefore, we can argue that in many urban cases boundaries do not exist anymore. They have been substituted by collaboration between different urban developments in order to achieve more profits, higher level of wellness and the old order has gone, whereas 10 years ago there were 100 cities on the investor’s radar, now there are 300, and over 600 routinely enquired about by corporates (JLL Cities Research Center 2014). An example of the expansion of a city by world influence could be the Luxembourg phenomenon. The city represents a newly emerged urban category called cross-border city, which means that the city does not have fixed limits or boundaries. Due to the high taxes and the expensive house rent, the majority of the people only work there but live in adjacent countries, such as France, Germany and Belgium. The daily migration from one country to another became possible when the boundaries within the European Union disappeared. Thus, probably, we can argue that cities can evolve and they can change their structure and organization without the developers’ control. The example of the Luxembourg’s every day migration shows us that unpredictability can take place in the urban development.

In contrast to this developmental paradigm, however, we can identify an evolutionary paradigm, in which the city is not conceived of as a unified whole following a developmental programme (Batty, M; Marshall 2009, p. 552).

This point can convince us of the rigorousness of the evolution theory in the urban development process. Thus, probably, we can argue that cities can evolve and they can change their structure and organization without the developers’ control. The example of the Luxembourg’s every day migration shows us that unpredictability can take place in the urban development. To link this idea with another field we present L. Bradley’s concept dealing with the computer science. There is no doubt that computer science deals with a completely artificial substance. Nevertheless, there are some arguments in favour of the urban evolution theory. As we have mentioned in the previous paragraph, the need of defying possible forms of cities’ organization urgently emerges because of the im possibility to control the rapid development of the urbanized areas. Thus, we can say that the urban development surpasses the designers’ control and achieves its own unpredictable behaviour (see Im. 3).

2 See Urban Lab: Transport Infrastructures, a workshop in the framework of Trans(lent) City programme (Luxembourg Ville, Luxembourg).

3 See the professor Elizabeth Bradley’s interview as an invited guest in the Introduction to the complexity online course by Melanie Mitchell (Santa Fe Institute 2014).
ertheless, the evolutionary process has a place in there, presenting the computers as dynamic systems that may have an unpredictable behaviour. Therefore, we cannot neglect a possibility of evolutionary process for initially artificial elements and systems. Moreover, in the case of the complex structure of cities that consist not only of the built artefacts but also of human flows, an issue of the relation between these two urban “contents” emerges. In this sense, we can say that that uncontrolled cities’ behaviour do not prove a theory based on the idea that cites are like a living organism which supposes an applying of the same approaches that are practiced in the biological field. Nevertheless, the combination of inhabitants’ flows and static urban objects can lead us to a conclusion that cities are not organisms but rather ecosystems.

Geddes also introduced a second evolutionary theme, in which the city was itself an environment: a built environment, of course, whose design could positively influence the social organism it contained (Batty, M; Marshall 2009, p. 556).

Accepting this idea, we can compare the city with a forest, which definitely can evolve, without doubt has an unpredictable behaviour and responds to external interventions. However, it does not live its own life as living organism does. According to the definitions of ecosystems in biological terms as a complex of living organisms, their physical environment, and all their interrelationships in a particular unit of space (Encyclopedia Britannica). Thus, we can say that the residents of urban developments are living organisms and the buildings and infrastructures are their environment. When there is an interaction between the organisms and the environment (or only between organisms), complex networks appear that are able to generate complex systems of relationships, which are studied by the urban and social science, psycho-geography, politics and market (see Im. 4). As L. Fadigas (2009, p. 42) wrote in his paper on ecological corridors, called

*The living organisms and the cities as ecosystems (because they are ecosystems), live and develop trough the constant consumption of energy” (renewable or not) and from the energy flows.*
2. DYNAMIC AND STATIC CITIES

The present introduction addresses modern theories developed recently that are dealing with urban function interpretations in contemporary urban studies. Thus, in this part of the thesis we will focus on the explanation of two contemporary interpretations of urban structures that emerged in the urban studies of the XX century. As we have mentioned, the proposed research is dealing with the fragmented urban structure that can be present in a large number of new constructed and developed urban areas or entire cities. Nevertheless, before entering into detailed analysis of the fragmented model, we will perform a comparative analysis between fragmented structures (which, in the most of cases, correspond to modernist cities) and the opposite urban system called the continuous city (which in the case of this research corresponds to the “historical city”4). In other words, we can define these two urban structures by the more wide and general terms STATIC and DYNAMIC CITIES. This means that fragmented cities correspond to the static system and continuous cities could be referred to as the dynamic category. Certainly, this kind of urban structure classification is not new in urban studies. One of the first and most considered work on this issue is an article City Is Not a Tree published by Christopher Alexander in 1965, which has already been exploited and cited by a multitude of researches in urban planning. Nevertheless, it still presents scientific interest, especially when dealing with modernist cities (urbanizations), which just started to become criticised at the time when the article was published.

In his article, Alexander investigates the difference between new constructions (artificially designed city) and historical cities (natural evolved urbanizations). As he pointed out in his work, there are two types of urban structure: the first one corresponds to a tree system; and another one named by himself, a semi-lattice system. In other words, these urban systems could be interpreted in artificial cities or natural cities, respectively. In his work, Alexander gave an implicit definition of these categories based on the type of communication produced between elements or systems within the urban schemes. As he stated: (see Im. 5).

The tree axiom states: “A collection of sets forms a tree if, and only if, for any two sets that belong to the collection, either one is wholly contained in the other, or else they are wholly disjoint.

The semi-lattice axiom goes like this: “A collection of sets forms a semi-lattice if and only if, when two overlapping sets belong to the collection, then the set of elements common to both also belongs to the collection (Alexander 1966, p. 5).

In other words, in his article, Alexander compared urbanizations designed by planners with naturally evolving cities. He argues that a “good” urban development should be approximated to the semi-lattice scheme as much as possible, i.e. to the natural city, in which all the components and systems are connected between each other and have a complex scheme of relations and communications. Further, he also argues that it is impossible to reproduce the whole complexity of the traditional or historical

4 In this case, we have put the term “historical city” into quotation because of the wide usage and definition of the expression. In the case of the present study, we are referring to the cities that have a complex, evolved through the time urban organization, which consist of numerous morphological, social and functional layers that constantly interrelate between each other.
cities in an artificial city. In this sense, Alexander not only implies ... that cities were badly planned, but implies that cities could be unplannable in principle (Marshall 2012, p. 262). Therefore, in his work he is dealing with (i) simplified and designed urban models, which are represented by new constructed urban areas; and (ii) gradually grown and expanded natural urbanizations.

Other considerable work on this topic is Richard Sennett’s Open city (2006). This definition has a slightly different focus in comparison with Alexander’s concept. His ideas focus on the social-economic and governance meaning of open and closed systems, without direct and strong remarks on urban planning issues. In any case, the concept of Sennett’s urban classification have a similar course. He argues that there are two types of city organization, an open city and a closed city. In the closed systems, we are dealing with a perfect organized and fully integrated urban structure that does not accept any interventions or changes, whereas in the open cities the basic idea is to provide density and diversity to urban areas. In the open city concept Sennett is based on the ideas of J. Jacobs saying that the main characteristic that composes the Open city, i.e. a “good” urban structure, it is a mix of functions and places.

In her [J. Jacobs] view, big capitalism and powerful developers tend to favour homogeneity: determinate, predictable, and balanced in form. The role of the radical planner therefore is to champion dissonance (Sennett 2006, p. 3; see Im. 6).

He intensely criticizes modernist urban planning, especially in terms of urban zoning and segregation of functions saying that: “the art of designing cities declined drastically in the middle of the twentieth century”. Thus, we can see a lot of connection between the Alexander’s article and the Sennett’s study. This Especially stands out when criticising a Modern Movement way of planning, which, as we have already mentioned, is based on functional zoning and hierarchically organized urban elements. As Sennett comments on the Le Corbusier’s Plan Voisin:

...he has in the ‘Plan Voisin’ tried to destroy just those social elements of the city which produce change in time, by eliminating unregulated life on the ground plane; people live and work, in isolation, higher up. [Also he adds] Le Corbusier’s intended destruction of vibrant street life was realised in suburban growth for the middles classes, with the replacement of high streets by mono-function shopping malls, by gated communities, by schools and hospitals built as isolated campuses. (Sennett 2006, p. 3; see Im. 7).

Therefore, we have a potential base to argue that the concepts of dynamic and static cities could be rigorous in terms of urban studies. We clearly understand that the idea of this city classification is not new and does not belong to the present research. Nevertheless, as well as Sennett does in his work, we would like to interpret and reconsider the idea of Alexander’s (1966) artificial and natural cities, the open and closed systems of R. Sennett (2006) and the vision of J. Jacobs (1961) towards urban functioning. Therefore, we base the research on the

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5 R. Sennett says by himself that: The idea of an open city is not my own: credit for it belongs to the great urbanist Jane Jacobs in the course of arguing against the urban vision of Le Corbusier (Sennett 2006, p. 2).
ideas of “good” and “bad” urban development presented in the previously mentioned studies, comparing them with fragmented cites in general, and the case of our research (Minsk) with its green elements in particular. An objective is to understand its urban structure and social functioning. Nevertheless, we would like to avoid a strict city division on “good” and “bad” urban structures, which in some sense can be observed in the previously mentioned works. We are not defining the dynamic system as an example of “well functioning” urban areas and the static systems as a completely defective structure. This is not the aim of the present work, mainly because we will not perform deep research on the organization of dynamic cities. As we have already mentioned, the goal of this chapter is to compare the static and dynamic structures in order to understand the functioning and pathologies of the static system. Thus, the reason for the interest in the static system lies in the fact that the fragmented urban model has a static form of urban organization.

Thus, we do not argue that static cities present a “bad” type of urban structure or that the dynamic systems are perfectly functional developments. We rather think that it is quite difficult to separate these two concepts, because of the complexity of the city’s organization. In these terms, we would rather say that cities contain both elements: (i) changeable and mobile flows and (ii) solid and permanent structures (see Im. 8). This means that cities cannot be considered as exclusively artificially produced structures nor as living organisms. The definition of urban organization depends on how we approach the city in the moment of analysing it and investigating its particularities. Taking into account the fact that the cities are composed from dynamic and static elements, we consider that the scientific approach should be both complex and multidisciplinary. In this sense, we think that the way to analyse the city’s structure as a combination of buildings and infrastructures, apart from the social flows, would not give a whole picture of the multi-layer urban organization. In the same way, studying a social phenomenon without considering the geometrical and spatial characteristic of the place do not provide sufficient findings and material.

Urban planning is not only about the morphology and about functions. It is a transient process, which unify economic development, culture and sustainability in an interactive way (Fadigas 2009, p. 41).

Based on these concepts and on the definition of the urban structures in an article Systemic Resilience Of Complex Urban Systems: On Trees And Leaves by S. Salat and L. Bourdic, we argue that cities are hybrids that consist of artificial elements (buildings and infrastructures) and natural components (inhabitants) that are directly related with the anthropogenic structures.

The material metabolism of cities is founded on the redeployment of the energy of nature through the construction of hybrids. The infrastructures of modern cities combine human dynamics and natural forces in ways that transform nature and change society. The redeployment of the forces of nature provides the energy for processes in which complex physical hybrids (motors, telecommunications, heating, lighting,
water distribution systems, air-conditioning, etc.) and complex social structures (governments, national and transnational companies, universities, etc.) are built out of simpler components (Salat & Bourdieu 2012; see im. 9).

In other words, the city can be represented as a system that is made up of a rigid frame of static elements that are filled out by agents that mix with each other within this stable structure. The type of relationship, that is established between fixed elements and constantly moving social flows during the urbanization process, defines the type of urban organization (dynamic or static). Thus, we can summarize the dynamic and static concepts in the following statements.

**DYNAMIC CITIES** (see Im. 10) are cities that have self-organization properties that balance quantitative and qualitative characteristics of the urban structures. It means that the relation produced between artificial and natural elements (i.e. dynamic and static components) is well adjusted. The urban zones of this type have semi-fixed structures that have a capability to readjust in accordance to the users' needs. Therefore, they facilitate the mobility of residents and favour the development of mixed activities which increases the habitability level.

**THE STATIC CITIES** (see Im. 10) present the cases in which the urban structure has a greater importance both at quantitative and qualitative levels. In a spatial structure of this type of urban organization, the emphasis is made on the development of permanent urban elements, which transform into artificial boundaries, which instead of conducting and facilitating the natural flows of circulation, impede their mobility.

With regard to the second type of urban organization we can refer new/recently (re)constructed cities or urban areas based on the Modern Movement ideas. The grounds of rational urban planning were found in the creation of a perfect-functioning urban machine. In contrast, the human side of the entire urban organization was not considered as an important component in the urban design or development process. A new wave of urban concepts that was presented by the Modern Movement in the Athens Charter (1933) produced an essential revolution in architectural and urban thinking. As a consequence of the Industrial revolution and as a product of popular futuristic ideas at the beginning of the XX century, the Modern Movement in many cases idealized the rational side of urban planning. Pretending to create favourable urban areas for the cities’ inhabitants, the planners set aside the human factor. Instead of creating resident friendly urbanizations, the urban designers reproduced architectural mock-ups in the real life urbanizations. In this way, the cities and urban areas were constructed from the macro scale without zooming into the user scale approach. Consequently, in many cases we can observe high-quality urban and architectural constructions that do not accomplish the settled requirements at the moment of utilization by the residents. Nevertheless, the rational urban thinking generated new approaches to the urban planning that deferred radically from the former ways of town designing. Due to the fact that innovative concepts were presented, the architectural and urban projects of the period had a big success. That made propagandizing their ideas possible in the absolute way. Due to this, today we are faced with a huge amount of architectural and urban projects constructed under modernist concepts.
The Modern Movement ideology executes the city as an artificial mechanism by focusing only on the practical and rational face of the urban structures. By comparing the main characteristics of the rational elements with the typology that we have presented previously, we can conclude that the urban structures constructed under Modern Movement concepts present the Static city model. That is to say, that the spatial organization and the relationship between fixed elements and residents are built in accordance to the static development. In this way, we are dealing with urban structures which are not able to adapt to the social changes that are constantly occurring during the time. The reason for the low adaptive level lies in the lack of urban flexibility of static developments. In other words, the social structures are components with self-organizational capacity that performs a constant evolutionary process, whereas the artificial urban structure does not possess the ability to transform in accordance to the social needs which emerge at a certain moment (Jacobs 1961, Sennett 2006).

To summarize, we can present these two types of urban organization in the following scheme (see Im. 12 on page 27). The first type (dynamic organization) in most of cases can be found in historic cities that are constructed in layers that are superimposed over one another. In this way, a complex relational system between artificial elements and urban agents is created. In the scheme, we can see that due to the relation produced between natural components of the city, the configuration of artificial components is determined by the natural flows. In this way, the urban agents modify the static urban elements in accordance to their needs. To give an example of this type of organization, we can refer to the rather famous example of the paving process of pedestrian ways which happens only after the inhabitants trail the tracks. This simple example shows, that in this case the residents decide on the organization of the mobility and accessibility around a place. Finally, we can say that in the case of the dynamic systems the social needs and economical demand are defining the way in which the city develops. The second case (static development) frequently deals with new constructed urban structures that are placed on the terrain in an artificial and rapid way. Due to the unpredictability of the agents’ behaviour in statically organized urban structures the residents’ behaviour and habits cannot be examined before the construction of the urban elements’ starts. In this way dead urban structures are constructed that are not related with their residents movement and behaviour. In this case, the adaptation process is opposite to that of dynamic cities: the city’s residents have to adjust their behaviour within the solid and constant structure according to the architectural configuration. As an example we can give cases of recently constructed urbanizations based on the Modern Movement concepts, in which the urban structure has more weight than the city life. For instance, in the new constructed capital cities, such as Brasilia or Canberra, the idea of representing the national identity and governance power stood out by putting emphasis on the development of the formal city centre as an open-air museum and its segregation from the rest of the city. The characteristics of the static system can be also found in residential cities such as English New Towns, American suburbs, New Urbanism developments and the socialist Urban Planning. In this case, in the same way as in the capital cities, the mono-functionality of the urbanizations and division of the land into segregated zones make it impossible to generate dynamic development that comprehend constant adaptation to social needs. The research case, the city of Minsk, represents two of the mentioned above categories of static urban organization. On one hand, rapid reconstruction of the city in accordance with the soviet urban concepts has increased the role of the city in the soviet scene by creating a representative city centre. On the other hand, due to the multiple destructions after World War II, a huge lack of residential areas was produced. Therefore, a large amount of new constructed dwellings has given a residential nature to the city of Minsk.

Observing the relation between static elements within both urban types, we can highlight the following characteristics. In the case of dynamic cities, the elements are related between each other thanks to the urban life of the agents that use them. The artificial urban elements are a string on the network of natural elements. Conversely, in static structures the artificial components dictate their movement to the residents, within the city. Nevertheless, the artificial components do not relate with one another because of the absence of a cohesion factor. Instead of coordinating with natural elements during the development process, solid components of the static city are organized according to a strict hierarchy that complicate any changes within the established urban order.

7 The concepts of the soviet Urban Planning were based on the ideas of the Modern Movement with slight in order to satisfy the Socialist ideology (Scheer et al. 2000).
Among other particularities which stand out in the static and dynamic urban organization, there is a difference in the urban scales. In the first scheme of urban organization, the artificial and natural components are related to one another not only because of the connecting links but also due to the harmony between human and architectural scales. That is, the building and urban infrastructures have a proper dimension to be utilized by the residents in a convenient way, while the mega volumes of the static urban structures do not correspond to the human dimensions. In this way, the urban elements cannot be perceived or utilized properly and/or sufficiently by their inhabitants (Lynch 1984; Ching 2012).

