Dwelling

Chapter authors
Dr hab. inż. arch. Karolina A. **Krośnicka**
Dr Gabriela **Rembarz**
Dr Magdalena **Rembeza**
Dr Dorota **Wojtowicz-Jankowska**
Dr Katarzyna **Zielonko-Jung**
Department of Urban Design and Regional Planning
Faculty of Architecture, Gdańsk University of Technology, Poland

Introduction: Research questions and objectives

According to UN Habitat, "(...) *housing contributes directly or indirectly to the implementation of most of the UN Sustainable Development Goals*". Housing is one of the most fundamental human needs. Villages, towns and cities evolved to provide groups of people with safe places to live and access to everyday needs such as food, water and other resources: goods, tools, materials, etc. Slowly, these groups turned into societies. Over time, cities have become more specialised in terms of human activities (work, transport, services and recreation) and socially stratified (urban societies consisted of different economic classes, religious groups, etc.).

Human activities have defined the use of land and have spread unevenly across the territory, creating multifunctional, densely built and populated areas in some places and monofunctional, low-rise and loosely populated residential areas in others. In this way, what was once a relatively homogeneous and compact space has become a vast, heterogeneous, highly complex human ecosystem whose identity is determined by the relationships between spatial, ecological and economic dimensions.

The objective of this chapter is to explain how dwelling (or: housing) relates to landscape economy. We refer to urban landscapes, also referred to as townscapes or cityscapes. And our focus is on the following questions:

- What type of urban landscape form arises resulting from which type of social process?
- Which economic factors shape urban landscapes primarily?
- How might we govern urban development to preserve or even increase its quality and therefore also the value of the landscape?

The structure of the chapter is thus built up by the following issues:

- basic *definitions* distinguishing between the concepts of housing and dwelling, highlighting the social dimension of the urban landscape;
- the *components* of the urban landscape in static and dynamic terms, and the interrelationship between these components;
- the *location*, in terms of situating the place within the city structure, and its meaning for the economic value of the landscape;
- the *factors* influencing the character of urban landscape components. This includes the socio-political system, forms of ownership, stakeholders and environmental threats, amongst others.
- the *directions* of sustainable transformation and positive, constructive and regenerative transition pathways.

All the these considerations, supported by two study cases of new housing districts in Gdańsk in Poland, aim to assess the value of the urban landscape from a landscape economy perspective.

Dwelling and Housing: Definitions, approaches, references and current development trends

The concept of *housing* is usually understood by means of measurable infrastructure and goods: buildings. At the same time, these goods are understood as property and generally as commodities. But *dwelling*, and also *living* as a notion, are embedded in a much broader context. They relate to other components of the city, such as society, environment and all the complex life activities of the residents.

The term *housing* is a complex concept that has to be considered in the context of changing ideas of the nature of the city. Dating back to the mid-19th century, the tendency to give the city and its developmental dynamics the characteristics of a large-scale machine (as part of the fascination with the steam engine), influenced the definition of the modernist planning paradigm. In the ideograms of the functional city, implemented in accordance with the Athens Charter (CIAM, 1933), the concept of housing denoted a hierarchical system of functionally specialised neighbourhoods and residential areas, provided with basic social services (Clarence Perry's *neighbourhood unit concept,* 1928). Green zones separated them not only from the production and industrial areas, but also from the city centre. During the modernist period, the previously integrated concept of dwelling was narrowed down, resulting in mono-functional residential districts, popularly known as 'urban bedrooms'. These areas were designed with an awareness of the importance of the landscape and with favourable proportions and relationships between built and open spaces. During this time the term *urban landscape* was introduced and popularised (Bodenschatz et al.,2009).

However, the post-war European neighbourhoods that followed this concept in the form of huge, mono-structural, multi-family dwellings were a social failure. Accused of being "non-urban and therefore unhuman", they produced what has been described as the "large-scale housing syndrome", i.e. the creation of an environment threatened by the development of a spiral of social decline (van Kempen et al., 2006). This argument was one of a series of arguments against the city-machine paradigm, reinforced by the experience of the negative effects of urban sprawl, which cast a shadow of scepticism on the functional city concept and a general rejection of car-oriented urban development.

The decade of the 1980s put the belief in the effectiveness of the idea of programmatic specialisation and functional separation of urban districts on hold (Jencks, 1978). The search for new solutions led to a new understanding of the nature of the city. In the postmodern era of fuel crisis and growing ecological awareness a city came to be understood as an endless process, resulting in structures like living organisms with their own DNA codes. Housing, or the living environment, becomes a

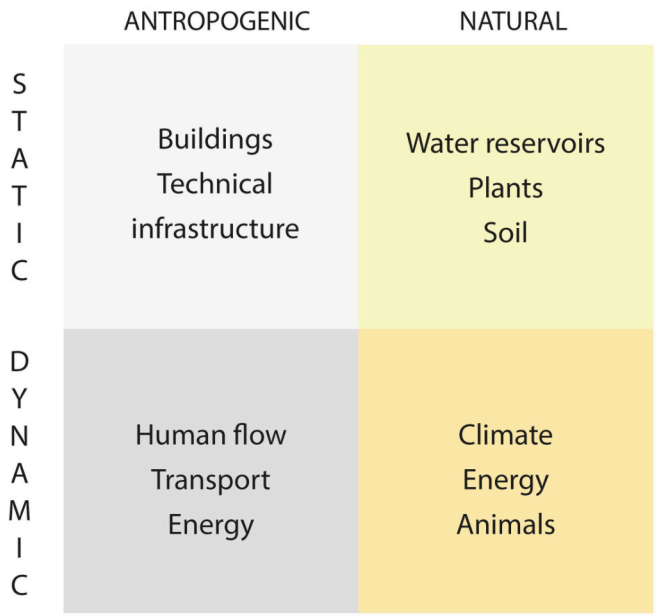
more ecological habitat in which quantitative indicators do not dominate over qualitative ones. On the rating scale, universalism and standardisation swap places with individualisation and identity construction. The modernist emphasis on semi-rural green living is balanced with the dream of a return to urbanity, understood as living in mosaic-like, socio-spatially integrated urban neighbourhoods with perceptible local identities (New Athens Charter 1998, Leipzig Charter 2007)

Maintaining a balance between improving existing urban districts (compact city, smart growth) and limiting urban sprawl in favour of high-quality inevitable suburbanization (net-city, region-city, in-between-city) puts the topic of urban landscape in a central place of contemporary city planning and management processes. In this approach, housing is expected to take place as a component of integrated urban transformation led by a holistic approach to city planning.

Revitalising, restructuring and improving already urbanised areas are knowledge based processes recognizing both technological and social changes. The city as a network of data and spatial energy complexity (Smart City) is the current challenge. Not so much for building and improving existing housing, but for new models of communities and neighbourhood communities (Pact of Amsterdam, 2016; New European Bauhaus).

Components of the urban landscape
Adopting an understanding of the city as a living organism introduces new concepts into the planning toolbox, opening up a wide range of analysis and design methods. Prominent concepts are *urban morphology*, which deals with the static elements of the urban landscape, and *urban metabolism*, which describes the changing processes and phenomena that occur within the city as it interacts with the climate and the wider environment.

Both of these problem areas, tracing cities as *urban tissue*, fall within the spectrum that seeks objective, tangible and measurable characteristics that are also recognisable for defining economic dimensions. However, understanding the economic aspects beyond the classic assessment of the market value of a property in a given location involves a number of aspects referred to as unmeasurable, intangible, elusive (relative) characteristics. These can only be approximated on the basis of often subjective analyses. In the context of housing development, there are two problem areas to be mentioned here: the form of the urban landscape (urban design) and the sphere referred to as 'genius loci', which integrates many cultural aspects, such as cultural heritage, in an individual way. While the former is analysed and designed according to the current paradigms of spatial composition, the latter must be seen as a phenomenon that escapes criteria, often an ephemeral phenomenon caused by and linked to social or psychological aspects (environmental psychology).

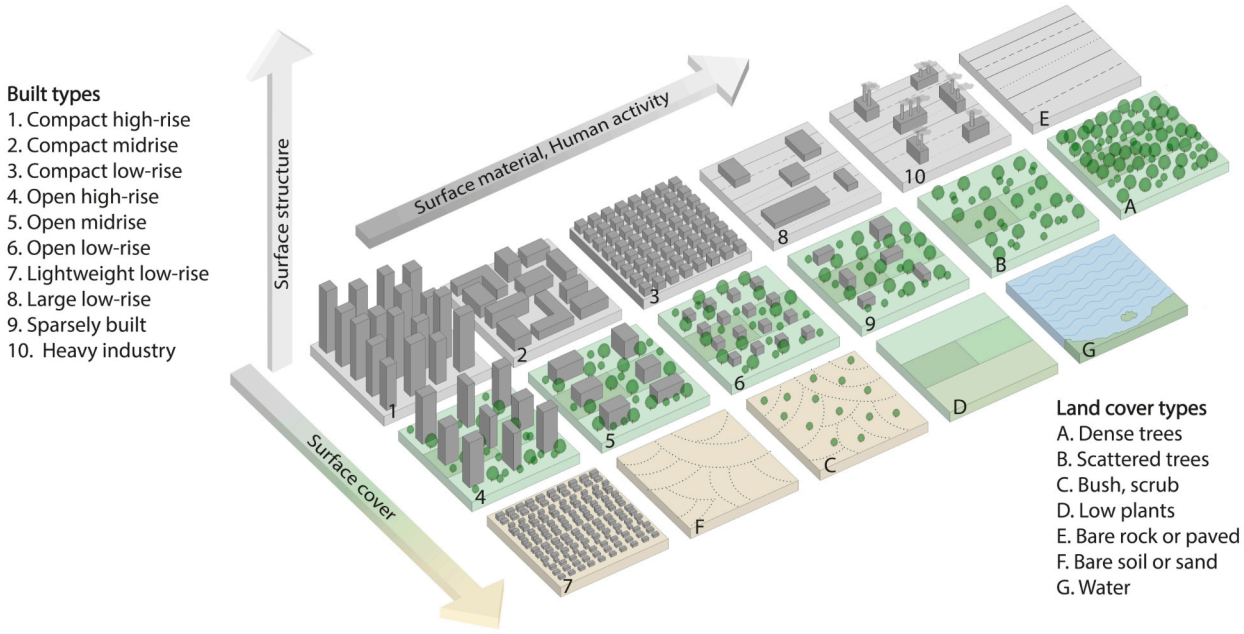


Components of the urban landscape. *Source: authors*

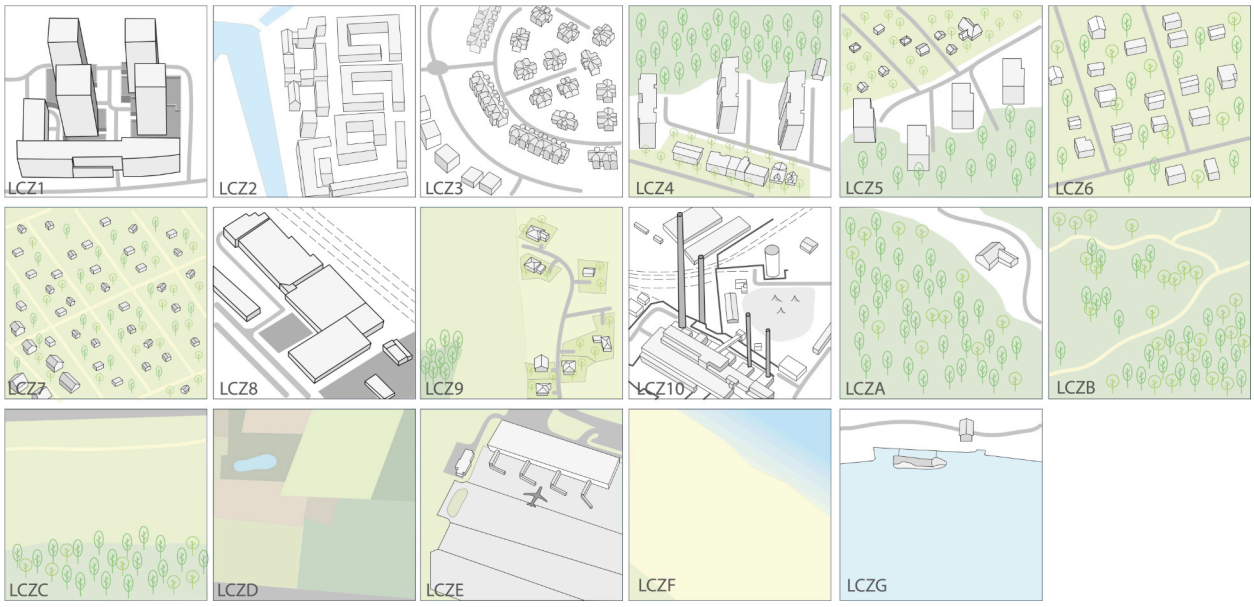
Housing structures, seen as urban landscapes, consist of *static* elements, resulting from the topography of the land, *fixed* landscape elements (embedded), and those *introduced* into the landscape by human activity (anthropogenic infrastructure). It should be remembered that the voids between the built elements are also structural and functional features of the landscape. They can be considered as open space and biologically active greenery, more recently defined as blue-green infrastructure, or as space-filling (void). The urban landscape structure is a kind of construction (frame, wrap) for metabolic urban processes (circulations, flows, relationships) generated firstly by nature in numerous local urban ecosystems - climatic factors (wind, temperature, humidity, dust), water cycles, renewable energy - and secondly as a result of human activity - flows of people, goods, communication, non-renewable energy, etc. (see matrix above). When describing an urban landscape, one can use the analogy of comparing a city with a computer system, where the urban morphology could be consideres as the hardware and the city's metabolism could be considered as the software.