To summarize, we can outline the following main characteristics that distinguish the two urban systems between each other:

- The relationship between artificial and natural components in dynamic cities and its absence in the static ones;
- The fact that the structural role in dynamic cities belongs to the residents, i.e. to the natural components. While in the case of static urban development, the buildings and infrastructures determine the city’s function;
- The relationship between the city’s components differs in terms of the scale: in the case of static cities, the dimensions of urban structures do not correspond to the perception capacity of the residents, while in dynamic developments the urban forms are perceived and utilized by the residents properly.

Im. 12. Comparative scheme of dynamic and static urban models: a.) relation between artefacts and flows, b.) Organization of elements in urban system. developed by author
3. EXAMPLES OF THE STATIC URBAN STRUCTURES

The present research focuses on static model urbanizations. In the following paragraphs we are going to explore the concepts and structural characteristics of the selected cases in more detail: capital cities Brasilia and Canberra and residential urbanizations based on the New Towns and New Urbanism movements. We believe that even a superficial analysis of these cases, still can serve to understand the function and pathology of static systems which, in turn, will lead us to comprehend fragmented development that corresponds to static development.

3.1 Canberra

In the case of Canberra, from the very beginning, the idea of a perfect city occupied the most considerable part of the entire project’s concept. A prevalence of the ideological aspect in the city construction was even reflected in the choice of location for the future capital of Australia (see Im. 13).

*Canberra District was selected as a site for a new City of Australia in 1909 due to its prominent location and commanding position with extensive views* (Meng 2002).

As a creator of the Plan for Canberra, Walter Burley Griffin, said: “*I have planned an ideal city—a city that meets my ideal of the city of the future*” (Griffin 1912).

The spatial organization of Canberra was based on the ideas of Garden City and Beautiful City movements (see Im. 14). Due to the precedence of the main creator of the Australian capital, a landscape architect from Chicago Walter Burley Griffin, the influence from the Chicago
The project for Canberra Capital City was based on the land and water axis and on a complex topography of the place which was a main composition focus of the entire project. The idea of Griffin was (i) to carefully integrate the urban areas of the future city into the topography, respecting its configuration and particularities, (ii) strict urban zoning and (iii) segregation of functions by grouping them in different divisions according to their “importance” in the city structure. For instance, he suggested locating the government and recreational functions in the Primary division and then, universities, military and municipal administration and markets, industries and residential sections in the Secondary Division. Therefore, the construction of a good connection between disconnected areas was needed. To resolve this problem, Griffin insisted on the importance of good public transport communication between zones suggesting wide boulevards connecting the various centres of activity (Wensing 2013).

The structure of the city (see Im. 15), and the composition of its elements are based on the Y-plan, which was named so because of the series of towns with a “Y” pattern in the distribution of zones and roads.


In the central area of the city near Lake Burley Griffin, major roads follow a wheel-and-spoke pattern rather than a grid. Griffin’s proposal had an abundance of geometric patterns, including concentric hexagonal and octagonal streets emanating from several radii.

Lake Burley Griffin was deliberately designed in such a way that the orientation architectural and urban design school was considerable.
of the components was related to various topographical landmarks in Canberra. The lakes stretch from east to west and divided the city in two; a land axis perpendicular to the central basin stretches from Capital Hill—the eventual location of the new Parliament House on a mound on the southern side—north northeast across the central basin to the northern banks along Anzac Parade to the Australian War Memorial.

The straight edge of the circular segment that formed the central basin of Lake Burley Griffin was perpendicular to the land axis and designated the water axis, and it extended north-west towards Black Mountain. A line parallel to the water axis, on the northern side of the city, was designated the municipal axis. The municipal axis became the location of Constitution Avenue, which links City Hill in Civic Centre and both Market Centre and the Defence precinct on Russell Hill. Commonwealth Avenue and Kings Avenue were to run from the southern side from Capital Hill to City Hill and Market Centre on the north respectively, and they formed the western and eastern edges of the central basin. The area enclosed by the three avenues was known as the Parliamentary Triangle, and formed the centrepiece of the Griffin’s work (Wigmore 1963).

As we can see from the description of the city’s urban structure, the idea to create a mono-functional, perfectly designed governance centre, which would emphasize the national identity of the country, was the main aim of the project. In this sense, the design of the city for its inhabitants rather than for representation purposes went to a second level. Nevertheless, in the outer areas of the city, which were built later, the pattern has changed, obtaining a less formal configuration. In other words, we can say that the inner city of Canberra represents the static system as a capital representative city, whereas the residential outer areas, with their low-density construction typology, were created to fulfill social needs rather than to create a representative city (see Im. 16). Thus, the combination of the formal city center and later, fragmented residential development convert Canberra into a city with an urban structure constructed via fragments. Furthermore, currently the authorities of the city are realizing the non-functionality of the well-designed city centre and are asking the following question:

Yet this totally planned city provides an enviable standard of urban living for its inhabitants, notwithstanding some identified problems. The conundrum is then: why such an excellent and carefully planned city is so little known overseas and so little loved within Australia. Can Canberra be an even better national capital – or will it remain as a second-ranked city? (James 2012).
3.2 Brasilia

Similar spatial organization and ideological representation can be observed in the case of another newly-constructed capital city, Brasilia. Constructed almost 50 years later than Canberra, Brasilia accomplishes the same goals as the Australian capital does: in answer to a need for a governance centre, which will hold the main official organisations. Building up just in two years, Brasilia represents the ideas of the modernist architecture in its absolute way. The main urban planner of the city Lucio Costa with his close friend Oscar Niemeyer brought an idealistic and in some sense futuristic urban project to life, that can be considered a well-designed group of buildings, rather than a city for living in (see Im. 17).

The main spatial and structural ideas of the Brasilia project are based on the division of the city into four scales: the monumental scale, residential scale, gregarious scale and bucolic scale (El-Dahdah 2005; see Im. 18). From this approach, we can see that, apart from being considered a modernistic city, in the case of Brasilia, the ideological aspect plays a significant role in its constitution. The main concept promoted by Juscelino Kubitschek, the president of Brazil at that moment, was to create a socially equal city. “The city should have hold the open society without class segregation; the bankers and politics should have been living next to the bus drivers and employees” (Arquba.com n.d.). Nevertheless, the spatial and structural organization is based on the high zoning and segregation of functions in accordance with the four-scale approach. The monumental scale was designed to promote Brasilia as a capital city, formed by wide avenues and representative mega-volumes. Six-story residential super-blocks, organized into superquadras in juxtaposition order, arranged the residential scale. The social scale (gregarious) was dealing with the public transportation system that should have played an important role in the city construction due to the fragmented and isolated structures. In the bucolic scale, L. Costa grasped the idea of creating a park-city with extensive green areas that should act as a divider between different urban areas (Arquba.com n.d.).

The projection of the city resembling an airplane shape shows the importance of creating a symbolic artifact to generate a sense of national identity. We can observe the same ideological concept in the case of Canberra. The obsession with the representative aspect in the urban construction provoked a lack of habitability in the urban areas. Therefore, we are dealing with a prevalence of macro-scale planning and the absence of user scale preoccupations.

These are residential complexes which consist of 11 6-story blocks in an area of 90,000 sq. m. (El-Dahdah 2005).
The idea of the Brazilian superquadras leads us to another block of static urban developments, which correspond to the English New Towns, and New urbanism movement development. These two directions in urban planning were elaborated during slightly different periods and could have a different visual representation. Nevertheless, the main concepts, purposes and urban function are similar.

In comparison with the capital cities presented above, the urban structures that we are going to present have a different concept. In this case, these are not dealing with ideological aspects. Due to the social situation of the countries where those projects were elaborated, a huge amount of new housing was needed. In this sense, we can say that in the case of residential static development the main driving force was social demand. Nevertheless, due to their fragmented structure and static model function, the residential cities mentioned above still do not poses necessary characteristics to provide urban benefits to their residents and be considered as good urban development (Lynch 1984).
3.3 New Towns Movement

In order to face the sanitarian and over-population problems of new industrial cities at the end of the XIX century, the idea of urban improvement was proposed. The main tool for achieving a better urbanity level was the urban decentralization suggested by the pioneer of this movement, E. Howard (1899). These ideas were reflected in the creation of Garden City, which was the main inspiration and reference for later development of New towns. The concept of New Towns gave planners the possibility to put the ideas of modern urban planning into action in their pure form: “New towns gave modernist planners a blank canvas on which to create their vision of the” (Hobson J. 1999, p. 1). Therefore, the idea of top-down rational designed development was implemented in about 32 New towns constructed in Britain in the period from 1946 to the late 1970 (Anon 2014b; see Im. 19).

The main goal of this kind of satellite development of the period was “to stabilize London’s population and prevent the growth of employment in central London by dispersing population to self-contained towns of 20,000 to 60,000” (Hobson J. 1999, p. 4).

This aim, based on the intention to improve the citizens’ life by creating a new organized and controlled lifestyle from the top, has never been accomplished. Nevertheless, the amount of the new developments that were constructed and the population that currently lives in the New Towns cannot leave the importance of this kind of urban development without attention. Therefore, the New Towns present almost paradigmatic cases of modernist urban thinking.

There were three waves of New Town construction:

Mark One’ new towns, 1946-50, were most influenced by the Garden City. In the early 1960s, ‘Mark Two’ new towns were modest and the programme slowed during this time. ‘Mark Three’ new towns of the late 1960s and 1970s resulted from the official ‘South East Study’, which proposed large new developments to meet projected population growth (Hobson 1999, p. 4).

In each wave, some emblematic examples can be highlighted. In the case of first wave, we can mention Harlow (1947), which was arranged from four residential groups around a main commercial center and an elementary school (El-Dahdah 2005, p. 42). The waste green areas were used to separate the neighborhoods between each other. Each neighborhood has its own secondary civil center. In this sense, we can say that the city of Harlow consists of self-sufficient neighborhoods which together with the main civic center form an entire city structure.

The second wave can be presented by the case of Cumbernauld (1958) organized in a linear scheme, without strict hierarchical division on independent units such as those presented in the Harlow urban structure. The number of services within the neighborhood unit were reduced to only one center, which serves the city as whole. This changes in comparison with the previous case, makes the Cumbernauld concepts quiet inflexible and applicable only for cities of a certain size. Thus, the hierarchical division (the case of Harlow) was not considered an optimal option and a greater flexibility was needed (El-Dahdah 2005, p. 42-44).
That led to a third generation of gridded towns such as Milton Keynes (1964) with its one-kilometer-square grid”. As the planning group report: “Homes are not grouped to form an inward-looking neighborhood unit, but will each be part of overlapping catchment areas, according to different functions and the interests and requirements of each household” (El-Dahdah 2005, p. 42-44; see Im. 19).

Performing a brief tour of the New Towns’ planning evolution we can observe the changes which have occurred. From the completely static and unchangeable fractal-like and lineal models (Harlow and Cumbernauld), spatial organization evolved into the Milton Keynes case, in which we can observe the similarities with the organization of historical cities.

3.4 New Urbanism Movement

This question leads us to another urban concept that also belongs to static development. The New Urbanism concept emerged as a neo-modernist movement with a traditional form. This means that the idea of New Urbanism is to create a representation of the historical city on the bases of the Modern Movement ideas.

Yet, there is a contradiction between the aim of New Urbanism and its real representation. The paradox consists in the critique of the Modern Movement urban developments by the adherents of the New Urbanism wave and the real result of New Urbanism constructions. As the creators of the movement state in the Charter of New Urbanism (CNU), “… they are anti-Modernists — or conversely, that the Modernists were anti-urban” (Vanderbeek & Irazábal 2007, see Im. 20).

The most emblematic example of the New Urbanism development is the case of Seaside, Florida. It was constructed in 1981 by Robert Davis, a builder and developer in Miami in the 1970s. The city represents the main ideas of new urbanism in its pure form. We even can say that the Seaside project was a prototype of the New Urbanism movement, which pushed the creation of an entire wave in urban planning. Thus, the core of New Urbanism planning resides in four main principles (Arendt et al. 2000; see Im. 20).

- A city should be walkable: all services should be places within walkable distance;
- De-emphasize the car role in cities by placing garages behind homes or in alleys;
- The buildings should be mixed both in their style, size, price and function;
- Strong emphasis on the community.
In the case of Seaside, we can observe all of the characteristics mentioned above. However, the most specific property of New Urbanism developments is the fact, that they are more fantasies, than real world urbanization. Therefore, a parallel between other “fancy” urban projects corresponding to theme parks could be drawn: (i) the concept and attractive image are stronger and more relevant than the real construction and (ii) the creation of mono-functional urbanization. If we pay attention to how the city is presented on the official website or non-critical articles, we can always find some poetic divagation from the precise planning issues “...but long before what you see today, Seaside was just a dream...30 years later, the Seaside dream continues...” (official web page of Seaside, see Im. 20).

Therefore, the schematic analysis of three cases (Capital Cities, New Towns and New Urbanism movements) shows that static systems can be found in a different developments from various periods of the 20th century’s urban planning and construction, in which the Modern Movement’s and the Garden City’s ideas were the dominant concepts of urban thinking. Therefore, we can argue that, due to the configuration and organization, all the cases mentioned above are products of the Modern Movement9 that was born from G. Howard’s Garden City. The influence of modernist concepts on architecture and urban planning was very significant throughout the 20th century, and we notice the repercussions of the rational design boom until today. The application of the same ideas of the Modern Movement in the observed cases makes their spatial organization quite similar: (i) the arrangement of the lineal and continuous elements to provide circulation through the urbanized zones and (ii) the creation of the auto-sufficient fragments that should function in an independent manner from each other and from the city center. Thus, the fragmented structured organization was produced, which is characterized by stability, non-changeability and closed nature to any external or internal interventions.

It is interesting to add that in soviet urban planning the idea of constant urban development and evolution did exist. That is to say, there is no doubt that soviet urban planning was based on the Modern Movement concepts:

...in the urban planning the most important aim is well-designed spatial organization of the urban functions (work, everyday life, rest and collective activities) in order to the functional zoning (Anikin 1987, p. 11).

This means that the functional and urban segregation were considered a good form of city organization. Nevertheless, the idea that cities are non-stop developing systems was taken into account as well. However, the concept of static and dynamic schemes differed from contemporary understanding. According to soviet urban planning, the static scheme was presented by historical cities which were organized around the old town without reserved terrain. Because of this, there is no place for further development in the inner city. In contrast, the possibility of an isolated development of each urbanization makes the city structure more flexible. Thus, in accordance with soviet urban planning understanding of static and dynamic urban developments, fragmented cities have a dynamic urban scheme (Anikin 1987).

Notwithstanding, we are arguing that the fragmented structure cannot be characterized as a dynamic system due to its closed nature. In order to resolve this question, we will progress into another chapter of our study, which directly deals with fragmented urban structures, which, as we have mentioned before, are a product of Modern Movement ideas.

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9 Including the New Urbanism developments, which, as the creators of the movement state in their charter, is the opposite approach to urban development. However, as we can see from the case presented on this study, there are many familiar characteristics and features in New Urbanism and developments based on the Modern Movement concepts.
III. FRAGMENTED CITIES

STRUCTURAL ORGANIZATION OF FRAGMENTED CITIES, RESIDENTIAL FRAGMENTS AND GREEN ELEMENTS: Comparative Analysis of the Case of Minsk and Three New Towns (Harlow, Cumbernauld and Milton Keynes)
III. FRAGMENTED CITIES

As we have pointed out in the previous chapter, fragmented structures are products of the Modern Movement. Therefore, many of them are newly-constructed urban developments or completely reconstructed ones (the case of Minsk). Thus, in this case the implementation of the fragmented structure was possible in an absolute way. That is why the cases of application of modernist principles in the urbanization of beforehand empty zones or the construction of entire new cities (Canberra, Brasilia) present exemplary urban structures. In this manner, in new constructed cities, planners have the opportunity to interpret the urban organization based on modernistic ideas: static components are arranged in accordance with a strict hierarchical order, which provokes an establishment of all urban elements into complex organized categories (see Im. 21). Once the categories are settled, they form a complex structured system that is not adapted for modifications. That is, that the artificial elements that compose the fragmented cities are the main structural elements, which are characterized by a stable and fixed position in the urban terrain. As Richard Sennett defines the closed systems in his work Open city (2006):

>A closed system is meant to be an integrated system. Ideally, every part of the system has a place in an overall design; the consequence of that ideal is to reject, to eject, experiences that stick out because they contest or are disorienting; things that don’t fit are diminished in value.<

This is why those elements transform into boundaries that do not facilitate circulation and resident activities but segregate the city into isolated zones instead. Thus, they impede the establishment of a network of the physical, visual and virtual relationship between the city and its inhabitants (see Im. 21). This provokes that fragmented structures are not only unable to change naturally, i.e. to evolve; they also neglect any intentional or accidental intervention in their structure. This feature of the fragmented structures explains the phenomenon of a huge amount of the contemporary cities organized in a fragmented way. Therefore, we can argue that in the case of external interruption to their structure, fragmented cities cannot resist and could even collapse. The fragmented cities are absolute structures, and apart from being closed and incapable of any modification, they have a low level of resilience capability, i.e. they do not adapt to changes that are occurring in the environment or even within themselves, instead of that they try to defend by struggling with any modifications in order to eliminate them.

As uses change, buildings are now destroyed rather than adapted; indeed, the over-specification of form and function makes the modern urban environment peculiarly susceptible to decay (Sennet 2006, p. 1-2).

In this manner, low quality fragmented cities continue to be produced, in which urban fragmentation play a principal role in generating discontinuity problems.

The quick degeneration of the fragmented structures is a relevant problem to urban studies. As we have pointed out, the amount of cities or urbanizations, in which the fragmented structure can be observed, is extensive. As long as we are focusing on post-socialist development, we can say that the majority of post-war urbanizations within that territory have a fragmented
structure. For instance, massive block housing construction, which without doubts is developed on the base of the fragmented urban scheme, can literally be found in each part of the world.