Interaction between the components

The components of the urban landscape remain in a certain relationship to each other. They depend mainly on the predominant functional use of the buildings on the site (e.g. residential, commercial, industrial) and on the prevailing morphology and density of development. These relationships are well reflected in the Local Climate Zone (LCZ) typology, originally developed for climate research (Oke et al., 2017). It considers different types of urban and peri-urban land use on the basis of variations in the type of development, i.e. the anthropogenic elements of the landscape, and land cover, i.e. the natural elements of the landscape (compare figure on the following page). The different LCZs are characterised by similar building types: compact or open, with a distinction between high, medium-high and low, as well as low light, low large-scale and heavy industry (figure on following page). Each is associated with a specific type of technical infrastructure, utilities and energy supply, as well as a specific human activity, expressed in terms of their number, transport needs, thermal load on the buildings, etc. The design and use rules for buildings of a particular typology affect the



Typology of Local Climate Zones (LCZs) according to Steward & Oke (2012). Source: Authors based on Steward & Oke (2012)



Samples of the morphology of individual LCZs for the city of Gdańsk. Source own based on https://obliview.brg.gda.pl

Examples of medium-rise compact buildings in Gdańsk. On the left: buildings in the medieval urban tissue of Gdańsk; in the middle: 19th century quarters supplemented by contemporary buildings; on the right: post-socialist housing estate designed according to the principles of modernism. *Source: https://obliview.brg.gda.pl*



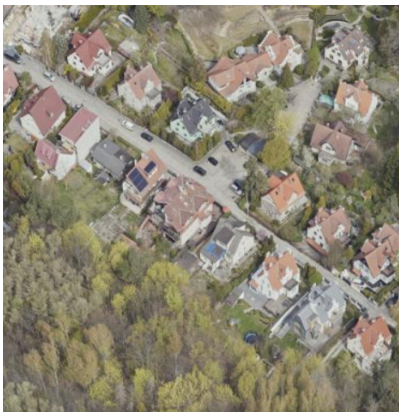
size of the space between them and therefore the possibilities for land cover with natural elements - high, medium and low greenery and water bodies. Each of these types results in a different type of landscape. Obviously, this approach is still somewhat simplistic, as each of these zones with a specific prevailing density may have a different kind of urban and architectural design solution and style, resulting in changes in both the local urban metabolic pattern and the assessment of landscape economy indicators.

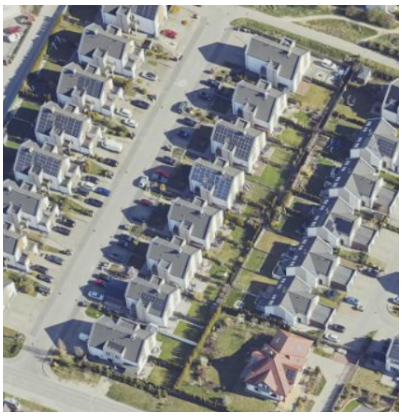
These differences can be explained by comparing two common housing types found in any large city: the medium-rise compact development type (LCZ2) and the open low-rise development type (LCZ6).

Medium-rise compact buildings are characteristic of historic city centres, inner cities and neighbourhoods adjacent to inner cities (see figure above). This typology is also increasingly appearing in suburbs as a cheaper alternative to locations closer to the centre. It is an example of efficient use of land and technical infrastructure. Residents have good access to services, public spaces and public transport. It is a characteristic of the compact city model, in line with the sustainable development idea of making the best possible use of land already occupied by the city rather than occupying new land. However, this type of development offers little opportunity for the introduction of natural elements and biodiversity as much of the land, even when not occupied by buildings, is paved (e.g. roads, car parks, access routes). Areas developed in this way are prone to overheating in summer, and it is difficult to provide smooth ventilation, which contributes to the urban heat island phenomenon and air pollution.

At the same time, buildings can shade each other, limiting the access of daylight to buildings and urban interiors. The perception of the landscape of compact medium-rise developments is primarily related to the spaces of streets and squares created by the buildings. Anthropogenic elements - buildings, pavements, landscaping elements definitely dominate over natural ones. Residents' contact with nature and their access to open views in the immediate surroundings of buildings is limited.

Examples of low-rise open buildings in Gdańsk. On the left: a single-family housing estate on the edge of the forest, in the middle: a chaotic single-family development with small garden crops in the vicinity of a transit road, on the right: a contemporary development estate; *source https://obliview.brg.gda.*pl





Low-rise open development is typical of suburban zones (figure above). It is the realisation of the dream of a house with a garden, chosen mainly by families with young children, people who prefer to live close to nature. Although it is an expression of a pro-ecological approach to the lifestyle of a certain group of people, it is not the realisation of the idea of sustainability from the point of view of the city as a whole, as it is associated with very low land use efficiency and the threat of urban sprawl. In this type of landscape, it is the natural elements that prevail over the anthropogenic ones, creating wide open views. The microclimate that prevails there is favourable for residents, free from many of the problems found in highly urbanised zones. However, these types of settlements tend to be built at the expense of agricultural or environmentally valuable land, they result in the need to build new technical infrastructure, and poor access to services, public spaces and public transport increases the burden on individual transport throughout the city.

The differences between the two types of development described here can therefore be considered not only in terms of landscape characteristics, but also in terms of the opportunities and constraints they offer to residents and their impact on the sustainability of the city as a whole. The LCZ typology allows the different types to be described in terms of measurable parameters (Oke et al., 2017). These include building intensity and height, factors characterising the geometry of urban interiors (e.g. sky view factor, aspect ratio H/W), percentage of undeveloped and biologically active area, heat storage capacity, surface albedo, anthropogenic heat load and many others. In each type of LCZ, these parameters fall within specific ranges. They help to quantify and therefore assess and compare different types of phenomena (e.g. energy, climate, human flows, functional capacity, natural potential, etc.), but they do not express all landscape characteristics. Indeed, within the same type of urban landscape, examples with different visual impact can be found. Depending on the features of the urban composition, the quality of the architecture, the arrangement of greenery, the development of public spaces, different effects can be achieved in terms of aesthetics, the rendering of the identity of a place, the impact of interiors on the well-being of users, i.e. features that cannot be directly and absolutely parameterised.

On the left: view of the residential buildings in the Garnizon district (mid-rise) in the centre of Gdańsk;
on the right: similar morphology of buildings (mid-rise) located on the outskirts of Gdańsk, next to the large shopping mall.
Source: https://obliview.brg.gda.pl

The urban context: Importance of an area's location in the urban structure and its meaning for the economic value of the landscape

The urban morphology, as well as its aesthetics and harmony, are significant factors in determining the perception of a city's landscape and its value. However, it is not the only factor. Another leading key factor is the *urban context*.

This includes:

- the *location* of the area within the city structure (center or periphery)
- *accessibility* to transportation and services (e.g., near a train station, near a tram/metro/bus stop, next to mobility node, near a shopping centre, near a health clinic, school);
- the *proxomity* to biologically active natural elements (e.g., by the sea, next to a park, near a forest, overlooking greenery)
- the *relation* to other land uses (e.g. close to an industrial district, next to a factory, in vicinity of a shopping centre)
- the idea of a *"good neighbourhood"* or "neighbourhood with appropriate social profile" (e.g., quiet neighbourhood, active local community).
- The *identity of the place* and its history (e.g., in the old town, dock district, near the old market)

The greater the number of the above-mentioned factors, usually positively perceived by residents, the greater will be the real estate appraisal of the area, but also usually the greater will be the intangible value and positive perception of the urban landscape, for example, as more cohesive, harmonious and healthier.

The location of different urban landscapes depends on different natural, social and economic conditions. One of the most important triggers and tools for defining the location of a particular urban landscape is the city's planning policy and the designation of suitable areas for different activities. Land use, which co-defines the character of the urban landscape, is governed by Local Development Plans (LDPs), the provisions of which can also significantly influence the value of the landscape.

The value of the urban landscape is therefore a result of the land use, the urban morphology (understood as a set of physical parameters of a group of buildings) and the urban context, which indicates a relationship between these buildings and the surrounding environment.

Driving forces affecting the components of the urban landscape

The components shaping urban landscapes, as discussed above, depend on a variety of driving forces that are often in conflict with each other. The driving forces that shape built-up areas influence both local activities (bottom-up, carried out by spontaneous groups of people, NGOs, neighbourhood authorities) and top-down activities (decisions by the EU, state and municipal authorities).

Decisions on spatial transformation often create a clash of interests among many actors, communities and stakeholders. The effective involvement of all relevant actors in the process of urban landscape transformation depends to a large extent on the local political and economic conditions (including the socio-economic system).

One phenomenon that needs to be taken into account in the design of urban space, especially today, is the impact of environmental threats. Thus, the main driving forces shaping urban landscapes are: society and its cultural, technological, socio-economic level of evolution, and the natural environment in which the society is living. This includes: geographical location, climatic zone, access to water and natural resources. In the further, we describe three of these important driving forces (socio-economic system, stakeholders, environmental threats) in more detail.

Socio-economic systems

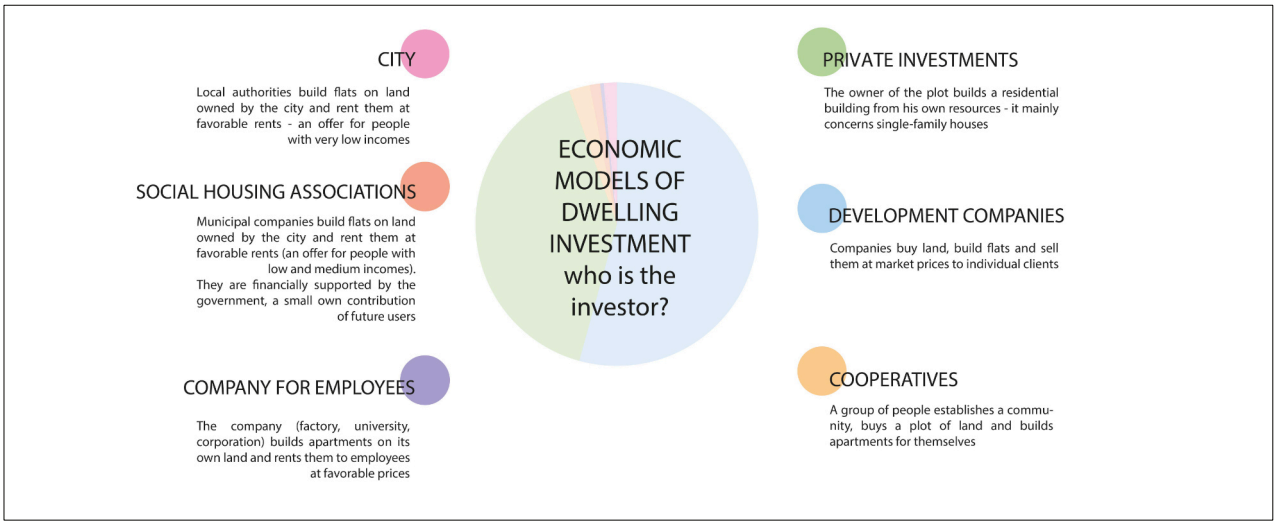
The development of urban areas varies according to the socio-economic system. The economic system determines, amongst others, the ownership structure of the land (Goráwski et al.) and thus strongly influences the urban landscape. Throughout history, the urban landscape has reflected changing economic systems - from feudalism in Europe, through capitalism in the 19th century, capitalism in the 20th century in Western Europe and socialism in Eastern Europe, to contemporary neoliberal capitalism. Three of the latter systems, each with a different approach to ownership of land and housing, are discussed in simplified terms below.

The capitalist system: Private property is key to this system, but it is not the only form of property. The economic system is a market economy in which individual entities are guided by their own interests. Real estate is a commodity whose price is regulated by the market. What is important here is competitiveness between entities from the same industry. In a market economy, construction develops in line with the expectations of developer companies, i.e. it aims to obtain the highest possible profit from real estate. The government and municipality interferes little in the functioning of individual market sectors, while supporting entrepreneurs through relevant institutions. This is done by increasing the density of buildings, limiting recreational areas in favour of development, and using existing services in the vicinity. At the same time, the architectural form,

construction standard and choice of location are competitive. Private apartments dominate among the forms of real estate ownership, often constituting a type of financial investment, some of them are available for rent (Pietrzak, 2018). Housing allows for a wide variety of different forms of buildings and their urban composition. Usually, the space left for recreation and greenery in cities is limited, as its maintenance is rather costly. However, the important place in these cities is the concentration of services (streets, malls) and Central Business Districts (CBDs).

Socialist system: Goods such as means of production and real estate belong to the general public. It should be noted that each state in a socialist system solves the question of private ownership of housing differently. For example in Poland private ownership of land existed all the time during the socialist period from 1945-1989. The dominant form is the centrally planned economy (Stec, 2001). There is no free market and therefore no competitiveness. The housing economy is implemented through housing cooperatives or company cooperatives. Due to the usually high demand for relatively cheap housing, a rapid increase in the supply of housing is sought through the use of modular construction and prefabrication of building elements. This often results in little spatial differentiation of architectural forms and highly functional, albeit small dwellings. The space accompanying the housing complexes is shared and belongs to the whole community. Therefore, the composition of housing complexes has extensive green and recreational spaces and provides access to services, especially social services such as schools and kindergartens. However, communal spaces are not always properly cared for, if lacking a defined host-manager (Stryjakiewicz et al., 2014).

In recent decades, the dynamic **neoliberal system,** which assumes minimisation of the state's influence on entrepreneurship (strong private property rights, free trade and markets), has had a particularly dramatic impact on the urban landscape, as we observe it here in the case of Poland. The process of transformation of the socialist system into the neoliberal one was noticeable especially in Central and Eastern Europe and was manifested in changes in the model of ownership relations and the living environment. Over a long period of time, this system has led to the disappearance of the public sector importance in housing, to an increase in the freedom to shape space and social stratification in the city space. Changes were also made through the reorganisation of the legal order, the spatial planning system and the privatisation of housing resources and public infrastructure (Drozda, 2016).