Earlier we thought that such all-looking-alike housing estates stretched from Vilnius to Vladivostok, but now the horizons have broadened, and we can see the same things stretching from the Atlantic to the Pacific (Drėmaitė/Petrulis 2013; see im. 22).

Nevertheless, the application of the fragmented urban scheme is not limited to block housing. As we can see from the explanation of the static urban model, this kind of urban development can be found in different kinds of urbanization, from the New Towns, which by 1990 contained a total population of over 2 million, to New Urbanism constructions and some new-constructed capital cities. Furthermore, the fragmented method of organization is still applied in urban planning, especially in residential development and mostly in the post-socialist (soviet) territories.

Therefore, the question is how can one intervene in those structures if they do not accept any kind of intervention? Is it possible to produce changes without total deconstruction of the fragmented developments? In order to answer that question, we believe that it is essential to understand a current function of this type of urban development; how it was produced and what its main pathologies are today.

1. STRUCTURAL ORGANIZATION OF THE FRAGMENTED CITIES

To present a general organization of fragmented urbanizations, we have based our work on the idea that fragmented cities were constructed according to the Modern Movement concepts. Thus, the concepts of urban zoning, strict road and elements hierarchy and functional segregation are presented in an absolute form in the cases of fragmented developments. Another outstanding general characteristic of fragmented cities is their focus only on the material and practical aspects of urban planning.

...it [the Athens Charter] does not deal deeply enough with economic, sociological, and ecological factors and with legal implementation; it is very much a product of architectural thinking... (Sert 1973)

This means that the fundamental characteristics of the fragmented urban model are rationalization of the urban structure through the functional segregation and transformation of the city from a complex organized ecosystem to an artificial mechanism. The whole structure of fragmented cities can be divided into two principal groups of elements: continuous corridor systems and urban fragments. These elements can be arranged in different ways: lineal, orthogonal, radial etc. systems. Nevertheless, the function and relation between those two groups are quite similar in each urban scheme.

By lineal elements, we understand the road and green/empty corridors systems that define the configuration and the shape of the urban fragments. Nevertheless, the inner structure of urban fragments does not depend on lineal elements. Due to the auto-sufficiency of fragments and their fractal-like structure\(^1\), these

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\(^1\) The city made of urban areas that present a group of sectors configured by urban fragments, which in turn, are composed by urban units arranged in groups. Thus, each element of the city can be divided in smaller ones with similar properties as the previous one.
have their own way of development that differs from lineal elements. The combination of lineal elements with urban fragments is a crucial point in the structural organization planning of the fragmented cities. As soon as they have different ways of developing, the continuous elements and inner organization of the urban fragments cannot be related one to another. Thus, we are dealing with a segregation problem that consists of a lack of connection between lineal elements and fragments, and between fragments themselves. Therefore, we are coming back to the issue which we have discussed in the chapter on static and dynamic cities: the relation between artificial elements and cities’ residents. In the case of fragmented structures, the solid artificial urban structure dictates the inhabitants’ behavior. In this way, in place of enabling mobility of social flows, urban elements become artificial boundaries that prevent further development of the three primary qualities of urban areas: mobility, accessibility and habitability (see Im. 23).

Therefore, what is the reason of segregation between fragments and lineal elements? As we look at the organization of a fragmented city, we can define two types of development: from the macro scale and micro scale. The continuous elements (road and green corridor systems) typically cover the entire urbanized territory organizing urban fragments into systems. Therefore, we can say that these are arranged in a deductive way: from bigger elements that embrace the complete urban territory and depend on the natural characteristics of the place (topography, fluvial system, etc.) to subordinated urban fragments. Nevertheless, the mentioned urban fragments have a certain urban development based on the inductive approach. The self-suffi-

(Anikin 1987).
Hence, the question is: can the disassociation between two approaches to city development be perceived not as a negative particularity, but as a possible solution for the evolution of fragmented urban structures?

To answer this question, firstly, we should define what role the theoretical disassociation between scales plays in the structure of a real city, i.e. what is its material interpretation. That will shine the light on the issue of functional configuration of fragmented cities and its main elements.
2. RESIDENTIAL FRAGMENTS AND GREEN ELEMENTS

2.1 Scaling laws

In the present research, we are focusing on the post-socialist (soviet) interpretation of the fragmented structure. Nevertheless, in this chapter we are still attempting to explain the particularities of fragmented cities in a general way. We believe that, in despite of the different contexts, size and priorities in the global scene, the conclusion that we are reaching from the study of post-socialist fragmented development (in the case of Minsk) can still be applied to other cases with a similar structure, e.g. New Towns, North American suburbs, etc. Furthermore, due to the fractal-like nature of the fragmented structure, analogous analysis and intervention methods could be applied in cases of entire cities or just for urban developments. To prove our point of view and at the same time detect the dominant elements of a fragmented urban structure, we performed a comparative analysis between three New Town cases and the study case, the city of Minsk. Initially, these cases are incomparable because of the multitude of relevant particularities in each development, such as social, political and market context, geographical location, size and ranking in the global context. According to the M. Batty there are Laws of Urban Scaling, which

...may not be laws in the accepted sense of the term in the physical sciences but they are regularities that seem to persist in time and space (Batty (2013)).

Due to the big number of particular details in urban scaling and growth laws, we have chosen the most relevant statements for our research which, in the first place, are dealing with urban morphology and the interaction between residents and city. Therefore, the following statements were highlighted (see Im. 25):

- Cities change shape as they change in size – allometry, meaning we tend to move differently in cities of different sizes
- As cities grow, the number of ‘potential connections’ increases by the square of the population (Metcalfe’s Law, the network equivalent of Moore’s Law)
- As cities grow, the ‘density’ in their central cores tends to increase and in their peripheries it tends to fall.
- As cities get bigger, they get ‘greener’ (Brand’s Law)
- People interact with each other more intensely in bigger than in smaller cities
- People interact with one another less with increasing distance between them: the gravitational law.

As we can see from the quoted statements, the size and the rank of urbanization do matter with respect to its configuration, shape and relation within the city. Nevertheless, we can also argue that in the case of fragmented structures the idea of morphology dependence on the size of the city could be debatable. However, we do not put into doubt lifestyle changes due to the rank of the city2. Thus, the incongruity between

2 There is no doubt that the life style in the capital city of Minsk differs from the life style in the small towns like Harlow, Cumbernauld and Milton Keynes.
inevitable social changes and morphological stability in the moment of urban growth/development proves the idea of segregation between “human” content and physical components of fragmented cities.

As we have mentioned, fragmented cities are static systems. Therefore, we speculate that the process of growth in this kind of structures does not have an important influence on its morphology, or this just does not take place. In other words, in the case of the urban expansion of static systems, the growth process occurs according to already established morphological patterns. Furthermore, as we have pointed out, fragmented structures tend to have a fractal-like organization. Therefore, growing occurs by the attaching of similar urban developments to existing ones.

To give some examples of the impossibility to apply the scaling laws to fragmented structures, we perform a quantitative comparative analysis of the urban development of four chosen cases: Harlow, Cumbernauld, Milton Keynes (New Towns) and Minsk (Capital City). We will focus on the growth of the population, urban expansion, and analyze it by the calculation of population changes and areas of increment from the moment of construction of the selected urban developments to the actual time.

<table>
<thead>
<tr>
<th>Case/ Date of establishment</th>
<th>Project population</th>
<th>Rapid population increment (year - population)</th>
<th>Establishment of population (year - population)</th>
<th>Population, 2011</th>
<th>Initial area, km²</th>
<th>Current area, km²</th>
<th>Population change, %</th>
<th>Area growth, %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HARLOW, 1954</strong></td>
<td>4,5 / 60, 0</td>
<td>1955 - 17,0</td>
<td>1971 - 78,1</td>
<td>82,1</td>
<td>25,0</td>
<td>30,54</td>
<td>1955 - 1954 - 277%</td>
<td>22,16</td>
</tr>
<tr>
<td><strong>CUMBERNAULD, 1957</strong></td>
<td>3,0 / 50, 0</td>
<td>1965 - 18,46</td>
<td>1980 - 48,96</td>
<td>52,27</td>
<td>16,8</td>
<td>20,8</td>
<td>1957 - 1965 - 515%</td>
<td>23,8</td>
</tr>
<tr>
<td><strong>MILTON KEYNES, 1967</strong></td>
<td>40,0 / 250,0</td>
<td>-----------</td>
<td>-----------</td>
<td>212,8</td>
<td>88,4</td>
<td>89,0</td>
<td>432% = 9,81% per year</td>
<td>0,67</td>
</tr>
<tr>
<td><strong>MINSK, 1946</strong></td>
<td>40,0 - 50,0 / 1273,5</td>
<td>1970 / 1979 - 915,5</td>
<td>1899 - 1607,1</td>
<td>1864,1</td>
<td>130,0</td>
<td>348,84</td>
<td>1946 - 1970 - 2118%</td>
<td>168,3</td>
</tr>
</tbody>
</table>

Im. 26. Comparative table of the population and urban growth. (Harlow, Cumbernauld, Milton Keynes, Minsk) Developed by author, data: see footnote # 4.
2.2 City and population growth

As we can see, there is a difference in the value of population and areas in the case of New Towns and Minsk. Because of the different position in city ranking (capital city vs. suburb cities), the number of inhabitants and the surface change. Nevertheless, the way the population increases and the city grows is quite similar despite some slight particularities.

In the population increment we can observe the following patterns (the cases of Harlow, Cumbernauld and Minsk): due to their construction from scratch, the initial population is always lower than the projected one (4,5/60 thousands – Harlow, 3,0/50,0 thousands- Cumbernauld). However, the constructed/projected areas have been calculated for the predicted population. Therefore, we can see, that during this period, from the construction (the dates slightly differ) to today, the population grows rapidly, whereas the surfaces do not change a lot (in the case of New Towns). Of course, there is some variation, which can be explained by context factors of each case. For example, in the case of Milton Keynes the population growth has a gradual character, whereas in the rest of the cases there are some marked points in population growth: the initial population value, spontaneous and rapid growth until reaching a fixed point, in which the growth stops or achieves a more gradual character. For example, the initial population in the Harlow case was 4,000 inhabitants, then it was still only 5,571 in

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1951, but it then increased rapidly to 17,000 in 1954, 37,000 in 1957, 53,680 in 1961, and 78,087 in 1971. It reached a peak of 81,000 in 1974, but fell to 77,000 in 1976 and to 73,000 in 1979 (British History Online 2014). Thus, from 1971 the population obtained an established nature. The similar template can be observed in the cases of Cumbernauld and Minsk (see see Im. 26, Im. 27).

Nevertheless, the surface growth pattern between these cities is completely different. In the cases of New Towns, the area almost does not change during the entire development period. For instance, Harlow, since becoming a new town,

(...) has undergone several stages of expansion, the first of which was the “mini expansion” that was created by the building of the Summers and Katherines estates in the mid to late seventies to the west of the existing town. Since then Harlow has further expanded with the Church Langley estate completed in 2005, and its newest neighbourhood Newhall has completed the first stage of its development, with the second stage underway in 2013 (British History Online 2014).

In the case of Cumbernauld, the urban extension has also occurred: to achieve a target population further 1,472 hectares (3,638 acres) was designated as a Town Extension Area in 1973 (Cumbernauld Unofficial, 2014). Regarding the Milton Keynes case, comparing the projected surface and the current urbanized area, we can see that it has not changed (only a 0.67 % increase). In the case of Minsk, we have a slightly different picture: from the establishment of the current urban structure in 1946 the city is expanding around the initial structure repeating the same residential urban pattern (see Im. 26, Im. 28).

Therefore, despite some variations in urban growth and population increment between the New Towns and Minsk, we can conclude that the process of city development has a similar model: the cities reach a certain size and population number and then they stop developing. Otherwise, if they continue the growing process which happens gradually, as in the case of Minsk, they repeat the existing urban pattern.

The quantitative analysis performed shows that fragmented cities do not match the established scaling laws, due to their closed character. From the studied cases, we can see that the population and the surface, after meeting a target number, practically do not develop.

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**Im. 28.** Comparative graph of urban area growth. (Harlow, Cumbernauld, Milton Keynes, Minsk)
Developed by author, data: see footnote # 4.

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**URBAN AREA GROWTH**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>HARLOW</td>
<td></td>
<td></td>
<td>25</td>
<td></td>
<td>30,54</td>
</tr>
<tr>
<td>CUMBERNAULD</td>
<td></td>
<td></td>
<td>16,8</td>
<td></td>
<td>20,8</td>
</tr>
<tr>
<td>MILTON KEYNES</td>
<td></td>
<td></td>
<td></td>
<td>88,4</td>
<td>89</td>
</tr>
<tr>
<td>MINSK</td>
<td>130</td>
<td></td>
<td></td>
<td></td>
<td>348,84</td>
</tr>
</tbody>
</table>

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4 The history and the process of urban development of Minsk will be presented further.
further (as seen for New Towns). Conversely, due to the different category in the cities’ classification, the case of Minsk is still growing by repeating the same urban model. Thus, the urban structure and the city functioning does not change. These conclusions allow us to compare the two forms of urban developments (New Towns and Minsk), and speculate that in the case of urban intervention, similar tools might be applied.

2.3 Dominant element in the city structure

To detect dominant elements in the city structure, we base our work on the quantitative analysis of functional distribution and spatial configuration of the selected cases (Harlow, Cumbernauld, Milton Keynes and Minsk). In the present section, we will perform zoning and a first structural comparative analysis of the selected cases. With the help of this comparative evaluation, it will be possible to illustrate that the fragmented urban scheme is not unique to the city of Minsk, but can also be found in other cases within different contexts. This fact converts the fragmented structure into an urban model.

As we can see from the zone distribution, the green and residential areas and the road system are quantitatively prevalent in the urban structures of all cases. In some cases (Harlow, Cumbernauld), the green areas have a predominant role in comparison with other functions, in other cases (Minsk, Milton Keynes) the green and residential areas share a domain in functional zoning.

Due to the economic, political and social circumstances in the moment of the cases’ construction, the most relevant issue was the lack of housing (the case of Minsk) or the necessity of improvement in living conditions (the case of New Towns). Therefore, the primordial place in urban development was occupied by the dwellings’ construction in order to meet the social demand. This explains the prevalent role of residential areas in urban structures not only of the presented cases, but also in other urbanizations constructed under the same ideological and economic concepts (all New Towns cases, North American suburbs, socialist housing constructions and new socialist cities).

The influence of the modern movement dictated the urban configuration that is reflected in the functional zoning and percentage of the uses’ distribution. It means that, due to the idea of functional segregation, a division between different areas should be created. In multiple cases, the green areas/corridors act as divider element. Thus, the percentage prevalence of residential and green areas can be explained. In the same manner, the dominant idea of functional segregation in Modern Movement constructions, generate the fragmented urban structure that demands a well-developed road system and divisors (green corridors) between urban areas. Therefore, the connection between functional zoning and urban structure establishes a quantitative relationship between urban functions which in the case of fragmented cities is based on the road system, green and residential sides (Anikin 1987; see Im. 29, Im. 30).

For this reason, we can say that the quantitatively dominant elements in the fragmented urban model are road systems (to provide a good communication between disconnected fragments) residential areas (to meet the social demand of the moment) and green corridors (to divide urban fragments from one another in accordance to their function). On the other hand, in the urban configuration, the lineal elements, as road systems and green corridors, play a structural role, and urban fragments are subordinate areas that take shape in accordance with the lineal elements composition. Thus, if we mix the quantitative importance that residential and green areas have in urban zoning and the structural role of road systems and green corridors in the city’s organization, we can see that green corridors have a dominant position in both cases.

Thus, we argue that in order to achieve a higher urbanity level of the residential fragments, it is opportune to study a relation produced between fragments and green corridors. In other words, the problem of a lack of habitability in the modernist neighborhoods could

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5 In the case of Minsk the road system, Green and residential areas occupy nearly the same area in the city structure.

6 This deals with the idea to remove the residential functions from the cities contaminated by the industries. In particular in the case of New Town development the purpose was to stabilize London’s population and prevent the growth of employment in central London Hall and Ward, 1998; Merlin, 1971; Osborn and Whittick, 1969 in (NEW TOWNS, THE MODERNIST PLANN PROJECT AND SOCIAL JUSTICE, Jane Hobson, p. 4).

7 Separation of the neighborhoods from the unfavorable elements or areas, such as highroads and industrial polygons; or the segregation between formal and ideologically correct city center and the exclusively functional areas (residential/industrial/services etc.; the case of Minsk and other capital cities).

8 Later in the text, the idea of ecological corridors appears.
depend on the structure of the entire urban sector (including urban fragments and lineal elements that organize them) and not only on the inner configuration and organization of the neighborhoods. With this in mind, we argue that the elements that produce pathologies in the urban functioning of the neighborhoods are green corridors and road networks (El-Dahdah 2005). Therefore, in a wide sense, our conclusion could be expressed in the following way: the common critique of the modernist residential areas should be addressed not only with regard to the neighborhoods, but also to the lineal elements (green and road networks) that organize them in urban sectors at the macro scale and provoke segregation between them at the micro scale. Therefore, in order to increase the habitability level we suggest to focus on the study of green corridors as prevalent elements in the fragmented urban structure.
Im. 30. Functional organization of a.) Minsk, b.) Harlow, c.) Cumbernauld, d.) Milton Keynes
Developed by author
IV. THE DUALITY OF GREEN CORRIDORS

IV. THE DUALITY OF GREEN CORRIDORS

In the previous chapter, we have determined that green corridors have a structural role in the configuration of urban fragments (especially in residential development) and the percentage predominance in functional distribution. Therefore, we assume that green elements could provide a solution in order to improve the level of habitability of residential areas in fragmented cities and convert their static structure into a dynamic one. That is to say that the functioning of urban fragments and the level of wellness within them depend not only on their inner organization, but also and mostly on their environment which in the case of the present research, are green corridors. However, we still do not know if it is possible (and necessary) to change the relationship between urban elements from a static to a dynamic organization. Nevertheless, we do believe that the idea to add some dynamic characteristics to static developments could be a possible intervention in order to improve the existing, functional fragmented urban areas.
1. PRESENTATION OF THE STUDY CASE: MINSK AS A MODEL OF SOVIET URBAN PLANNING

Therefore, to come to conclusions about the function of green corridors’ in a fragmented structure, their role in the formation of fragments formation and their disconnection with residential areas, we suggest building this research on the case of Minsk which we have already slightly presented in the previous chapters. The reason for this selection is based on the city structure (a static system found in the fragmented structure), city construction history (newly-constructed), and the circumstances which influenced the city’s development. The mentioned particulars of the city’s development process and its structure, convert Minsk into an emblematic example of a fragmented urban structure.