Different types of investors in the city while building housing estates. Source: authors

Stakeholders and interest groups

As can be seen from the characteristics of socio-economic systems, the essence of the difference between forms of development is the type of ownership and, consequently, different methods of management (figure above).

There are three basic forms of ownership (Matel, 2019):

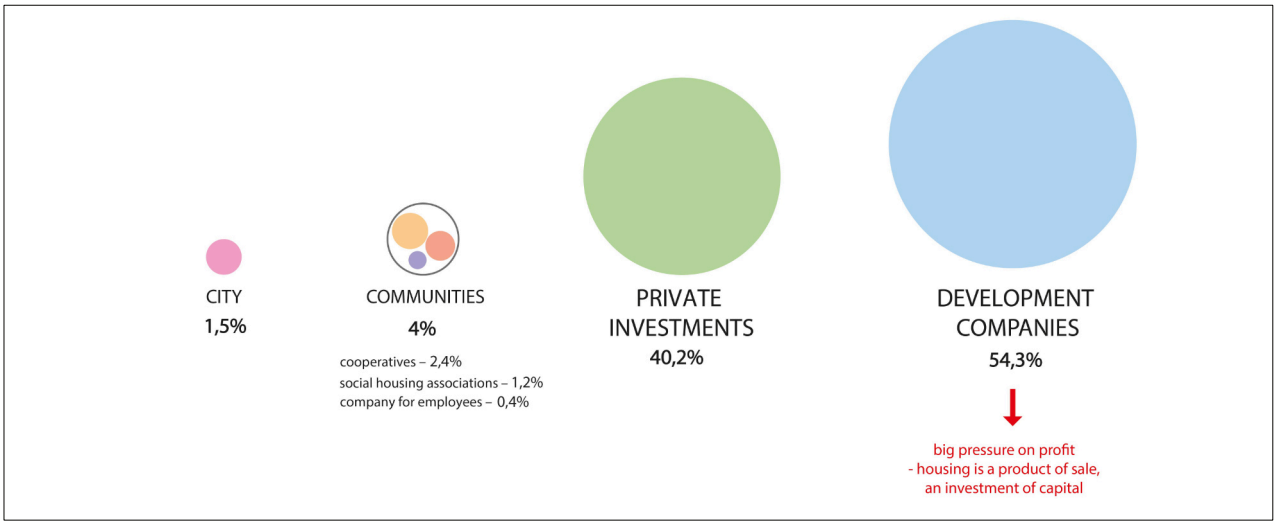
- private
- public (state, municipal)
- social, in the sense of being intermediate between private and public

Private property is in the hands of individual investors, e.g. physical persons or developers, but ownership in the form of a cooperative is also possible. Private investors are, for example, physical persons who decide to build or purchase real estate for the purpose of using it (living, renting). This situation most often occurs with private investors who build single-family houses on their own plot of land.

A developer is usually a company owned by one person or a group of private investors, which, under a purchase and sale agreement concluded with end users (target residents), carries out large construction investments. The aim of such a project is to sell apartments, which are treated as goods. Residential premises are a product sold according to established price rates, usually calculated from one square meter of usable floor ratio area.

Cooperatives are also possible, in which a group of private investors buys a building plot together and, limiting investment costs as much as possible, often uses their skills and implements a construction investment for their own needs. In this case. the builders are also the target recipients, the residents.

Another type of investment is that of a social nature. They are intended for low-income users. Here, the investor is often the city authority, which provide housing in the form of support for those most in need by means of municipal apartments. City authorities can also implement residential investments in urban areas with the help of associations, in the case of Poland this is, for example, the Social Housing Society (pol. Towarzystwo Budownictwa Społecznego - TBS). In the case of TBS construction, partial financial contribution of future residents is required for the



The percentage share of various types of housing investments in Poland in 2014. *Source: authors, based on Twardoch (2014)*

According to EUROSTAT research, 70% of the EU population lived in their own household in 2020, with the remaining 30% living in rented accommodation. The highest proportions of owner-occupiers were observed in Romania, where 96% of the population lived in a household that owned its dwelling, followed by Slovakia (92%), Hungary and Croatia (both 91%). In Germany, half of the population lived in an owner-occupied household and half in a rented household.

The lowest proportions of home ownership were found in Austria (55%) and Denmark (59%). Thus, the majority of dwellings in Europe are privately owned in post-socialist countries (compare figure above), while renting is much more popular in countries with a continuing tradition of a capitalist economy. For example, in Poland, a post-socialist country, in 2024, municipal property accounted for 1.5% of the total, various forms of community ownership (cooperatives, social housing and corporate housing) accounted for 4%, privately owned property accounted for 40.2% and 54.3% was owned by various development companies, which treated property as a product for sale and a capital investment to increase profits (Twardoch, 2017).

An important driving force behind the development of built spaces are therefore stakeholders, i.e. those who are interested in implementing housing investments. Regardless of the political system or economic development of a given country, they can be divided into users and the team implementing the initiatives and belonging to one of these groups does not exclude belonging to the other (Twardoch, 2017). Users include the local community, these are: owners, residents and the people working there. The second group are the initiators of change who commit their financial resources, such as: investors, city authorities, local authorities, national authorities, but also the European Union. Each group discussed has slightly different interests, which is why they sometimes come into conflict with each other.

Environmental threats

Factors influencing the development of built-up areas also include the policy of adapting cities to climate change. This policy forces the search for new, more ecological technological solutions than those previously used and the adaptation of construction to new environmental conditions. An example of such action is changing the heating system of apartments

so that the material structure itself has the highest possible insulation parameters to reduce heating costs and CO_2 emissions. For this purpose, solar energy (photovoltaic panels), wind energy (wind farms) or energy from the ground (heat pumps) are used amongst others. To use the advantages of a place, such as sunlight, it is necessary to know the geographical features of a given location. On the other hand, the existing resources in the form of existing housing infrastructure require adaptation to new technical parameters. That is why facades are insulated, windows and heating systems are replaced. Carefully selected species of greenery are also introduced to absorb harmful dust and shade street spaces in order to avoid the phenomenon of urban heat islands. It analyses the shading and sun exposure of facades, sometimes introducing intelligent panels, etc. Reusing existing buildings and avoiding CO_2 emissions generated by new construction is another very relevant paradigm shift emerging now.

Directions of sustainable transformation and positive transition pathway

In developing cities where population growth is forecast, the housing sector is successively expanded. This is influenced by housing needs and the attractiveness of apartments as a capital investment. Lack of control over the process of introducing new buildings in cities and transforming existing ones may result in urban sprawl on the one hand, and excessive development intensity on the other. Both phenomena pose environmental and social threats. Guidance on the desired directions of transformation is provided by the UN Sustainable Development Goals (SDG) and the provisions of the European Green Deal (EGD) by the European Commission. A large part of the points included in the EGD are directly (e.g. making homes energy efficient) or indirectly (e.g. protection nature, from farm to fork, eliminating pollution, ensuring a just transition for all) related to housing. The necessary change suggested by these goals can be synthetically described by three lines of action in relation to anthropogenic and natural components of the urban landscape.