In the presentation of this case, we will focus on the formation of the urban structure of Minsk after World War II which destroyed almost the entire pre-war city structure. The process of urban reconstruction of Minsk plays an important role in its current configuration. The radical changes in its urban structure, which were developed during that period, transformed the city into a unique case of soviet urban development. The transition from a historic to a contemporary city, the description of implementing an urban model and its main features introduce us to the current urban function of the city of Minsk (see Im. 31).

The city had its maximum development in the post-war period that has reflected in the reconstruction of the almost devastated city embodied in the Master Plan of 1946. The current urban structure of Minsk is composed of three road rings that define the urban zones by establishing a hierarchical order which, in turn, depends on the location of the fragments from the geographical city center. At the same time the continuous green system is configured by the natural (or in some cases artificial) fluvial corridors of the city. The self-sufficient and independent urban fragments are arranged in accordance with the roads and green structures.

The fragments are made up of “mykrorayons”¹ system that consists of the super-blocks developments. In other words, the urban structure of the city is organized according to the hierarchical order of the articulated and independent urban elements. All the components of the city, road system; green corridors, residential and industrial fragments, urban centers, etc., are prioritized.

Minsk is situated in the geographical center of the country. It has an area of 348,85 sq. km and a population of 1,943,664 inhabitants. Currently it is the capital of Belarus and the most important city in the country. Despite having a long urban history, a complex and well-designed city structure, the city of Minsk has awoken the interest of the urban studies in a few cases. Nevertheless, the fact that the city is understudied from the urban planning point of view, Minsk is a unique and paradigmatic urban case of a dominant New Soviet City that has emerged after World War II. Therefore, we believe that the case of Minsk deserves special attention in order to explain the soviet city and a fragmented model structure (see Im. 31).

¹ Microdistrict, or microrayon (Russian: микрорайон, Ukrainian: мікрорайон), is a residential complex—a primary structural element of the residential area construction in the Soviet Union and in some post-Soviet and former Communist states. Residential districts in most of the cities and towns in Russia and the republics of the former Soviet Union were built in accordance with this concept (Anikin 1987).
according to the role that they play in the city’s structure, creating complex categories between these elements and within families of the same elements (Territorial and functional organization and further urban development of Minsk, see Im. 32).

Notwithstanding, the structure of the city has not always had the same character. For this reason, in order to understand the current city, it is necessary to analyse how this transformation occurred through the analysis of the instruments and processes which led to it. After a brief analysis of the city’s growth during the period prior to WWII, we will focus on the urban proposals, which corresponded to the General Plan of Minsk in 1936, which proposed the reconstruction of the city according to the concepts of the Modern Movement. Particularly, we will focus on the General Plan of 1946; analysing its proposals and the elements, which radically changed the urban structure and aspect of the city between World War II and today. These elements converted Minsk into a paradigmatic case of Soviet Urbanism which is captured mostly in its contemporary identity.

1.1 Development prior to the Second World War

The first notion of Minsk corresponds to the year 1907 in which, Nestor’s Primary Chronical² described a battle at the Nemiga River after which, the city of Minsk was completely destroyed (Osmolovsky 1952).

Minsk's history begins with the reference to a conflict, which determined the destiny of the city: continuous destructions for reasons of war, trespassing from one country to another, subjugation to different governments and politics. Due to these circumstances, during the pre-war period, the city practically had never played an important role, and its cultures and aspect was continuously changing (Klinov 2013). A brief introduction of the city's history will make the conditions under which Minsk was developed before World War II, clear.

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² The Primary Chronicle (often translated into English as Tale of Bygone Years) is a history of Kievan Rus’ from about 850 to 1110, originally compiled in Kiev about 1113. The work is considered to be a fundamental source in the interpretation of the history of the Eastern Slavs.
By the time Minsk was made mention to for the first time, it found itself caught in a war between two powerful countries of the period. The Principality of Polotsk and the Kievan Rus’ continuously fought for the city’s control. In the XIII century, during the Mongolian Invasion of Russia\(^3\), the city lost its importance in the development of Slavonic territories and disappeared from historical chronicles. The next mention of Minsk corresponds to its entry into the Grand Duchy of Lithuania\(^4\), which caused an active growth in the city, such that in 1496 it received the Magdeburg rights and in 1565 it became the administrative centre of the region. In 1569, due to weak exterior politics, the Grand Duchy of Lithuania arranged a union with the kingdom of Poland. This founded a new country, the Polish-Lithuanian Commonwealth\(^5\). In this period,

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\(^3\)The Mongol invasion of Russia began in the medieval Rus of Kiev, lasted from 1237 until 1240, precipitated the fragmentation of the principality and influenced the subsequent development of Russian history.

\(^4\)The Grand Duchy of Lithuania was a European state from the 12th century until 1795. It was founded by the Lithuanians, one of the polytheistic Baltic tribes from Aukštaitija. The duchy later expanded to include large portions of the former Kievan Rus’ and other Slavic lands, covering the territory of present-day Belarus, Latvia, and Lithuania, and parts of Estonia, Moldova, Poland, Russia, and Ukraine. At its greatest extent in the 15th century, it was the largest state in Europe. It was a multi-ethnic and multi-confessional state with great diversity in languages, religion, and cultural heritage.

\(^5\)The Polish–Lithuanian Commonwealth, Poland, Kingdom of Poland, after 1791 officially the Commonwealth of Poland, was a dualistic state, a bi-confederation, of Poland and
there was an intense growth and development within the city, which lead to Minsk becoming the economic, cultural and religious centre in the middle of the XVII century. These period of the Grand Duchy of Lithuania and the Polish-Lithuanian Commonwealth became the most considerable periods towards the urban, economic and cultural development of Minsk in the period before the industrial revolution.

However, after a brief peace, a new wave of wars and conquers arrived, moving Minsk to the periphery of the Polish-Lithuanian Commonwealth. Because of the political and economic crisis within the Commonwealth, the country was divided into the Russian empire and Prussia. It is then, in 1793, that Minsk was placed under Russia’s control. From then until the establishment of socialism, the city was part of the Russian empire, developing as a peripheral city in which the only economic activity was artisanal production (Klinov 2013). According to the description of the city in Osmolovskiy’s book *The Practise of the Soviet Urban Planning on the Example of Minsk* (1952), practically all buildings were made of wood, the urban structure had no clear character and the organization of urban elements was chaotic. Furthermore, the city did not have sewer or water channelling. There was no existing urban planning, therefore, as with many cities of this time, Minsk grew spontaneously depending on industrial and commercial development (see Im. 33).

The Russian Revolution led to radical changes in all aspects of life. Urban and architectural practice also suffered revision and restoration. However, during the initial period of the establishment of the soviet government, the changes were specific and did not include cities’ general structure. In Minsk’s case emblematic buildings were built after the First World War and restauration of the city’s road system, based on the reorganisation of the current open urban structure to a system based on Modern Movement concepts (hierarchical order of urban elements and division of the city into functional zones), was proposed. In 1926, a draft of the General Plan was presented, which proposed restructuring the urban system of the city converting it into the radio-central model. After this draft, in 1938, the General plan was developed and approved, in which emphasis was made on the road system structure and the new urban fragment building which would suit the needs at the time (Linevich 2010). In other words, the objective of Minsk’s 1938 reconstruction project was to adapt the city to the new soviet society through the establishment of a new urban organization based on the Modern Movement and Soviet avant-garde. However, due to the weak economic situation of the soviet Union, and the start of the Second World War, the urban changes were only fulfilled in writing (see Im. 33).

In conclusion, in spite of the continuous destructive cycles and the city’s reconstruction, Minsk’s urban evolution had a lineal and natural character in the pre-war period. That is, the city extended around its historical centre slowly obtaining a traditional city structure which represented a system of closed blocks configured by an orthogonal road system. This describes Minsk’s structure as a continuous and open system made up of fragments or urban units developed at the user’s scale, before the Second World War (see Im. 34).

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Lithuania ruled by a common monarch, who was both the king of Poland and the grand duke of Lithuania. It was one of the largest and one of the most populous countries of 16th- and 17th-century Europe, with some 390,000 square miles (1,000,000 km²) and a multi-ethnic population of 11 million at its peak in the early 17th century.

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6 See the Government Palace and the architect Longbard’s Theatre of Opera and Ballet, which until today have play a significant role in the urban structure and ideology of the city.
Im. 34. Pre-war (World War II) urban development of the city (the First Mention In The chronicles (XIX c) To The 1941. Developed by author
1.2 Minsk’s devastation during World War II

During World War II, many cities were seriously destroyed and in some cases completely devastated. One such case was the city of Minsk, ranked as the third city with the largest destruction in Europe, after Warsaw and Berlin.

Minsk was occupied by the German army from the beginning of World War II on Soviet Union territory (1941) up to 1944. After the liberation of Minsk, the city was a pile of ruins and rubble. During the occupation, there were numerous attacks and bombings, in which 5975 residential buildings were destroyed, i.e. 70% of the housing stock, and 80% of urban infrastructure. The population decreased by 80%. If Minsk had 250-300 thousand inhabitants the pre-war years, in 1944 only 40-50 thousand people survived (Osmolovsky 1952; see Im. 35, Im. 36).

Destruction data show that the city needed urgent reconstruction. Thus, the work on a restoration plan of the city began. In the year 1944 the Commission for Architecture performed as study on the state of the city and the prospects for recovery. However, due to the numerous demolitions, the decision to build a new city, rather than rebuilding the existing one was made. Some even though of moving Minsk a couple of miles away to not have to remove the debris of the city. Relying on the studies performed, and primarily considering ideological demands, a sketch of the city’s plan based on urban proposals made in the early years of the establishment of the Soviet Union\(^7\), was written. In the Sketch Plan great intention was set on the construction of a city center, representative of the city and the following points were made (Linevich 2010):

- Rebuilding of the main pre-war artery of the city, into the main avenue of the post-war city.
- Building of a secondary road, perpendicular to the main avenue as the basic structure of the city centre.
- Building a new central square between the intersection of two main roads, creating a socio-political centre for the city.
- Building of two bypass arteries aimed at turning the city’s structure into a radio-central system.
- Creation of a continuous system of parks along the river Svisloch flood plain, which form a green diameter in the city.

The government approved the project as the starting point for Minsk’s rebuilding and reorganization. In summary, in 1946, a new City General Plan was presented which converted Minsk from being a traditional city with an orthogonal structure into a Soviet City with a radio-central organization.

\(^7\) See a Master Plan of 1938.
Im. 36. Destruction of Minsk after WWII.
1.3 A modern city: The Soviet Model

In 1946, the reconstruction plan was an important document in Minsk’s urban history. It was a definitive project, which changed the city’s image radically, changing into the Ideal City from the Soviet Urbanism’s point of view, which corresponded to that of new cities.

... which were characterized by their extensive arteries, large green areas, the majestic and multiplicity of collective buildings found in central areas, the absence of social segregation and the difference in architecture between the different districts (Fernández 2005).

The urban proposals made in the General Plan have defined the function and development of the city until today. The document established the following points in the city’s reconstruction (Borovoy 2004; see Im. 37, Im. 38).

- Rationalization of the structure of the general plan, by the conversion of the existing orthogonal system into a radio-central system.
- The idea of two perpendicular diameters, the main avenue and the green axis, which would form the architectural and spatial structure of the city.
- The expansion of main raids.
- The creation of a system of continuous green corridors.
- Urban zoning of the city; the tertiary uses were located in the centre of the city and at the same time, the residential and industrial zones were located in the perimeters.
- Creation and development of the new urban centre.

In other words, these proposals restructured the road system and segregated urban functions. Thus, a radio-central structure with high road specification and hierarchy and strict zoning by function was set. These features refer to ideas of the Modern Movement, in which the relevance of the rationalization of urban space through the city’s division into fragmented urban areas stands out. From the crisis of industrial cities, the primary role of the Modern Movement was to improve the quality of urban life through the creation of a controlled and therefore closed, urban system. The concept of the Modern Movement was an international notion reaching several countries and cultures. In 1925 A. Meyer W. Gropius’ prologue said:

*Most citizens of a country have the same life and living habits; it is not understood, therefore, why our buildings should not undergo a similar unification to our dresses, shoes, cars ...* (Benevolo, L. (1994, p. 539).

Instead, post-war soviet urbanism had two primary objectives (Kosenkova 2000):

- Overcoming of the economic level of the period prior to the Second World War in the first quinquenal plan by reinforcement of the industrial sector.
- Creation of the Ideal City, which will hold the

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8 The five-year plans for the development of the national economy of the Soviet Union (USSR) (Russian: пятилетка, пятилетка, literally: “five year-er”) were a series of nation-wide centralized economic plans in the Soviet Union.
socialist ideology through the construction of buildings with a monumental and representative character.

That is, the government’s ideology played a practically key role in socialist urban development. Besides the application of functionalist and rationalists ideas, the Soviet Union urbanism at the time paid attention to the development of urban projects according to the policy doctrine, which aimed at raising the populations national identity through the construction of national palaces, sports arenas, wide avenues, etc (Klinov A 2013). In other words, it aimed to create a city at a monumental scale, which represents the autocratic power of the time.

The combination of the urban planning objectives of the Soviet Union and the concepts of the Modern Movement created a New Soviet Urbanism. Attributing the properties of this type of urban development to the specific characteristics of the General Plan of Minsk for 1946: In which way were these two types of urban development reflected in the 1946 proposal for Minsk’s urban planning?

As mentioned above, the rationalization of urban structure and functional zoning of Minsk refer to the concepts of the Modern Movement established in the Athens Charter. In turn, the distribution of the applications was based on the economic and ideological system of the Soviet Union. The development of the industrial sector in the South-West part of the city, reflecting the need to build an industrial city; however, the location of the formal uses in the geographical centre demonstrates the idea of creating a representative architectural ensemble, accompanied by emblematic architecture. That is, the overall organization of the city is based on the concepts of the Modern Movement, whereas the localization of the areas and the new edification of the central part of the city corresponds to the ideas of Soviet Urbanism.

Soviet Urbanism is the product of the Modern Movement therefore it has a similar goal: the rationalization of the city, transforming it from a living organism into an artificial mechanism. However, the way in which the concepts are expressed is different: if in the case of the Modern Movement it is complete rationalization in both urban planning and architectural representation, in Soviet Urbanism an ideological side is present which requires the construction of a monumental and decorative architecture. The features of both ideas are markedly reflected in the reconstruction of Minsk. On the one hand, at the time of the planning of Minsk’s restoration, the government had totalitarian and autocratic character, which was reflected in the reconstruction of the city; on the other hand, the fast and complete transformation of via traditional natural evolution from a chaotic medieval city into a soviet city with a radio-central structure, based on hierarchical and strict zoning shows the idea of regulated and rational planning. The two features mentioned clearly express the socialist idea of construction of a new society through urban planning.

9 See a definition of the term Soviet Urbanism on the previous page.

10 See the concept of artificial cities and natural cities (Alexander, 1965).
Im. 37. Master plan, 1946.
Developed by author on the base of the data from Belarus Urban Planning Institute.
Im. 38. General urban elements of the Master plan 1946. Developed by author.
1.4 Totalitarian Architecture

Aside from the change in the cities’ structural elements the idea mentioned above was achieved: the creation of a new ideal society reflected in the construction of a symbolic and isolated urban centre. In other words, the construction of a city within another. The first is the Ideal City, played by the arrangement of the centre of Minsk, which was subordinated to ideological interests. The second corresponds to the residential and industrial city that meets the economic and social demands.

The construction of the city centre arrangement coincided with the time the new urban replanning. By contrast, in terms of its concept, it represents the different ideas compared to the rest of the city. The periphery of the city reflects the rationalist ideas in the construction of a fragmented city with the open block building however, the centre represents the traditional city with an orthogonal structure built by the classic and monumental character architecture. Thus, the peripheral zone of Minsk corresponds to the ideas of the Modern Movement; however, the central area represents totalitarian urbanism reflected in the imperial style buildings.

The centre of Minsk is made up of a main road and three squares with governmental character, with a compositional role, structured around the central arrangement. The production of the central part of the city has great symbolic weight, interpreting utopic ideas of the Sun City (Klinov 2013). In 1945 the competition for the design for the central arrangement of Minsk was organized. At this time and the importance of the creation of a representative center which would emphasize the governmental center, was already recognized. Precisely for this reason, the
eleven projects submitted to the competition, despite belonging to different authors, have the same type of design: transformation of the existing street over a representative axis accompanied by architecture of totalitarian and imperial character and the creation of hard squares to contain military parades and show soviet autocratic power. The winning project for the central plaza proposed the construction of a large open space with the monument in Stalin’s honour in the middle of the square and some galleries off the main street so as to watch the parades and state stops (see im. 39).

In terms of its structure, the new axis mimics the route of the pre-existing road from the pre-war period. However, its appearance changes dramatically. In the image you can see the difference between the existing street and the avenue that was created. Apart from expanding the street, its scale was changed from the urban and architectural point of view. The building typology was modified, traditional blocks became kvartales with garden interiors and architecture achieved monumental character (see im. 40).

In conclusion, we can say that Minsk' center project deserves special attention because it represents the idea of a utopian socialist city, the construction of which, for various reasons, was not possible in other cities within the Soviet Union.

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11 ... The idea of Kvartal or superblock, which develops a scheme already used in nineteenth-century projects for gardened blocks, in the same time kvartal shows some overlap with rationalist blocks (Quilici 1978).
1.5 Devastation as an urban transformation engine

Carlos Itriago’s doctoral thesis, three types of restoration of devastated cities are proposed:

... those which aim to be faithful to the legacy of the past (self-referential); those at the opposite end of the spectrum, taking advantage of the destruction to rethink a new city different to his past (refounding) and those strategies which seek a compromise between the obtained inheritance and the desired modernization (emancipatory) (Itriago Pels, 2006, p. 57).

According to this definition, Minsk’s restoration was carried out under the refounding strategy, i.e. the omission of the city’s past in favor of its new development.

Analyzing three sketches of Minsk: the sketch of the pre-war period (1941), the sketch of the General Plan (1944) and the General Plan (1946), one can observe the transformation of the urban structure since 1941 until 1946. If the sketch of 1941 represents the traditional city with an orthogonal structure, then, in the 1944 proposal, a few attributes of the radio-central system are highlighted. Nevertheless, due to the fact that the mock-up sketch centers on the development of the central part of the city and on the recovery of important governmental buildings (Linevich 2010), some characteristics of the orthogonal structure are conserved. On the other hand, in the General Plan, the radio-central system comes into force without leaving any features belonging to the previous structure. Therefore, it can be concluded that the mock-sketch was an intermediate stage between the historical city and the Soviet Urbanism model city (see Im. 41).

The existence of the intermediate design clearly explains the reconstructive strategy that was accepted for Mink's restoration: forgetting the preexisting city and creating a Soviet City model. Precisely the election of the omission strategy turned Minsk into a singular and paradigmatic case. Certainly, the model of the Soviet City would have had to be developed in Moscow, in the capital of the country. In 1935 there was even a proposal for the New General Plan of Moscow which later was taken as an example for the development of the Plan of Minsk:

12 See the 16 Principles of Socialist Urbanism (Scheer, 2000)

1.6 The Soviet City

The urban change led by the massive deterioration of Minsk is a key point in its development. The establishment of the Soviet City model was achieved in the General Plan of Moscow of 1935, but materially capturing the concepts of the New Soviet Urbanism was only possible in Minsk.

The analysis of the General Plan of Minsk of 1946 helped establish the starting points according to which the Soviet City was constructed and its typical characteristics were defined:

- Rationalization of the urban structure reflected in the hierarchical structuring and road network specialization, urban zoning and functional segregation.

The plan was based on the proposals of previous years13, which respected the preexisting structure of the city. In the sketch of 1935, with the idea of constructing a new city and leaving the former one as an outdoor museum, the designers came to the conclusion to preserve the ancient city, but with a radical reorganization of its urban structure. Nevertheless, because of the presence of an urban rich history and with a lower destruction index during World War II, the proposals made for the reconstruction of Moscow was not achieved. In the same way, in case of Minsk, due to the constant devastations, cultural changes and the almost total destruction of the city after World War II, the model of the city could be radically changed, achieving the social and urban changes which could not have been possible under other circumstances (Klinov 2013).

In conclusion, one could say that the physical and in some cases cultural deterioration, can cause the urban transformation in a fast and complete way (Itriago Pels 2006).

13 See the New Moscow Plan and the Great Moscow Plan developed during 1918-1925.
Image 41. Transitional process from the traditional city structure to the Soviet Urban Model: a.) superposition of the city plan 1941 and the draft for Master Plan 1944, b.) superposition of the draft for Master Plan 1944 and the Master Plan 1946.

Developed by the author
• Establishment of complex road categories which defined the configuration of urban fragments, which at the same time divide into functional zones depending on their use (residential, industrial, formal).

• Designing of each fragment as an autosufficient and separate unit.

• Creation of an urban centre with formal and representative character, accompanied by totalitarian style architecture and emblematic buildings.

In many aspects, the characteristics mentioned, coincide with the urban concepts of the Modern Movement modified depending on the socialist ideology. The division of the city into two parts, a central part with a formal use and another functional part with residential and industrial character, had the aim to fulfill the main tasks of the Soviet Urbanism of the period: an increase in the economic level of the country through the promotion of the industrial sector; the supply of housing for the population and reinforcement of the ideological influence via the construction of the Ideal City.

In summary, the Soviet city represents a combination of urban concepts and architectural styles:

forced by the circumstances, the USSR constructed a hybrid, empirical and changeable urbanism, whose foundations would come about by the forefront culture and the proposals of western rationalism (Quilici 1978).

In other words, double eclecticism is present, which is reflected in the totalitarian and monumental architecture which appropriates elements from different styles (roman, baroque, classicism, functionalismo), and a mixture of two urban concepts: the first one based on the rationalist ideas and the second one linked with the governmental ideology. Therefore, the Soviet city can be interpreted with the following formula (see im. 42).

The composition of these two elements can be observed in case of the city of Minsk, where the periphery corresponds to the rational city and the center represents the Ideal City constructed through totalitarian architecture.

Thus in Minsk’s General Plan of 1946 there certain criteria of Soviet Urbanism were established. The fact of being able to achieve the proposal of urban transformation due to the complete destruction of the city, turned Minsk into a case of great urban interest. The model implemented according to the General Plan of 1946 presented a closed and hard to modify urban system. Therefore the urban structure of Minsk and its functioning until today reflects the ideas of Soviet Urbanism: presence of two cities in one answering to socio-economic and ideological demands of the post-war period. The double analysis of Minsk is reflected in its representative center, the functional periphery and its general structure is based on the concept of Soviet Urbanism which demonstrates its singularity at the urban and cultural level in order to maintain it preserved as an arrangement of historical value. The idea of preserving the center of Minsk as an urban monument of the Soviet period without modifications can help construct an urban reference within the collective memory, which in the case of Minsk, was never established in a consolidated manner. In this way, the cultural void which favoured the radical transformation of Minsk at the time of reconstruction, could be filled.

In conclusion, we can say that apart from being a model of Soviet Urban Planning, Minsk presents an interesting case of the fragmented structure in general. As we have mentioned in the previous chapter about static and dynamic development, in the majority of cases there are two categories of static city: the capital cities, such as Canberra or Brasilia, and residential cities (urbanizations), such as New Towns, American suburbs or soviet residential developments. After the comparative analysis of Minsk with New Towns (Harlow, Cumbernauld and Milton Keynes) there is no doubt that, Minsk can be defined as a residential city. Nevertheless, the presence of a formal, representative and ideologically “correct” city centre not only makes the case of Minsk an example of the residential city, but also puts it in the same category as Canberra and Brasilia. Therefore, the fact it has two types of fragmented structure, a domain of residential function and a well-developed city centre, converts Minsk into an interesting field to study the fragmented urban model.

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14 The totalitarian style reflects ideas of Soviet realism which was an accepted standard and officially promoted by a regime which searched the definition of an image which: “... made each building a monument of its period, monument to victory and triumph (...) a sincere style as the Pompeya buildings or like the harmony of classic architecture (Itriago Pels 2006, p. 55).
Im. 42. Formula for the soviet Urban Model represented by the city of Minsk.
Developed by the author
As we have stated in the previous chapters we are focusing this research on green lineal elements, which we call green corridors. The phenomenon that we are interested in is the duality of these elements which depends on the scale at which they are examined. This pathology is found in the relationship between built zones and green/empty corridors. The lineal elements play a structural role but do not generate any kind of urbanity. In these cases, we are dealing with the dual role that the green corridors present: as an articulator of the urban areas at a macro/metropolitan scale and as a segregator of the urban fragment at a micro/user scale. The lack of functionality at the user scale turns the green corridors into disjunctive elements that cause physical disconnection and urban and visual discontinuity between adjacent urban fragments. Therefore, the main questions are:

- If the urban continuity is one of the keys to achieve a certain level of urbanity, in which way can segregation, caused by green interstices, be reversed and turned into an element of urban articulation?
- Could the transformation of green corridors from the segregator to the articulator of the residential areas at the micro scale be an answer to the issues of static systems’ function?

It is clear that the central point of this research is the macro – micro scales relationship, which is reflected in the dual role of the green corridors in fragmented structures. However, what is the original role green corridors had in Modern Movement planning and Soviet post-war urbanism?

In order to investigate the dual role of the green corridors, we will start with a brief introduction focused on the general history and functional transformation of green open spaces within a global context.

1. **INTRODUCTION INTO THE DEVELOPMENT OF GREEN AREAS: from a no-green space to complex typology**

The idea of the public green areas appeared only in the XVIII century.

*In the medieval era the idea of Green areas did not exist the implication of Green within public spaces in old Europe remained behind curtains until the city dared to surpass them...* (J. Florit 2012, p. 104; Im. 43 a, b).

With the cities’ spread over the fortress walls the green open space did not go to public use but remained under private authority use as “…an essential part of villas for relaxation and aristocratic pleasure...” (J. Florit 2012, p. 105; Im. 43 c). The industrial revolution brought a rapid and spontaneous expansion of the city and its industrial function and, as a consequence, the decline of the urban living standards. Therefore, with the promotion of the enlightened ideas and needs to improve the sanitary situation within the cities, the previously considered private gardens began to transform into public leisure green areas (see Im. 43.2). Nevertheless, it was an altruistic gesture, aimed at educating the society in refined taste and practices, but also searching compliance from those who should legitimize and guarantee future power. (J. Florit 2012, p. 105).
The complete realization of the idea to create a public, open-for-everyone green areas was performed only in the XIX century with the construction of the first park, entirely based on public funding, the Vásrosligeten Park (eng. City Park) in Budapest (see Im. 44). It was a starting point for the development of the idea of public green areas within the cities.

Nevertheless, until the end of the XIX and the beginning of the XX century green areas exclusively had representations in parks and urban gardens.

The association which is currently made with the designation of Green spaces, parks and gardens derives from the fact that... parks and gardens were considered the only expression of nature’s presence in the city (Fadigas 2009, p. 34).

At the end of the XIX century (1867), for the first time in the urban history, a green area with an ecological/protection function was constructed - Fairmount Park, Philadelphia, USA.

Philadelphia’s yellow fever epidemics of the 1790s spurred City Council to seek a system to provide safe drinking water to the citizens of the city. In 1801, water works were built on the original Centre Square, current site of City Hall. In 1815 the Centre Square Water Works were replaced by the Fairmount Water Works and its reservoir atop Faire Mount (the current site of the Philadelphia Museum of Art). The South Garden of the Fairmount Water Works, designed in 1829, is one of the earliest formalized public gardens in the United States and is the oldest section of Fairmount Park (Park & Recreation, Philadelphia official web page; Im. 44.2 a).

The construction of Philadelphia’s Fairmount Park was an initial point of the complex understanding of possible usages and purposes of green areas in the urban context. The idea to use the green space not only as a recreation area but also as a utilitarian urban item produced a revolution in the planning of the urban landscape. Furthermore, there are more early examples of green area multi-use: the Olmsted’s project for Boston – the sanitation of the Back Bay Fens and the river Way (J. Florit 2012). The Back Bay Fens was established in 1879. The reason for the project development was the damping and pollution problems which existed in the region. To find a solution Frederick Law Olmsted was invited.

He proposed to flush out the stagnant waterway and add naturalistic plantings to emulate the original tide marsh ecology of the Fenway area. His plan was true to both the character of the land and the needs of the growing population” (City of Boston.gov official web page)

A couple of years later (in 1890) because of the same sanitary problems, he developed a project for the River way which included not only a sanitation proposals but was also distinguished by its remarkable landscape characteristics: “When you walk along the Muddy River, it is easy to mistake it for a natural remnant of the New England landscape” (City of Boston.gov official web page; Im. 44 b, c).

Thus, the creation of a new typology of green areas which combine sanitation and leisure functions gave a first push to the development of ecological ideas in urban planning. Therefore, currently we are presented with a wide typology of green urban areas:
... infrastructure corridors, geographic and ecologic corridors, run-offs, woods, larger forest areas, primary exploitations in disuse and other active ones, unoccupied marked slopes, halting of urban processes, large parking areas, large private gardens or mosaics of small particular gardens (Florit 2012, p. 109).

In general, we can divide all this array of green areas in two big groups: continuous and discontinuous green area systems. To the discontinuous green areas can be referred to as urban parks and gardens, whereas the continuous elements are presented by green corridors, which, in some cases, form part of an ecological continuum (see Im. 45). The idea to create a connected network of green lineal elements that configure the entire urban structure leads us to the historical-modernist cities discussion, again. If the non-occupied space was formed by minimal distance between built areas in the historical city (Florit 2012), in fragmented cities the open space has the opposite function, to modulate and configure constructed areas. Nevertheless, the concepts of the “traditional stand-alone” parks do not disappear in the modernist city. The huge amount of central parks in the post-soviet cities shows the importance of central green area development.

Up to two hundred parks were built over ten years across the entire Soviet Union. The first, in Moscow in 1929, under the name of Central Park of Culture and Rest, according to the consulted English translations. (see Hayden 2005 in Florit 2012).

However, the purpose and a social meaning of those green developments differ from the idea of the green corridors. In fragmented cities, and in Soviet urban planning in particular, green corridors play a structural and, in some cases, ecological role, whereas urban parks have an important ideological sense reflected in the creation of central and unique urban places.

The issue that we are interested in and the main pathology of continues green elements within the fragmented urban structure is found in their mono-functionality and structural duality. We speculate, that the dual interpretation of green corridors is the main characteristic which should be investigated in order to understand (i) the influence of green continuous areas on the development of the entire urban structure at the macro scale and (ii) the functioning and perception by city residents of urban fragments and units at the micro scale.

2. DUALITY OF GREEN AREAS IN FRAGMENTED CITIES

To explain the idea of the dual paper of green corridors in the function of fragmented cities, we should come back to the issue of disconnection between urban scales (macro and micro scale) presented in fragmented cities.

As we have pointed out in the chapter about the organization of fragmented cities, their structure has two principal components: lineal elements which are presented by a road system and a green corridors system and urban fragments that are subordinated by lineal elements. The main characteristic of the lineal system is their continuity in the urban structure. They present a group of elements connected as a network that embrace the entire city and in some way dictate its urban function. Thus, grouped into networks, lineal elements play a
structural and modulator role in the organization of the city. In the other hand, urban fragments have a subordinate character. This means that their configuration and shape depend on the lineal elements. Nevertheless, the inner functioning of the fragments does not relate so deeply with lineal elements. The urban fragments (residential areas) in most of the cases of fragmented developments are self-sufficient urban units with a fractal-like inner organization. That is to say, that in the case of decomposing certain urban/residential fragments into smaller segments the function of those segments is similar to the discomposed fragments. Thus, urban/residential fragments and lineal continuous elements have different organizational methods (see Im. 46).

A definition of elements that compose the fragmented cities and their main characteristics help us define the functional scheme of the fragmented structure. The lineal elements dictate the configuration of fragments, but do not interrelate with them. Due to the closed configuration of the urban/residential fragments, continuous elements (mostly concerning green corridors) do path through urban fragments but do not overlap with the constructed areas. In other words, in place of providing necessary amenities, the lineal elements (road system, green corridors) divide the fragments in smaller units and impede the mobility between them. In this manner, the existing closed nature of urban fragments escalates, converting them into isolated areas.

We assume that this kind of disconnection and disassociation take place in the fragmented structure because of the different nature of lineal elements and urban fragments. It means that, as soon as the lineal elements organize the city structure, they belong to the macro scale. Thus, in order to develop the road system and green corridors, the deductive method is applied. That is, that the developing process starts from the general, i.e. from the bigger element gradually zooming to particular details.

Im. 46. 1. Green corridors as coordinators of the subordinated urban fragments. 2. Fractal-like organization of the urban fragments. Developed by the author.
In the case of urban/residential fragments, the development process is different. As we have defined, the configuration, i.e. the shape of the fragments, is defined by lineal elements. Nevertheless, inside the fragments, the lineal elements do not influence their organization. Therefore, the fragments have their own way being constructed as a self-sufficient unit. The organization process in the case of urban fragments is based on the inductive method. It starts with smallest urban elements (residential block) that with other blocks form a unit, which then arranges into a fragment with adjacent units. Furthermore, the fragments group with each other creating an urban sector (see lm. 47).

The different development methods of lineal elements and urban fragments make their connection with each other more difficult. Due to the fact that lineal elements belong to the macro scale, they do not have a connection points with fragmented developments that are organized at the micro scale. Therefore, we are dealing with a scale and development methods dissociation within the same urban structure that produce an interstice space. As we have already mentioned in the theoretical framework, the interstice between two scales is a crucial point in the development of the fragmented structures. We believe that continuity and contiguity is an essential characteristic for achieving a high level of urbanity which includes the following properties: mobility, accessibility and habitability. Therefore, by achieving a connection between macro and micro, deductive and inductive or, speaking in a material way, lineal and fragmented elements, one could produce positive changes in fragmented urban developments.

Therefore, how are the issue of urban discontinuity, and the focus on green corridors presented previously, related to each other?

As we have said, the gap between the scales is an important point in the development process of fragmented structures. Taking into account the relevant position that green corridors have in the organization of a fragmented city, we are speculating that the green corridors occupy the interstice between macro and micro scales. Thus, this fact converts them into a possible connector between two disassociated components within the fragmented structures.

For a better understanding of the so-called catalyst properties of green corridors in the fragmented structures, we suggest to address the concrete case of our work — the city of Minsk.

### 2.1 THE CASE OF MINSK: GREEN & WATER DIAMETER

As we have already mentioned, the city of Minsk represents an emblematic case of a fragmented structure. Due to the almost complete destruction after the World War II, its historical (natural) structure was completely changed. A new city organization was artificially implemented into the rubbles of the pre-war city. Due to the rapid establishment of the new city structure caused by changes in the city's urban function: the structure (the administrative city center in particular) resembles more of an architectural complex than an urban system.