Firstly, it is postulated to increase the quality of anthropogenic elements. The emphasis on quality rather than quantity results from environmental threats and the need to reduce the strictly consumer and investment oriented approach to the resource that is housing. Therefore, we should strive first to make better use of this resource, not to multiply it. Increasing the quality of buildings and technical infrastructure involves:

- increasing energy efficiency and reducing the environmental footprint
- increasing the functionality and aesthetics of buildings
- resource recovery - adapting existing buildings to new functions
- development of public spaces, increasing the urban quality.

These changes should be guided by the goal of social justice postulated by the EGD. It implies the postulate of inclusiveness and accessibility of public spaces regardless of various types of limitations (economic, physical, age, etc.) and the need to introduce a housing policy that promotes the economic availability of housing.

The second visible direction of changes consistent with the EGD is the increase in the quantity of natural elements, which is expressed as:

- protection of undeveloped areas, including existing elements of blue-green infrastructure
- increasing the biologically active area at the expense of paved areas
- introducing new green areas, green roofs and walls, retention reservoirs, etc.

The third direction is to increase the quality of natural elements. A very good tool for assessing this quality is the theory of ecosystem services, which talks about four types of roles played by elements of nature: supporting, provisioning, regulating, cultural (Yeang, 2008).

The great advantage of this theory is the integration of natural and cultural dimensions into a common system of values. Increasing the quality of natural elements involves increasing the effectiveness of the roles, i.e. the range of ecosystem services that the same elements can perform.

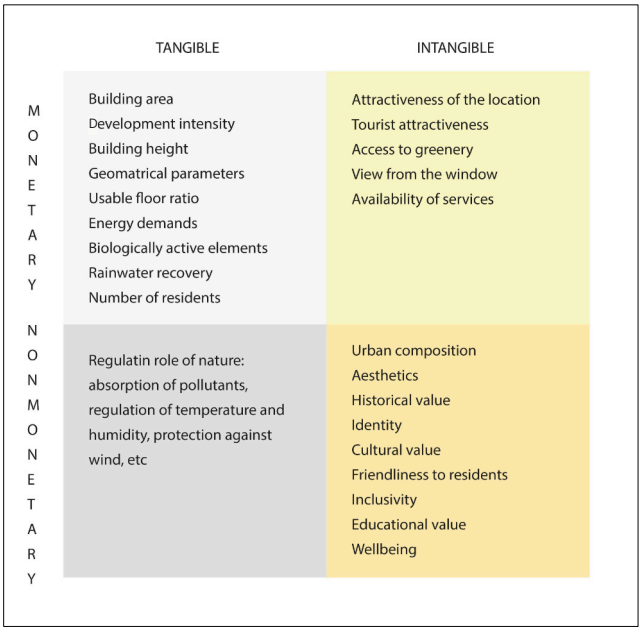
It may involve:

- increasing biodiversity
- on-site management of rainwater
- using the climate-forming role of greenery and water
- increasing the opportunities for residents to grow plants, including edible plants
- creating green places conducive to social and neighbourly contacts, supporting well-being, increasing the aesthetics of these places, supporting their educational role.

How to assess the values of a housing landscape

The value of the housing landscape consists of many elements. Some of them are quantitative and can be measured, and some are elusive and impossible to parameterize. Typical measurable parameters include those related to the geometry of permanent landscape elements, i.e. volumes, surfaces and dimensions. A large part of them, for example land area or apartment area in a given location, can be directly translated into monetary value.

However, many features of the urban landscape related to measurable geometry remain elusive and incalculable. For example, the compositional quality of urban space has neither an appropriate indicator nor a price, even though it results from dimensions and proportions, i.e. measurable parameters. Its value can be estimated indirectly, for example by the higher price of real estate in a given place that people are



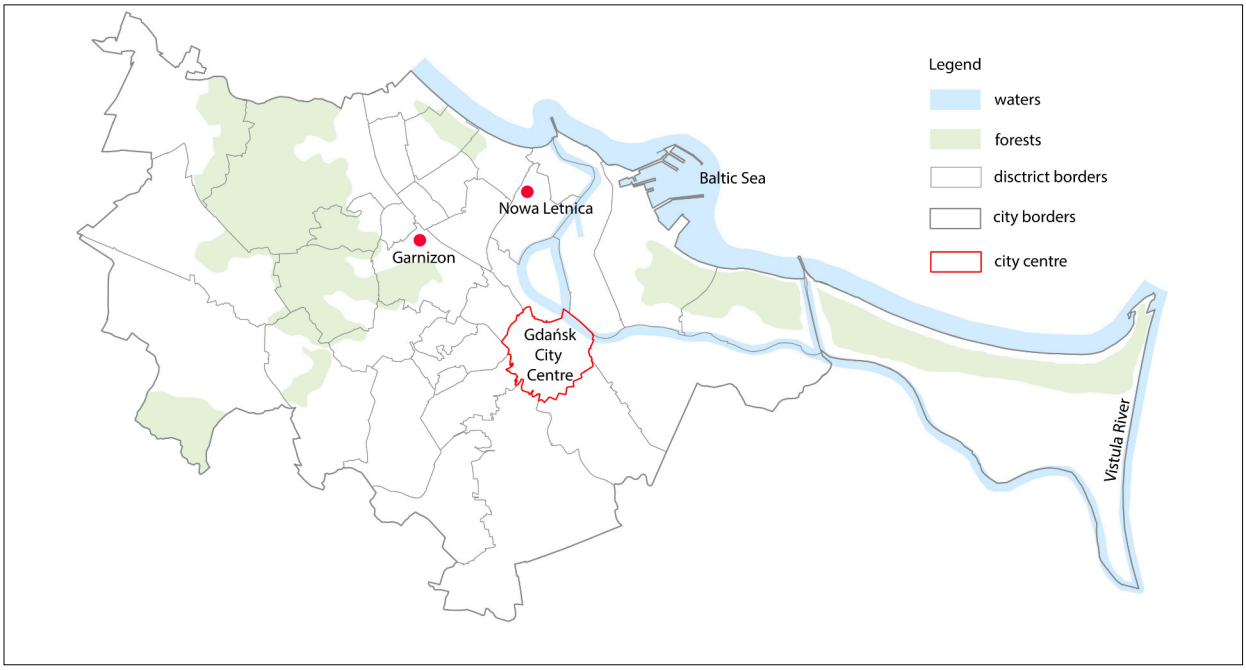
Tangible and intangible values of a housing landscape. *Source: authors*

willing to pay or the popularity of a given place expressed by the number of visitors or images posted on social media.

Other types of value that are difficult to fully parameterize and evaluate are elements of nature in the city landscape. The value of, for example, one tree can be estimated based on various components, such as the profit from the fruit it can bear, the amount of pollution it can absorb, the energy savings its shade can provide, or a measure of stress reduction for people within its reach. A more or less accurate quantitative assessment of these components is possible, although it requires interdisciplinary expert knowledge. This certainly makes it easier to estimate the value of a tree, but it is still not enough for this value to compete with such economically strong, easy-to-value elements such as a parking space or a square metre of a building. It is also important to ask: Who uses the given values? Who pays for them? What is the time horizon of profit?