The problem of the garden cities, academic cities and slipping districts is found in the approach to their construction exclusively from the design point of view. The architects assume that the finish point in the project execution is to copy of its paper design on the terrain. Nevertheless, even for buildings it is not true... there is
Im. 47. 1. Duality of the green corridors, conceptual scheme.
Developed by the author.
always a place for an unpredictability. It has more concern if we are dealing with the urban development that cannot be execute in one-shot way... (Anikin 1987).

That is, that there is no complex correlation between areas, overlapping of functions or co-working and co-existing of elements. Instead, a mono-functionality of urban areas, domination of lineal elements and isolation of urban fragments from one another are presented. The particularities of the urban scheme of Minsk mentioned above are characteristic of the static system. Therefore, the examination of the static urban scheme, the fragmented structure in general, green corridors and residential areas in particular in the example of Minsk, can be a good opportunity to understand their function and main features.

In the present research we are interested in green corridors which play an important role in the fragmented urban scheme. Our hypothesis is based on the speculation that green corridors can be interpreted in two ways: on one hand, acting as elements of urban articulation and from another – acting as dividers and segregators of urban fragments. In other words, we are interested in studying the duality of green corridors in order to understand how fragmentation of the urban structure can be converted into continuity and contiguity between urban elements. We believe that the dual interpretation that the green corridors possess can be a possible answer to that question.

Before observing the duality of green corridors, we would like to connect the theoretical input on the fragmented model and its urban functioning with the case of Minsk. In other words, associate the theoretical background with a real existing urban structure.

As we have explained in the section about the fragmented urban scheme, this type of urban structure has two main components – the continuous lineal elements and auto-sufficient fractal-like fragments (see im. 48). In the case of Minsk, the lineal elements are presented by the hierarchically organized road system that consists of a wide road typology with a dual function: organization of fragments and providing mobility. Another lineal element that we can observe in the case of Minsk is a system of green corridors which in the same way as the road system construct the outer configuration of urban fragments. Nevertheless, green corridors do not have a clear utilitarian function (mobility and accessibility provision) as a road system has. Nevertheless, as we have pointed out in the section about the development history of green areas, the most relevant characteristic of the contemporary green elements is their ability to be multi-functional. This especially refers to ecological corridors, which not only improve the environment of the urban zones, but also act as a leisure place for residents. Nonetheless, in the case of Minsk, green corridors perform a mono-functional element or in some cases non-functional abandoned interstices. The green corridors of Minsk, as well as in other fragmented city examples, are organized in a network that form the entire green system of the city. The network, in the same manner as the whole city structure, was constructed as an implicit project, which means that it did not have an opportunity to have an evolution or development process. Therefore, the modulator role it played when urban fragments were developed is the only function of the green corridor system. Thus, we have a paradox to resolve, in one hand, we are presenting green corridors as mono-functional (non-functional) elements and at the same time, we are talking about its dual interpretation within the urban structure. In the following paragraphs, we will try to explain what the duality of green corridors means and how it co-exists with the mono (non)-functionality of the same green areas.

2.2 HISTORY OF THE GREEN & WATER DIAMETER OF MINSK

As an introduction, we perform a brief historical input that deals with the construction and development of a green corridors system in the case of Minsk.

The system of green corridors has an essential role not only in the structure of the city but also in its identity. The idea to create a complex system of green corridors in relation with the existing fluvial system appeared for the first time during the pre-war period. Nevertheless, the construction of the principal green corridor, which repeats the city river configuration that divides Minsk into two parts, began in the period of the post-war reconstruction. Then, in the late 70s, due to the city’s expansion and industrial development, it was suggested to complement the main corridor with a so-called water-park ring, which implied the creation of the artificial and natural waterways with a total length of 40 km.  

1 It was created on the base of the Slepyenka and Loshitsya water systems, the natural water systems of the city of Minsk
Im. 48. Lineal elements and urban fragments in the case of Minsk.
Developed by the author
The main purpose of such an ambitious landscape project was the lack of potable water caused by rapid industrial development in peripheral sectors of the city. Thus, additional water resources were necessary. For this purpose, in 1968 the construction of a huge hydro complex began, which incorporated natural water systems situated outside of the city’s limits and included the construction of the biggest artificial water reservoir in the territory of Belarus (almost 65 sq.km, Im. 49).

In 1976, the construction of the outer city water diameter was finished. The next step in the creation of a so-called green-water diameter of Minsk was a building up of two green semi-rings from both sides of the existing water diameter. The initial purpose of the green rings was exclusively utilitarian. Nevertheless, during the development process it was decided to add a recreational function to existing green areas in order to provide the developing neighborhoods at the time with the necessary amount of the green areas (Darius 2012; see Im. 49 1.a), b.).

The project was finished in the middle of the 80s. In 1989 it was awarded the Lenin Prize, making it the only case of Minsk’s architecture that had achieved such an honored prize. Nevertheless, nowadays, because of the lack of maintenance, the green system is not a place of citizens’ pride; neither does it play an important role in Minsk’s resident’s everyday life. Thus, the question is: is the bad preservation and maintenance of the green infrastructure of Minsk the only reason for the obliviousness towards it? Has it ever been a “place for people” or has the utilitarian function been a dominant feature from the very beginning? (see Im. 49.2).

To explain the ambiguity of green corridors we suggest to investigate the case of Minsk from two different approaches: from the macro scale and from the micro scale, which in turn have their subscales. The macro scale can be divided into the metropolitan and sectorial scales; and the micro scale includes urban fragment scale and user scale. This decomposing method will help to observe particularities of each scale in its pure form and makes it possible to explain the duality of green areas (see Im. 50.1).

As soon as Minsk was constructed as a model of the Soviet urban planning, we believe that the general rules of urban development in the Soviet Union can be considered as a typical characteristic of Minsk’s urban structure. Thus, we will support the analysis by the general normative basis for Soviet urban planning (see Im. 50.2).

2 The Lenin Prize (Russian: Ленинская премия) was one of the most prestigious awards of the Soviet Union, presented to individuals for accomplishments relating to science, literature, arts, architecture, and technology.
**Im. 50.** 1. Four scale approach. 2. Development of residential units in relation with a.) green areas, b.) road system.

Anikin
2.3 MACRO SCALE DEVELOPMENT

Thus, we start with the macro scale (metropolitan and sectoral scales) arguing that at this level the green corridors have a structural importance in the configuration of urban fragments.

**Metropolitan scale**

We can divide the entire Green & Water (G&W) system into two elements: the main corridor that coincides with the configuration of the city river and the two rings which were created later as an addition to the already existing G&W Diameter.

In order to explain the structural role that the G&W has on the city configuration we will divide the analysis into two aspects: chronological, that deals with the construction order of elements and morphological, that explains the configuration of the corridors and fragments.

If we look at the time-line of the city’s development, we can establish the following layers:

- Topography and fluvial system
- Natural green system (situated outside of the city)
- Road system
- Artificial green system
- Urban fragments development
- Units’ development
- Dwellings

Therefore, the chronology of the urban development can follow the following order: topography and fluvial system with natural green system----- creation of the road system in accordance with the green system----- insertion of the urban fragments into gaps between road and fluvial-green networks (see Im. 51).

In this concrete example, the form and the composition of the first element of the G&W system, the green diameter, was dictated by the natural hydro system. As we mentioned in the historical input on the G&W Diameter, the main corridor followed the outline of the city river in its configuration. The main idea of the green diameter was to create a system of urban parks as an emblematic element of the new socialist city:

- *What can we call the most important achievement in the Minsk’s urban planning? – The one of the most important element in the city structure in the post-war and following periods is an artificially created G&W diameter. Repeating the outline of Svisloch (the main city river) and complemented by two green rings, it cross the entire Minsk* (from an interview with the Principal Architecture of Design Institute of Minsk, Gaufeld M.).

Thus, in comparison with the two green rings added later, the city diameter had a recreation purpose from the very beginning. Regarding the adjacent construction, the idea of a representative park system played a primordial role in the development of the green diameter. Furthermore, the construction of the green area was finished before the residential development which we can currently observe in the northern and southern endpoints of the G&W Diameter was constructed. The G&W Diameter project was finished in the first post-war decade, whereas the residential areas was constructed only in the 80s. Thus, in accordance to the chronological aspects we can speculate that the configuration of the residential areas was conducted by the outline of the green diameter.

Due to the ideological and ecological importance of the main corridor in the entire G&W system of Minsk, the residential areas were dragged on to the G&W Diameter. In other words, in accordance with the current normative regulation of the period the construction of new, enormous residential agglomerations (about 30.000 inhabitants) required a well-designed green area: “*residential areas have to be situated ... nearby water reservoirs or green areas...*” (Anikin 1987, p. 6). Because of the already constructed green diameter, the residential fragments were simply attached to the green diameter’s border repeating its configuration. The presence of the developed green corridor which initially should have played a role as the city’s emblem, led to the decision to collocate new residential developments nearby it, emphasizing its importance in the entire urban structure of Minsk (see Im. 52).
In the case of the green rings that were added later to the G&W system, we can follow the similar development process. The ring corridors was created in order to deal with the increasing development of industrial areas. After, the recreation function was added and due to residential development from the both sides of the green corridor, the ecological corridor was converted into a leisure area for the residents of the adjacent neighborhoods.

Thus, the W&G system, as we know it in our days, was adhered to the topography and fluvial system configuration. “The location of the green areas was greatly influenced by the geomorphology of the city – its relieve, the existed green areas, rivers and water reservoirs” (Anikin 187).

In turn, the idea of the representative park system was based on ideological, ecological and social demand. Nevertheless, due to the geometry of urban fragments and chronology of the city’s developments, we can conclude that the lineal elements and G&W system have modulated the configuration of the major part of the built fragments of Minsk.

Therefore, we can conclude that in the case of Minsk, as with soviet urban planning in general

...the green system was considered as a complex with sport and recreational infrastructures, and was formed as an integrated system that grouped all the functional zones (residential areas, civil centers, industrial polygons and suburban developments)” (Anikin 1987).
THE ENTIRE CITY: GREEN CORRIDORS AS AN ECOLOGICAL CONTINUUM

Im. 52. W&G diameter as a continues element in the city structure that organizes the urban fragments. Developed by the author
SECTOR # 3

SECTOR # 4

SECTOR # 5

SECTOR # 6

SECTOR # 7

SECTOR # 7.1
Sectoral scale

In the section we are dealing with the sectoral scale, thus we are interested in the configuration of urban sectors that present sequent urban development after the city itself. We will mostly focus on the relationship between the city structure and the urban sectors and not on the sectors’ inner function. In other words, in this section we are trying to demonstrate that, in the same way as with the case of the metropolitan scale, the configuration of the urban sectors depends on the road and green infrastructure. In other words, the objective is to explain the configuration and organization of the urban sectors within the city structure.

According to the definition presented in the A. Anikin’s book *Architectural Design of residential areas* (1987), the urban sector consists of a group of residential fragments connected by a road network with its own civic center and one or more industrial areas. Due to the prevalence of residential use in the new-constructed soviet cities and the mono-functionality of their urban zones, we will focus exclusively on the residential function. Thus, the urban sector consists of the residential fragments, called “residential rayon” in the soviet urban planning. In turn, the rayons include smaller residential developments called microrayons which consist of residential blocks, social and service infrastructures. The population of the urban sector within 1-million inhabitants of a city is normally about 100,000 – 300,000 residents; the common number of residents of rayons is about 30,000 – 40,000 residents. But the general organization of the urban sectors, rayons and microrayons has a similar character: it based on self-sufficient residential
zones gathered together by lineal elements. Therefore, we can observe the same fractal-like organization that has been presented previously (see Im. 53).

As we have established in the metropolitan scale functioning scheme, in the case of Minsk, the G&W diameter and G&W ring present an integrated complex system into the city structure that is connected with the natural woodlands situated in the outer city zone. Together with the stay-alone parks, the G&W system form a united landscape and recreational system, which in collaboration with the road network forms the base for spatial organization of the city.

The fragmented city has a fractal-like inner organization. Therefore, the sectors’ configuration in a certain way repeats the entire city function, thus the residential rayons have a similar structure as urban sectors have, the microrayons work in an analogous way to rayons etc (see Im. 53.2). As we are still dealing with the macro scale, we believe that the urban sectors have a similar nature regarding green areas to the entire urban structure. That is, that at the macro scale, as we have pointed out in the metropolitan scale section, the urban fragments were dragged towards the G&W corridors repeating its configuration.

In the case of Minsk, this kind of approach can be mostly observed in the case of the sectors that are situated from both sides of the green semi-rings. Here we are dealing with the same aspects, presented in the metropolitan scale: the chronological and morphological approaches. Chronologically the urban areas nearby the green ring were constructed about one decade later than the green corridor. Therefore, morphologically, their outline i.e. geometrical configuration was matched to the existing green axis contour (see Im. 54).

Taking into account, that the shape dictated the inner processes, we can conclude that in the case of Minsk and in the fragmented cities in general, the G&W system is more than just a frame for the city development. Defining the geometrical characteristics of the urban sectors or fragments, these are influenced on their inner organization and as a consequence on their inner functioning. As it is pointed out in the Architectural Design of the Residential Areas (Anikin 1987) the green, recreational and sports areas system influences the formation of structural urban units that include residential rayons and micro-rayons. Thus, we can conclude that the outer configuration and organization of urban sectors within the city depends on the continuous lineal elements in the same way as seen at the metropolitan scale.

Nevertheless, the role that the same lineal elements (green and road networks) have inside of the fragments changes as soon as we change the observing perspective. That is, in the moment of zooming into the urban fragment and examining it, not as integrated into the city structure urban area but rather like a place of resident everydayness, the green and road systems that are characterized as macro scale elements lose their structural function and become urban boundaries.

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3 See Geoffry West on Urban and Biological Allometry.
Im. 54. Urban layers, spatial organization and relation between urban fragments and G&W diameter in three selected Sectors of Minsk: sector #1, sector #2, sector #3. Developed by the author.
2.4 MICRO SCALE DEVELOPMENT

The micro scale in the same way as the macro scale has two sub-scales: the urban fragment scale and the user scale. In this section, we will show that the lineal elements that form the general city structure do not have the same function at the micro scale. This transition from the macro to the micro or from the structural element to the urban boundary is a point that cannot be read clearly in the development of fragmented cities. We understand the existence of disassociation between the two different development methods (deductive and inductive approaches), which is reflected on the dual interpretation of green corridors; nevertheless, the impact that it has on urban function is still an open question. Nevertheless, we believe that the gap between the macro and micro perspectives on urban structure has a significant influence on the urban function of the investigated areas. We also believe that this transition from the macro to the micro could be a crucial moment in fragmented urban development. Therefore, the investigation of two development methods separately and their subsequent comparison provides us with a conclusion on the processes that occur in the gap between two scales.

In the macro scale, we were dealing mostly with the G&W system aspects: the history of its development, its geometry, functions and role in the city structure. In this section, we will center on the urban fragments development and its functional and social meaning. Nevertheless, the issue of the relation between G&W corridor and built area is still a principal question of our interest. Therefore, the limits between the green and built zone are the focus point of this section.

**Urban fragment scale**

At this scale, we are dealing with the process of urban development of urban fragments and residential units that constructed/formed urban sectors. In order to explain the development method applied to the construction of the fragments, we will focus on the case of a sleeping district in the city of Minsk called Zelyoniy Lug. Because of the long development term, we can find a wide typology of residential units on the selected case territory which were constructed during different periods. Therefore, we believe that the selected district can be an interesting case to explore the relationship produced between green corridors and residential areas in different types of urban development.

The history of the district construction started in the early 60s, during the widespread development of the sleeping district not only on the territory of Belarus, but also throughout the whole Soviet Union. The history of the residential (micro)rayons as a self-sufficient urban element started in the 60s, but considerable outspread was reached in the 60s, when the prefabricated method gained a predominant position in residential construction. The selected district was one of the first outstanding residential area constructed in the territory of Belarus. Currently the microrayon consists of seven residential neighborhoods constructed in the period from 1962 to the 80s. It can be divided into two types of urban development. The first three neighborhoods, ZL-1, 2, 3, were constructed in the 60s – 70s and presented a standardized residential development constructed mostly from 80-apartments blocks, 5-storeys high. Lineally composed districts, which can resemble Siedlungen urban developments, at the time of their construction, did not present an interesting urban composition from the architectural point of view. Nevertheless, in comparison with the subsequent constructions, which started in the 70s on the other side of the green corridor, the first three residential developments adequately applied the prefabricated constructional method from the urban planning point of view. That is to say that the residential areas had comparable dimensions in comparison with the human scale. ZL-4(5), 6, 7 were constructed in the period when the 5-storeys residential building was not a favored dwelling model. Thus, the neighborhoods present a giant residential group of buildings that can be perceived only from bird-eye view (Darius 2012).

Due to the district development in different periods, the relation produced between them and the green corridors differ. If ZL-1, 2, 3 were constructed when the G&W ring project was under design phase, the later urban development, ZL-5, 6, 7 were thought of as a complex with the G&W ring. Nevertheless, in the case of earlier construction (ZL-1, 2, 3) the limit between the built zone and green corridor is perceived to a greater degree. The goal of the architects in the case of ZL-5, 6, 7 was to create an impressive architectural composition, whereas

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4 The Siedlungen housing units were created in Germany, mainly after WWII. The main reason of this housing type creation was a dramatic post-war lack of housing. The properties are outstanding examples of the building reform movement that contributed to improving housing and living conditions for people with low incomes through novel approaches to town planning, architecture and garden design. The estates also provide exceptional examples of new urban and architectural typologies, featuring fresh design solutions, as well as technical and aesthetic innovations.
Im. 55. Typology of urban units within the urban fragments and their relation with the green corridor. Developed by the author.
ZL – 1, 2, 3 dealt more deeply with a suitable residential solution.

In the 60s the residential issue still had strong relevance in the urban development of the Soviet Union. Due to the extensive destruction during World War II and rapid increment in urban population, the lack of residences was one of the most important preoccupations of the state. Therefore, in the 60s a massive housing policy was initiated. In order to meet social demand, the dwellings were constructed in the simplest and fastest form. Nevertheless, a the time of the second part of the ZL construction, the housing problem was not as significant. Thus, the architects had the possibility to focus on the architectural aspect of the design process, creating in this way, giant self-sufficient residential complexes.

Regarding the relationship between the constructed area and the green corridor, similar characteristics can be observed. In the case of the ZL – 1, 2, 3 developments, the green corridor is integrated into the residential area. In other words, in some points we can see an overlapping of the areas. From our point of view, the combination of two distinct areas is an important factor for “good” urban functioning. The green corridor is interconnected with the inner green areas of the neighborhoods, in this way creating a kind of green network.

In the case of the later development, ZL – 5, 6, 7, the only existing connection between green corridors and residential areas is their composition. The idea of perfect monumental complexes put visual characteristics in first place. In this way, composition plays one of the most important roles in the urban development. There is no doubt that good composition has an impact on the level of habitability. However, it cannot be a primordial characteristic of the developing process. As we can see in photos of the ZL districts, the constructed areas are perceived as an architectural complex from the green area. In other words, there is a visual connection between two adjacent areas, but the physical contact is not a characteristic feature of this urban development. Therefore, we are dealing with a disconnection between two bordering areas that provokes an isolation and individual functioning of each zone. In turn, this segregation impedes mobility and generates physical and symbolic boundaries (see Im. 55).

Talking about the green corridor itself, we can say that in the fragment scale it shows its dual interpretation in its clearest form. If at the metropolitan scale, we could only observe its structural role, zooming into the urban fragment scale lets us deal with two of its interpretations: the articulator of the areas and the segregator of the functions.

At the fragment level, the green axes have a structural meaning. That is to say, that they still organizes self-sufficient and isolated neighborhoods in a residential fragment. For example, in the case of ZL we can see four (or five if divided administratively) urban developments separated from each other, that are grouped in a unified microrayon by the green areas and road framework.

This structural function of the green corridor refers to the macro scale again, i.e. it does not deal with inner configuration or functioning of urban fragments. Nevertheless, in the same fragment scale we can also examine a relationship produced between green and built areas. As we have already demonstrated in the previous
paragraphs, the green corridor can be integrated into the urban development creating a kind of network with the neighborhoods’ green areas; or it can be completely isolated from the urban fragment. There is also a third aspect of the green corridor function that can be referred to as the segregation feature of the green corridor. As we have mentioned, the green corridor groups the neighborhoods in the residential fragment, but it still acts as a segregator of the residential developments. In the case of ZL the lack of the connection observed in the limit between green corridors and built area increases the closed nature of residential fragments. Thus, precisely in the urban fragmented scale the green corridor changes from being the articulator of the urban areas to the segregator between urban fragments.

Therefore, we assume that urban fragment is a transitional level from the macro to the micro scale where the duality of the green corridor can be observed in the clearest form (see Im. 56).
Im. 56. Transition from the macro scale to the micro scale development in the urban fragment.

User scale

As we have shown in the previous chapter, there are two types of relationship between green corridor and residential areas that can be produced in the case of the present study. In one hand, an overlapping of element characteristics is presented and from another, a visual connection dominates physical interrelation. In order to understand the nature of these two types of relationship, we will zoom into urban details analyzing the processes that occur at the user scale (see Im. 57).

The structural role of the green corridors has a significant influence on urban development of the whole city or several sectors. In this sense, the word “developing” has an important meaning. The developing process started with the construction of urban areas. After the establishment of urban relationship, the developing process is replaced by urban functioning or, in the cases of the dynamic systems, by urban functioning and evolution. In the static fragmented structures the development is not substituted by the urban evolution, i.e. in the moment of finishing of the developing process the urban structure gets an absolute and unchangeable form. Thus, we assume that the macro scale elements, which play a significant role in the moment of urban development, do not play such an important role in urban functioning after the development is finished. At this level, other factors come into effect – so called urban things (Solà-Morales 2008).

We believe that small elements and the relationship established between them have a big impact on the larger structural elements and urban areas. In this chapter, we will examine the urban things which at a first glance do not attract attention but play an important role in urban function. As a reference, we will use a Manuel de Solà-Morales’ paper On the Urban Things (2008), which from our point of view explains the importance of the proximity scale and the relation between small elements in the urban planning and functioning processes in a good way. In this paper Solà-Morales focuses on the skin of the city which, in the same way as the human skin reflects the inner processes of the organism/urban functioning. He compares urban intervention with acupuncture practices, in which by punctual intervention on the skin, inner changes could be initiated. He says:

The design acupuncture is not about the small, detailed or delicate, it is more about the strategies, systems and independence. As the Chinese wise man say, by acting on the ear, it is possible to treat the lungs or knees (Sola-Morales 2008, p. 24).

Therefore, what does the relationship between big urban areas depend on? In this section, we would like to show that the small elements and their measurable characteristics, such as shape, composition, dimension and distance between elements, could have an impact on the structural organization of the place.

In order to analyze these particularities we are going to use the same zooming-in and-out methods as in the previous sections. In this case, we divide the user scale into three subscales that correspond to the (i) urban units scale (residential blocks and its collocation on the terrain), (ii) urban elements, (connection bridges between residential and green areas and (iii) urban things (the smallest urban items).

Im. 57. Two types of relationship that is produced in between green corridor and residential fragments. Developed by the author

By the “bridges”, we understand not only physical bridges in its common sense, but also particularities such as a distance between elements, their configuration in the space etc.
Dealing with concrete examples, we can refer to the study case and urban things that play an important role in its functioning.

The first observed elements at this level are residential blocks. As we could see at the fragment scale, their configuration and collocation on the terrain have an influence on the functioning of the entire fragment and on the relation produced between them and other elements, such as green corridors. In the ZL case there are two composition types presented: the chain composition - the left side of the green corridor constructed in the 60s; and the cluster composition - the right side presented by super-blocks (Ching 200; Im. 58). The method of the blocks collocation influences the formation of the open space between them\(^6\). Therefore, two types of relationship are produced between built area and green corridor. Because of the certain open and juxtaposition nature of the chain organization, it is possible to connect the green corridor with the inner green space of the fragments. Nevertheless, in some cases the same chain composition closes from the external areas creating a wall. In these cases, the inner processes and the life of the residents are closed from the eyes of visitors. A different situation can be observed in the case of the opposite side of the green corridors. A distinct type of construction and composition applied in the configuration of residential fragments produces another type of relation between them and green corridors. The residential complexes constructed as a closed system do not permit penetration into their inner territory. In this case, we can observe a physical disconnection between the built area and the green corridor (see Im. 59).

Im. 59. Functional scheme of particular spots between green corridor and residential areas in the district Zelyoniy Lug.
Developed by the author
The next level of the detailed observation is an intermediate scale, which is presented by urban elements such as pedestrian paths and connections between urban areas. The creation of a good connection between two separated urban zones plays a significant role in creation of a “collaboration” between them. Anyway, the main purpose of the connection and overlapping of two morphologically, dimensional and functional different zones is to introduce a diverse utilization that may provide the increment in urbanity of the both areas. Therefore, the connection *bridges* make it possible to mix the properties of the areas and to generate communication between two different types of urban developments. In the case of the ZL, we can observe a certain lack of physical connection between the residential and green areas from both sides of the green corridor. If on the left side, the smaller dimensions and shorter distance between elements create a possibility to reach from point B to point A easily; in the case of the right side (cluster organization), its non-human dimensions leads to difficulties in the creation of a connection (visual and physical) between green corridors and the built areas. Nevertheless, on the left side (chain organization) a lack of pedestrian paths can be observed both between residential and green areas and in the green corridor itself. Thus, the possibility to generate an overlapping characteristics of the both areas in order to create a mixture of uses is restrained by the absence of an elementary physical connection between the areas (see Im. 60, Im. 61).

**RELATION OF THE RESIDENTIONAL FRAGMENT WITH GREEN CORRIDOR | GENERAL “EXTERNAL” ORGANIZATION**

**MODEL # 1**

**MODEL # 2**

**RELATION OF THE BUILDINGS WITH INNER GREEN AREAS | INNER ORGANIZATION**

**MODEL # 1**

**MODEL # 2**

**Im. 60.** Relationship produced between built areas / buildings and green areas / elements outside and within neighborhoods.

Developed by the author
Im. 61. Set of the transversal sections of the Zelyonyi Lug district that shows the different between two types of organization methods (chain and cluster) in terms of distance and sequence of urban units (residential blocks).

Developed by the author.
The last approximation is centered on the urban items which, despite of their small dimensions, may play an important role in urban function. The possibility to perceive and even to change or intervene on these things by the residents themselves, attribute a significant role in the urban processes to them. Small urban items such as benches, zebra crossing or urban amenities organized by the residents are able to change the functioning and perception of the place dramatically. For example, in the case of the left side of the green corridor we have observed interlacing between the green corridor and the inner residential green areas which improves a relation between green macro scale infrastructure and the residential inductively developed fragment. In other words, a combination and overlapping of two scales (macro and micro scale) can be observed. Nevertheless, from the small elements perspective, there are factors that impede or reduce this connection such as absence of zebra crossings in some places or lack of benches in the green corridor. In terms of an existing interrelation between green corridor and residential areas, the intervention at the urban things scale can provoke several positive changes that can give an opportunity to influence general urban function of the entire fragment or urban sector (see Im. 62).

**Image 62.** Urban items observed during the fieldwork. Developed by the author.
During this section, we have zoomed in from the metropolitan to the urban unit scale, in which it becomes relevant to consider the residents’ perception and their opinion about the place. In the earlier steps (at the macro scale) it was impossible to perform this due to a huge distance between the observed urban structure and the user living within it. That is, the resident of the place cannot imagine the urban structure at the metropolitan or urban sector scale. The observer cannot see it; therefore, he/she cannot visualize it and create an opinion about it. Nevertheless, it is more than relevant to consider the observer’s opinion at the user scale, in which the user lives and realizes his/her everyday needs. The major problem of the Modernist Architecture is a lack of definition of the place and an absence of distinction between macro and micro approaches during the design process. The modernistic urban projects are normally designed from the bird-eye view and focused on resolving of macro scale issues. Of course, the macro scale plays a key role in urban structure formation and determining of their functions. However, the micro level is a place, in which the residents live taking initiatives and making decisions. Thus, as we have pointed previously, it is indispensable to take into account the importance of the small-scale relation (Alexandr 1976).

Finishing the explanation of the role of duality of the green corridors and the urban function of fragmented cities from the small-scale perspective, we are entering a slightly different approximation to urban areas, which deals with the relation between urban objects and the residents that use them. The observed case is still the fragmented city of Minsk and the ZL district. Nevertheless, the analysis methods are different. In the following section we will go from the morphological approximation (or geographical) to the psychological or social interpretation of the urban territories. We realize that this field of knowledge is situated outside of our expertise. However, at the same time, we believe that the connection between the physical and social perspectives in urban studies have an essential significance in achieving new inputs. Therefore, we will try to make an approximation to this intriguing topic by analyzing the perception of the static urban form by the constantly changing society.
V. MICRO APPROACH AS AN INTERVENTION SCALE

THEORETICAL BASIS, MAIN GOAL AND CONCEPTS, FIELDWORK PROCESS: Mapping Process and its Application in the Research, Fieldwork methods, Fieldwork Steps and Findings - Spatial, Compositional and Psycho-Geographical Analysis, Overlapping of the Findings
V. MICRO APPROACH AS AN INTERVENTION SCALE

We are convinced that the study of the characteristics of green corridors is an important contribution in order to increase the habitability level of residential fragments. We have already pointed that the green corridors occupy a crucial point in the development of the urban structure in fragmented cities that permit us to speculate that an intentional intervention in these areas at the micro scale may influence urban fragments function. This fact converts the green corridors into elements of major interest from the urban planning point of view. Being bi-dimensional, the green corridors can act in a different manner depending on the scale in which we are working/observing them. Nevertheless, at the level, in which we can observe not only physical structure of urban development but also the behavior of its residents (micro scale), the green corridor loses its structural characteristics and turns into an interstitial divider without the capability to organize the adjacent fragments, as it does at the macro scale. Nevertheless, it does not mean that they lose their importance in the city structure and perception of space. Due to the transformation from articulator of urban space to segregator of residential fragments, green corridors attract more attention to their role in the city structure. Furthermore, we believe that the transitional moment from the articulator to the segregator element is a central point in the urban development of the fragmented structures that may provide design and intervention solutions.

Studying the urban areas only at the macro scale is not enough to understand their development and functional processes. At the macro scale, the urban structures present only two aspects mentioned above; chronological, which reflects the urban development during some X time, and geographical, that can be interpreted as spatial structure of the city. The third approach, which corresponds, to the society is not taken into account when we are dealing with the city as a metropolitan system. Due to this, we argue that the micro scale should be considered at a level where three approaches, chronological, geographical and social (users’ perception) meet. In this way, it becomes possible to deal with different urban aspects reflected in the complex urban systems that should collaborate, co-transform and co-evolve in concordance one with another.

These three (chronological, geographical and social (psychological) aspects should be considered in order to get the whole picture of the area functioning at the micro scale. In this case, it is important to not be limited by approaching the investigated area as an absolute entity, but also zoom into details scale, in which it becomes possible to examine the urban functioning from a different perspective dealt with a relation produced between urban objects and residents that use them. Therefore, at this level one of the most important and interesting issue emerges- relation between the urban form and its user that is reflected in the observer’s perception of the environment.

Therefore, due to the possibility to apply the three mentioned approaches to the city (time, space and society), the micro scale is considered as a scale of the major interest from the design/intervention point of view. After the performed analysis on the green corridors duality in the fragmented city of Minsk, we can argue that at the urban fragment scale two interpretations of the green corridors meet. From one hand, the ability to structure the urban fragments and arrange them into urban sectors; and from another – the interstitial and segregation nature of the same green corridors. The divider feature of the green corridors could be better observed at the user scale, in which the structural role of green elements do not have a useful application in residents’ everyday life. Thus, in the present section we are going to observe the functioning of the green corridor at the micro scale, focusing on the residents’/user’s perception. In other words, we will zoom into details of the selected urban area, examining in which manner the segregation, provoked by green corridors, influences the inner functioning of neighborhoods, and how it is reflected on the residents’ behavior and habits.

Thus, this detailed zoom into the urban area can lead us to a better planning or intervention solution, which, according to an Alexander’s (1976) statement, should be developed at the micro scale by producing interventions in small doses. Thus, this detailed zoom in to the urban area can help in applying of proper intervention solutions.
1. THEORETICAL BASIS AND MAIN GOAL AND CONCEPTS

In order to produce a research and to come to conclusion afterwards, we have performed a fieldwork based on different analyses. The result that we would like to achieve is a three-dimensional perceptional map of the analyzed space. The primary tool used during the fieldwork process and in the posterior interpretation of the collected data is the mapping method that will be presented further.

As we have mentioned above, our principal aim was to mix two types of approaches in order to analyze the urban structure: the first one is a spatial analysis that includes an observation of architectural and spatial composition of the examined area. This kind of analytical research helps measure a level of physical continuity and contiguity, e.g. relation between objects, their geographical position in the space and functional content. The second type we called society + space. This aspect is dealing with a residents’ perception of the place and their position towards the Environment. This approach occupies an important place in order to perform intervention proposals.

The goal of the space – perception combination is to understand a relationship between two complex systems in the area (the urban structure and forms and the social flows). As a result, we are supposed to understand the role of green areas not only as a structural/segregation elements, but also as a place that residents use or do not use. This kind of research is closely related to the mapping method, which is often based on the creation of mental maps of the place.\(^1\)

The concepts of the space and movement within it are closely connected one to another. Furthermore, we can argue, that in urban structures they may be ordered in a hierarchical way. It means that space and time, or urban forms developed through time, conduct and affect the movement of the subjects and their behavior within the place. To prove this statement we can give a quite famous example of an urban project presented in 80’th in New York’s problematic neighborhoods (in particular in the subway) based on the “Broken windows theory”.\(^2\) As the authors of the theory, James Q. Wilson and George L. Kelling (1970), stated: “...a correlation exists between law enforcement’s failure to control certain types of “quality of life” crimes, such as loitering, public drunkenness, and vandalism, and the increased likelihood that violent crimes, such as robbery will occur.” In the case of New York’s subway, apart from the police monitoring, condition of trains and stations was more strictly controlled. In other words, the maintenance program was improved. This program helped to decrease criminal problems in the subway. As a contribution to the present research, it shows us an impact that the environment can have on a persons’ attitude.

The critical point in the relationship between space and agents is an ability to understand the place. That is to say, that the residents do not have an image of the entire city structure, because of the impossibility to perceive its huge dimensions. In other words, the impossibility to create an image of the place makes it unperceivable. The difficulty in comprehending of the urban space is a current problem of big metropolis: the people who live there cannot measure the dimension of the entire city or its part, which provokes social frustration. The same phenomenon can be observed in the modernist sleeping district. Lack of congruity, huge dimension of units do not coincide with a human scale. If we cannot create an image of the place, it becomes unknown territory. Imagination and consequently perceiving the place makes us feel comfortable and secure. Thus, the ability to be perceived by the user is a primordial characteristic of the building environment. According to the Lynch:

> The degree of good city performance is determined by its ability of providing biological, psychological, social and cultural requirements to its inhabitants. City image is important because the ability to recognize objects in our environment is critical to our ability to act and function in places effectively.” (Lynch 1960).

Thus, the quality of the urban environment in a certain way depends on its ability to be easily found and identified.