It is often the case that investment profits are achieved by a small group of people, and the general public is responsible for the environmental (including landscape) consequences of the investments from which others have gained. For example, the cost of counteracting unfavourable climatic phenomena resulting from overloading the area with buildings and technical infrastructure is not borne by those who benefited from their construction and sale, but by city authorities financed by taxpayers. Current economic models are not able to fully capture the values of the housing landscape, and the evolution of these models towards social justice and valuing environmental issues remains one of the most important contemporary challenges. It is even more important to look for tools to fully assess the value of the urban landscape. This process is progressing, although many aspects still remain elusive. The figure above is an attempt to capture the current state of knowledge about the parameters and the possibility of assigning them monetary values.

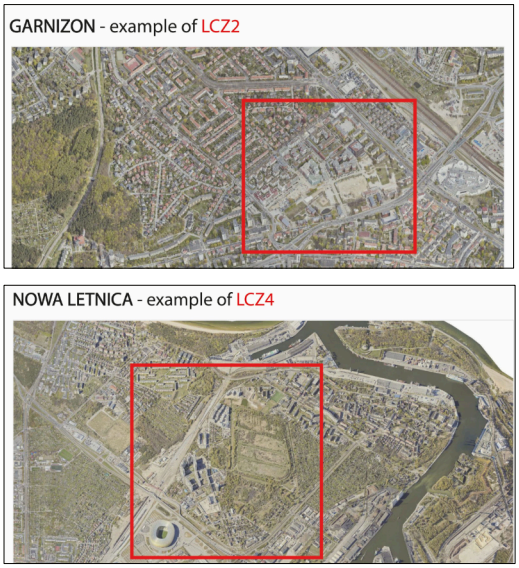
Localization of the districts: Garnizon and Nowa Letnica in Gdańsk. *Source: authors*



Study Cases in Gdańsk: Garnizon and Letnica

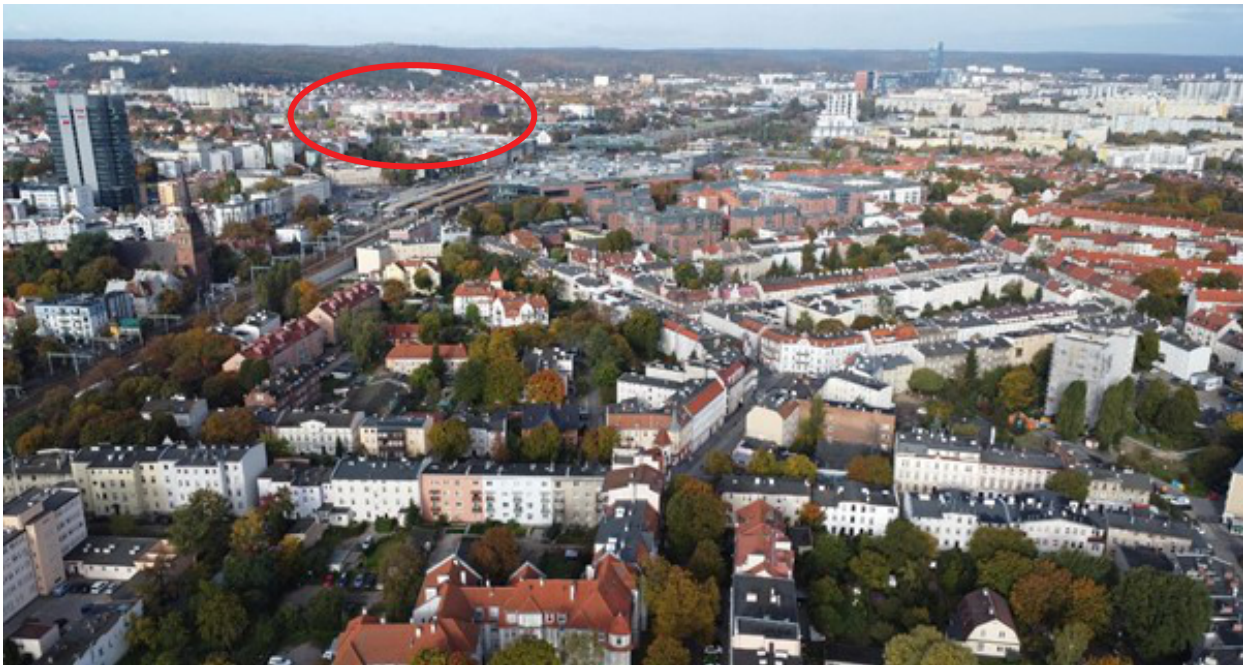
The two case studies located in the city of Gdańsk, Poland, have been described in this section as different images of a city, two different examples of physic-morphological urban features and two different approaches to the urban landscape. These are: Garnizon estate (the Garrison) in the district Wrzeszcz and Nowa Letnica (the New Letnica) estate in the district Letnica.

A description and comparison of both case studies is based on: quality of public space, culture, relation to natural landscape. These districts represent two different examples of physic-morphological urban features – Local Climate Zones: LCZ 2 AND LCZ 4, described earlier.



Physic-morphological urban features, Local Climate Zones: LCZ 2 - Garnizon and LCZ 4 – Letnica.
Source: https://obliview.brg.gda.pl

General view of the district Wrzeszcz in Gdańsk including the Garnizon neighbourhood. *Source: photo by Ł. Bugalski*



Garnizon

Garnizon (the Garrison) is a multifunctional development complex in the centre of Wrzeszcz district in Gdańsk (see previous page and figure above), located in the area of the previous Prussian military garrison. The project, executed to the plan selected in a competition, is staged and still needs to be completed. The ultimate goal of the concept was to create an open, multifunctional and buzzing city area with a rich service offer, densely developed and diverse, set in meticulously designed public space. This housing estate is also an example of compact mid rise urban tissue and a good approach to the revitalization of post-military areas in the inner city. This is also one of the most popular districts on the real estate market in Gdańsk. Garnizon has been developed by one local developer with an ambition to create a vivid and integrated part of a city in order to create a new city image.

Varied functions of the Garnizon are grouped in zones, and they are: offices in the eastern part of the area, housing and services units on the western side, and culture and recreation dominating in the southern side of the neighbourhood.

Among many different ecosystem services in the district, the cultural one are very important:

- high aesthetic values
- DNA of a place: cultural identity and heritage
- recreation and tourism
- vivid public space system.

Also, the quality of the following anthropogenic factors is important:

- buildings and their infrastructure,
- emphasis on modernisation and revitalisation,
- changing the functions of buildings rather than arising new ones,
- accessibility of public spaces and services (architecture and urban planning),
- high aesthetic values.

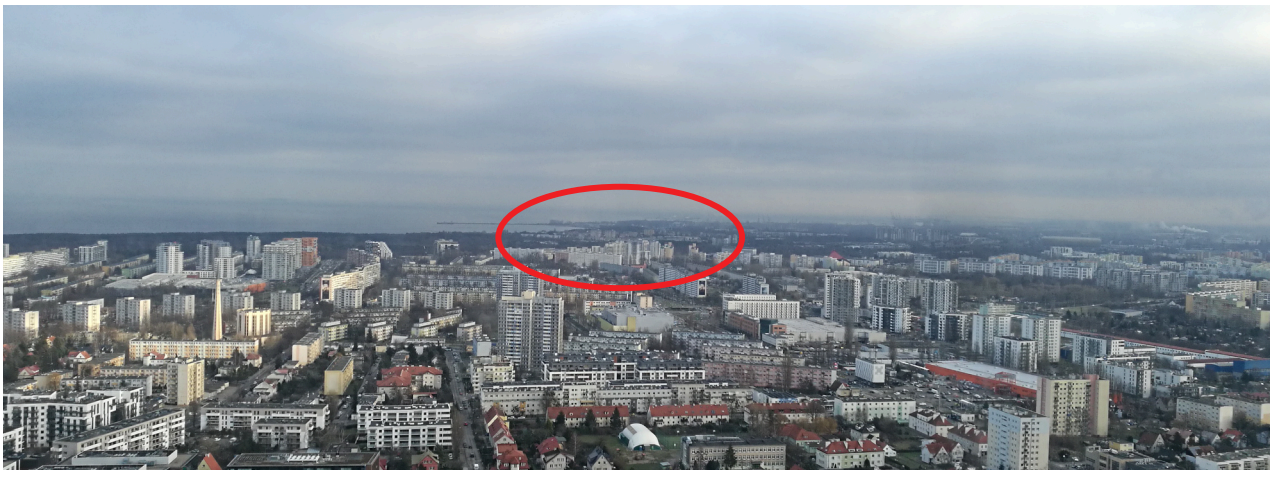
Public areas and green squares in Garnizon. *Source: M. Rembeza*

The public space system at Garnizon (see pictures above) is planned so as to blend it with the urban fabric of the surrounding area. The composition is crowned with squares and parks which open views of the estate and scenic axes which penetrate its expanse to bring historic structures into view.

Nowa Letnica – New Letnica

Our second case study is Nowa Letnica (New Letnica) in the Letnica district in Gdańsk (see figure below). The general function of this new housing estate is a multifamily housing area. The design is based on urban quarters with semi-public, recreational space inside. The local Climate Zone is 4 LCZ4.

This new district is located in a very demanding context. The Old Letnica neighbourhood dates back to the second half of the XIX century. This is an industrial and post-industrial district with factories and industrial plants (glassworks, steelworks), the brick, small scale housing units are under the process of revitalisation.



General view of New Letnica development. *Source: K. Krośnicka*

Old Letnica neighbourhood. *Source: M. Rembeza*

Ecosystem services in the Nowa Letnica district in relation to cultural values are:

- debatable aesthetic values
- no strict relation to DNA of a place
- recreation and tourism because of the close proximity to the Baltic Bay
- semi-public space system.

New Letnica (see also aerial view) has a debatable functional and aesthetic quality and limited accessibility of public spaces and services (architecture and urban planning). The concept of semi-public spaces is combined with water and green space design but unfortunately, these elements cannot fully balance the high intensity and building height of the new housing development.

Comparison of Garnizon and Nowa Letnica

When comparing the two case studies, it is important to stress that Garnizon was developed by one local developer. The ecosystem services in the area are more extensive and diverse, and it is a very good reference to the DNA of place: integrating the old, post-industrial part into the whole concept of a multifunctional neighbourhood. The district has a well-developed public space system. Overall, Garnizon is creating a strong, new city image connected with a context of a place and its history. In the case of Nowa Letnica the global developer was responsible for the whole concept.

Ecosystem services are less extensive and public, semi-public spaces are less connected with the general system of public space in the close neighbourhood of an area. There is no reference to the DNA of the place, the so-called "old" part of the Letnica district, which are the brick, small scale housing units. Nowa Letnica is creating a new city image more connected to the rapid urban development, rather than the DNA of a place, pointing the disturbing direction of development of new residential areas in Gdańsk.

Conclusions

Important driving forces shaping the urban landscapes are emerging from a society with a certain level of cultural, technological and socio-economic development, and the natural environment in which that society lives. Factors with particularly strong influence on the contemporary and historic urban landscape include the socio-economic system, the investment processes and the way in which stakeholders are involved, as well as design and planning paradigms that to some extent reflect available technology and knowledge, and environmental risks. The economic system determines, among other things, the structure of land ownership, which is the backbone of all urban investment. Throughout history, the urban landscape has reflected changing economic systems and social relations (from federal, capitalist and socialist systems to modern neo-liberal capitalism). The resulting urban governance and investment processes have defined the actors involved in shaping the urban fabric. The urban landscape has also changed with urban planning paradigms (e.g. modernist, postmodernist, contemporary), which were taking a very different approach to shaping the morphology of cities and were based on different design and aesthetic assumptions. Finally, by adapting to local natural conditions (surface topography, climate, natural disasters), urban landscapes have also reflected site-specific functional and spatial solutions and building forms not found elsewhere.

The physical (tangible) components of an urban landscape are static elements (such as land, buildings, transport and energy infrastructure, green and blue infrastructure) and dynamic elements (including flows of people, energy, freight, air masses, water). These components can also be divided into anthropogenic and natural, depending on their origin. The physical components of the urban landscape have a different character depending, amongst others, on the functions they perform. The layer of physical components is overlaid by a layer of intangible components resulting from psycho-social factors typical of people living in cities, such as cultural layers, perception of space, collective memory, biophilia, network of associations. Intangible components are important in creating the so-called 'genius loci' of a place. Only the combination of these two layers (tangible and intangible) allows us to assess the value of a cityscape. However, the intangible components are largely unquantifiable and the dynamic components are extremely difficult to determine due to the need for large databases.

The value of an urban landscape is a result of the function of the land and buildings, the morphology of the development, the aesthetics and spatial order of the development (including the urban composition), and the context of the place, which indicates the relationship between the components of the townscape and the surrounding environment. It is therefore a complex set of factors, both quantifiable

and non-quantifiable, which can only be fully determined by expert judgement over many years.

The measurable indicators that we currently use to characterise urban landscapes are primarily physical quantities that define the parameters of the landscape components and their interrelationships, such as building footprint, building intensity and height, biologically active area, factors that characterise the geometry of urban interiors, e.g. distances between buildings, sky view factor, but also heat storage capacity, surface albedo, anthropogenic heat load and many others. These relationships determine, among other things, the type of urban morphology and are well reflected in the typology of Local Climate Zones (LCZs).

The components of the urban landscape interact to form subsystems of the urban landscape at different scales (landscape patches), such as zones, settlements, neighbourhoods, districts, suburbs, and metropolitan areas. In assessing these landscape units, it is again important to consider their relationship to the surrounding environment. Irrespective of scale, therefore, townscape units should be assessed in the context of their surroundings.

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