Based on this statement, we argue that good urban form is apt to be perceived by the users’ minds, whereas a bad urbanizations be-

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\(^1\) See a chapter # 2.1 of the present section.

\(^2\) The broken windows theory is a criminology theory of the norm-setting and signalling effect of urban disorder and vandalism on additional crime and anti-social behavior. The theory states that maintaining and monitoring urban environments in a well-ordered condition may stop further vandalism and escalation into more serious crime.
comes an unrecognizable and strange territory. The incomprehensible places provoke uncomfortable fillings and impede movements of the users instead of providing the primordial urban qualities: habitability, accessibility, mobility. In these terms, we are dealing with (mentioned in the theoretical part point): the static and dynamic urban structures and their relation with social flows. As we have already said, the dynamic structure can adjust to the inhabitant’s necessities, whereas, the static cities (fragmented structures) are created as a solid object without capability to adopt or to transform.

Therefore, detecting the relationship between the user and the environment may help in identifying a users’ satisfaction level in a certain space and, if it is necessary, in choosing of intervention methods.

2. FIELDWORK PROCESS

In order to explain the methodological approach and to combine the theoretical framework and our findings during the fieldwork in the terrain, we present a brief introduction to a tool applied during the research process corresponding to the mapping method.

2.1 MAPPING PROCESS AND ITS APPLICATION IN THE RESEARCH

There are many different methodologies to process the data collected in the terrain with respect to different researchers’ backgrounds. Mapping is one of the techniques, how to deal with the data and transform it into visible objects and symbols, which communicate meanings. We understand this method is more procedural rather than descriptive, which refers to the Rob Kitchin’s and Martin Dodge’s (2013) conceptualization of mapping. They define mapping as a mapping where the meanings are constructed through a certain practice instead of being object possessing a certain immanent ontological status (Kitchin & Dodge 2013). However, we believe that in the case when complex social flows, with a strong morphological and spatial impact on them are being investigated and analyzed, mapping can be one of the most adequate tool to present the issue of the relation between urban form and residents’ perception and behavior.

Mapping is not just a collecting of information, but also is an interpretation of the reality by group of people or by one person, based on their experience of the terrain. Therefore, the mapping process cannot be done without previous investigation of the real world. Otherwise, it would be a subjective interpretation of what we see (or what we would like to see) that have more to do with the philosophy of visual art (Krygier & Wood 2009). In the case of the mapping process, one of the important part is to see the reality and collect information stored there. It means that at first, a researcher needs to go to the field in order to get the first impression of the place and collect data there and then to represent the collected data in according with his/her interpretation of the existing reality by creating a visual representative map. Therefore, the base of the mapping process is data collecting process; and the results are reinterpreted reality existed during the research process. Thus, we can say that the mapping process is an analytic tool that make us think and analyze, but not just collect data and put it in the right place. Nevertheless, gathering data is an important step. In other words, without the data there would be nothing to visualize in a map. Thus, certain standards of social research should be met in order to maintain the validity of the map.

In general, the mapping process is about the interpretation, which means we can project reality on the map as we see and understand it. Nevertheless, we cannot falsify the data: “Because maps are proposition, you must accept responsibility for the realities you create with maps...” (Krygier & Wood 2009). Nevertheless, the collected data cannot be a center of the entire mapping process. The data does not generate any analytical thoughts or questions. It is just a gathered information within the context that provides us with necessary input to further development of the critical product that is three-dimensional map (Kitchin 2013). During the map creation process, we are able to reinterpret the data and connect the unmappable features with physically measurable characteristics of the space. It is a tool that helps us to understand more deeply the surrounding reality and probably generate answers on such questions as what we have here? and how we could act? However, it is important to have in mind that the mapping
process does not have a final point or so called result (or at least should not have). The idea of the map is to fix or illustrate the un-mappable phenomenon that changes rapidly in according to the surrounding circumstances.

Maps are of-the-moment ... mapping is a process of constant re-territorialisation. As such, maps are transitory and fleeting, being contingent, relational and context-dependent. Maps are practices –they are always mappings... (Kitchin & Dodge 2013, p. 8).

That is why it is relevant to combine the map with explanatory text, which can help to interpret the codified information put in the map. Anyhow, it is not necessary that the information posted on the map should be the ultimate truth, because it is impossible to reveal such truths. As soon as we said that the map is the interpretation of reality, it can be disputed by another point of view. It means that we can identify maps as a problematic text. In other words, by doing maps we do not pretend to resolve problems, but more to ask questions and to put interrogatives. In this sense, it is rather a tool to explain the reality and leave it as an open and debatable resource of information, than to establish proved affirmations (Kitchin & Dodge 2013).

In general, the mapping process can be divided in the following steps:

- At first, we have a traditional 2-dimensional map that give us a general geographical and morphological input about the place.
- Then we go to the terrain: the aim of this research part is to get the first impression of the place and point out a relevant phenomenon observed there.
- Then, a field research is performed. At this step, the goal is to collect the information that is relevant for the research (in our case the data was based on the measurable urban form, locals’ opinions and our own perception of the place).
- After data collecting, it should be examined in order to exclude unnecessary information and ordering the obtained inputs.
- After the “cleaning” process, it is important to rethink the received information that included the processing of the relevant data and interpretation of the reality that was observed during the fieldwork.
- Finally, the issue of connection of the initial two-dimensional map with information that we have achieved during the fieldwork emerges. In other words, the conversion of the traditional map into a three-dimensional critical projection of the interpreted reality.

The main question of the mapping process is how to combine the collected information during the fieldwork with the 2-dimensional traditional map. In other words, how to transform the collected during the fieldwork information into a critical vision of the observed reality. Thus, in the present research, the final product in a sense, should illustrate how the physical reality of the place influences the residents’ practices and habits.

### 2.2 FIELDWORK METHODS

An author that dealt in a considerable way with the issue of urban form perception is Kevin Lynch, who was the generator of the entire Lynchian movement in this field. In his works, such as *View from the road* (1964) and *Imagine of the city* (1998) he investigated the issue of the urban form perception, which is of interest to us. Nevertheless, in the present research we do not use the Lynchian methods in their pure form. The Lynchian methods propose an immediate combination of two components of urban space: form and perception. It means that he does not make a difference between the material part and its perception trying to define the quality of the form and its geometry at the same time. In this sense, his research becomes too complicated and includes too many varieties and measure tools. Thus, it is quite difficult to understand his codified maps without a profound input to the methodological framework. Nevertheless, the manner to understand the place not only from the geometrical or morphological perspective, but also from the residents’ position was revolutionary at that moment. In this case, we cannot omit the input that was done. Thus, we do base our field research on the Lynchian methodology but at the same time, we try to separate the geometry from the perception in the first stage. The idea is to generate stand-alone conclusion of different analysis and consequently combine them in a general idea of the space. As we have already pointed out, the urban form conduct the resident’s attitude within the space. In this sense, we will start our research from the spatial (functional) and compositional analysis of the place. Once we have
defined the material content of the case, we can go on to a study of the inhabitants’ perception of the place. The advantage of the division of the research into two steps consists of simplification of the results and further connection of the findings that include (i) morphological characteristics, (ii) compositional analysis, (iii) and social (psychological) behavior of the residents. It means that afterwards we can combine the findings in order to receive a simplified and analytical model of the place.

2.3 FIELDWORK STEPS AND FINDINGS

It is important to readdress, that the study case is still the same sleeping district of the city of Minsk, analyzed in the section on duality of green corridors. In this section, we are mostly dealing with the perception of the place and urban forms. Nevertheless, the green corridors and their dual nature is still a main focus of the research. Therefore, in order to explain how this duality and other particularities of green continuous areas could be interpreted at the user scale, we have performed the following research methods during the fieldwork.

Spatial analysis

In this part, the goal is to understand the functionality of the sector through the analysis of the continuity of its structure and contiguity between the elements.

The spatial analysis of the case was presented previous chapter, in the subsection on observation of the duality of the green corridors from the user scale perception. Thus, in this section we would like just to summarize the achieved findings and results (see Im. 63).

Compositional analysis

The second approach is dealing with the composition and architecture of the sector. In these terms, we are talking about the urban form, its geometry and in which manner it influences the residents’ habits and behavior. In other words, we are attempting to explain the connection between users, architecture and urban elements, and define the role that the urban form plays in the residents’ everyday life.

The study of the proportions of the units compared to a human body commonly is presented in the architectural or interior scale. Nevertheless, the different compositional theories (Golden Section, Classical Orders, Renaissance Theories, Modulor, Ken, Anthropometry, Scale

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Im. 63. General scheme of spatial organization of the district; two spatial models. Developed by the author
etc (Ching 2007) are not considered at the urban scale. Thus, in many cases, the elements of urban developments do generate a proportional relation between each other, but do not coincide with the observers’ capability to perceive the space. This type of pathology is mostly observed in the modernistic architecture, in which the dwellings were precisely calculated to meet residents’ needs, the urban composition was designed to be observed and perceived from the birds-eye view, but the urban units normally were not related to the human body’s dimensions (see Im. 64).

**Psychological analysis (drift and interviews)**

After performing the spatial analysis of the sector, we would like to pass to the next step, which consists of the observing of the perception of the place according to its structural, compositional and functional features.

We are basing our perception analysis of the place on our own experience, by using the dérive methods⁵, and the residents’ opinion about the study case collected during short open interviews.

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⁵One of the basic situationists practices is the dérive, (dérive: literally “drift” or “drifting.” Like détour-ment, this term has usually been anglicized as both a noun and a verb.) a technique of rapid passage through varied ambiences. Dérives involve playful-constructive behaviour and awareness of psychogeographical effects, and are thus quite different from the classic notions of journey or stroll. In a dérive one or more persons during a certain period drop their relations, their work and leisure activities, and all their other usual motives for movement and action, and let themselves be drawn by the attractions of the terrain and the encounters they find there. The ecological analysis of the absolute or relative character of fissures in the urban network, of the role of microclimates, of distinct neighbourhoods with no relation to administrative boundaries, and above all of the dominating action of centers of attraction, must be utilized and completed by psychogeographical methods. The objective…terrain of the dérive must be defined in accordance both with its own logic and with its relations with social morphology.

... the first psychogeographical attractions discovered by dérivers may tend to fixate them around new habitual axes, to which they will constantly be drawn back. The average duration of a dérive is one day, considered as the time between two periods of sleep. The starting and ending times have no necessary relation to the solar day, but it should be noted that the last hours of the night are generally unsuitable for dérives. One can dérive alone, but all indications are that the most fruitful numerical arrangement consists of several small groups of two or three people who have reached the same level of awareness, since cross-checking these different groups’ impressions makes it possible to arrive at more objective conclusions.

The spatial field of a dérive may be precisely delimited or vague, depending on whether the goal is to study a terrain or to emotionally disorient oneself. It should not be forgotten that these two aspects of dérives overlap in so many ways that it is impossible to isolate one of them in a pure state. (Debord 1958).

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Im. 64. Two types of composition presented in the Zelyoniy Lug district. Developed by the author.
The objective of the drift analysis was to determine attraction points within the green corridor and in the boundaries between the residential areas and the green corridor. As we can see in the outlined map of the realized routes and photos of the elements that attract our attention, the architecture plays an important role in urban area perception. Nevertheless, we can argue that small architectural structures have the same importance as big designed complexes.

In the interviewing process, we could highlight the following topics which emerged frequently during conversations with residents in respect to their position in the green corridor:

- wasteness of residential areas and green corridor
- memories, stories and urban legends
- further development
- urban practices

The most mentioned category was the wasteness of the district. This was regarded both to the residential areas and to the green corridors. The respondents mentioned preoccupations about further development of the green corridor as a built area. The issue of urban legends and nostalgic mood was emerged frequently as well. In addition, we highlighted that there is a dissociation between built areas and green corridor from the perceptional perspective. That is, the respondents in lot of cases do not associate the residential area (a place where they spend the majority of their time) with situated nearby green corridor. There are some extracts from the interviews performed during the fieldwork:

1.) Respondent 1 (retiree, 75 years old, male): “It wasn’t a beautiful place from the very beginning. The beautiful buildings were constructed in the city center, for the ruling coterie. And we have to live our last years here in this wasted and neglected district”

   Interviewer: How can you describe that green area?

   R 1: Oh! It’s a beautiful place. I used to walk a lot there with my kids.

2.) Interviewer: How would you characterize the park that you have in your district?

   Respondent 2 (retiree, 85 years old, male): Which park?

   We can summarize that the general perception of the district and green corridor in particular have a negative character reflected in the nostalgic mood of the respondents and their ideas it was better in former times.
Overlapping of the findings and reaching of the final result

The final goal of the user scale approximation is to establish a connection between studied dimensions: spatial structure, land and “place” use, urban form and the perception of observers/residents. The key of the analysis is to demonstrate the close connection between material form, spatial organization and practical usage of the place and their relation with the lifestyle of the residents. As Lynch said:

*The degree of good city performance is determined by its ability of providing biological, psychological, social and cultural requirements to its inhabitants*” (Lynch 1960).

Therefore, after the fieldwork and morphological analysis of the selected case, we believe that we have proved that disconnection between three different areas (residential zone #1, green corridor and residential zone #2), exists, and is caused by the green corridor not corresponding to the perceivable micro scale element. Furthermore, we argue that this disconnection could have a three-dimensional character. That is, that it can be observed not only from the morphological perspective but also with perception and composition analysis approaches. Thus, the idea to observe urbanized areas as complex morphological, sociological and architectonic system has an important application in intervention processes.

*Im. 65. Results of the dérive analysis. Developed by the author*
VI. CONCLUSION

Urban Macro Scale Linearity vs. Micro Scale Transversality

The work presented in the beginning on static urban structure and its interpretation and the fragmented urban model are based on the idea of urban material segmentation in self-sufficient urban polygons organized by string system(s) of lineal objects that play a structural role in the city organization. Nevertheless, these particularities can be observed only at the macro scale, in which the linearity of elements appears as a positive characteristic in order to organize urbanized territories in a hierarchical way. The pathologies emerge when we zoom into a micro scale, observing the isolated urban fragments independently from the whole city structure. On one hand, being self-sufficient areas and having a fractal-like structure, the urban fragments can physically exist separately from other urban areas. Nevertheless, if we approach the social side of urban areas, we can observe multiply pathologies generated by a closed nature of the urban fragments. Rapid physical degradation, dysfunctional and abandoned areas, lack of identity and diversity, problems with accessibility and mobility and, as a consequence, low habitability level are some of the detected issues of isolated urban areas within the fragmented structure. At this level, presented at the macro scale, linearity and continuity of dominant elements (road and green corridor systems) do not act as elements of articulation but lose their positive structural characteristic and convert into urban interstices instead. With the decline of linearity at the micro scale, an issue of transversality emerges. That is, in the moment of switching from the macro to the micro approach, continuity should be replaced by contiguity; subordinated relation is substituted by co-relation; and parallel arrangement of elements switches to their characteristics’ intersection and overlapping. Thus, the urban pathologies mentioned above are caused by the lack of transversal relation between urban elements. In other words, we can say that in order to organize and connect disjointed areas at the micro scale, connection bridges should be created that may establish missing transversal links between those areas.

The reason of the dysfunctionality of lineal elements at the micro scale could be explained by their unperceivable nature caused by the huge dimension and developing method based on deductive approach. In other words, the lineal elements cannot switch their role as an articulator of urban areas at the macro scale to an amenities provider at the micro scale. Metropolitan characteristics they possess are not substituted by attributes perceivable by residents in the moment of zooming to the user scale. Therefore, dealing with the pathologies mentioned above, a new type of structural elements should be created in order to generate connections between elements. Strictly speaking, macro scale linearity and continuity should be shifted to the micro scale transversality and contiguity. By creating connection bridges at the micro scale, it becomes possible to associate areas and functions that currently are disjointed by the macro scale lineal elements.

1 See the chapter on the duality of green corridors, the user scale section.
2 See the theoretical background chapter.
The issue of function and areas connecting within the urban fragments has an important application not only in the punctual micro interventions but also in the articulation of urban developments at the metropolitan level. Due to the discontinuity of fragmented urban structures, each area within it works separately and not as a unified and integrated system. Thus, the entire urban structure cannot reply to the changes that occur both within its limits and in the environment. In other words, the fragmented urban structure tries to maintain its fragmented disconnected organization struggling with arisen social and environmental modifications. This inability to adapt in accordance with producing changes is reflected in the low resilience level, which in turn, provokes rapid urban degradation.

Therefore, we can conclude that the theoretical issue of macro – micro scale (deductive – inductive developing methods) transition could be replaced by more practical terms reflected in shifting from the lineal articulation elements to the transversal connection bridges. Therefore, a new issue emerges related with the selection of a designing (intervention) approach in order to achieve the transition from the macro to the micro scale mentioned above. A proper project strategy may help to increase not only the habitability level at the user scale but also provide resilience characteristic to the entire urban structure. Nevertheless, we speculate that the following problems could emerge in the moment of the strategy selection and application:

- Morphological issues: taking the studied case as an example, it is possible that the different nature of the disjoined areas (green corridor and two residential areas that possess different morphological characteristics) may produce difficulties in order to connect them.
- Loss of the continuity of the lineal systems at the macro scale.
- Difficulties with assimilation of new elements (e.g. connecting bridges) on the terrain.
- Negation by some residents of new elements that may change the already established lifestyle.

As we can see, the possible issues that may emerge in the moment of intervention could be organized in the same categories of city understanding established at the beginning of the work (see the theoretical background chapter). If the first two statements are related with the morphological and spatial approach, the next two points deal with the social perception of the urban form. Thus, the multidisciplinary approach to the urban functioning and intervention should be applied that may consist on the spatial strategies mixed with participatory involvement. Thus, we believe that it could be possible to integrate the fixed urban structure with changeable and constantly transitioning social component, achieving a creation of a complex system of relationships between urban things and elements and their users in this way.
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