

# Typology of terrain vague and emergence mechanisms in post-communist, post-industrial small and medium-sized towns in Slovakia: Case study of Humenné, Strážske and Vranov and Topľou

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**Abstract:** There have been many problems associated with underutilized areas in towns, although they also offer significant potential for urban renewal, especially in post-communist, post-socialist countries, where a series of key historical events has caused socio-economic and political changes leading to urban decay. The underlying feature of unused areas is their apparent abandonment, absence of use, lack of identity but high potential. However, not all unused areas should be labelled as brownfields; therefore, we studied the terms commonly used to describe underutilized areas. We chose the term terrain vague to map and describe all apparently empty but still intriguing spaces in our model towns of Humenné, Strážske and Vranov and Topľou, in eastern Slovakia. Our paper aims to create a typology of terrain vague to better understand its manifestation in our conditions. It also aims to determine the causes that led to its emergence or as we call it the emergence mechanisms, in the context of post-industrial small and middle-sized towns in Slovakia. We combined field survey and desktop analysis methods to map terrain vague based on set criteria. We evaluated mapped terrain vague and, using the data, created a typology of terrain vague consisting of nine types and identified three key emergence mechanisms and their subcategories. We based them on commonly used terms that fit within the specific context of our model towns. By using the new typology and emergence mechanism, we can identify patterns running along towns with similar backgrounds that result in similar problems and develop solutions accordingly. Results of our research could be generalized and serve as a basis for future research aimed at finding strategies for revitalizing terrain vague in shrinking post-industrial towns facing different problems than prosperous cities.

**Keywords:** terrain vague, typology, post-communist, post-industrial, small and medium-sized towns

## INTRODUCTION

The importance of brownfield regeneration and reuse of abandoned and vacant land is crucial for sustainable development and redevelopment in built-up areas of towns (de Sousa, 2008). However, labelling all unused areas as brownfields does not provide a comprehensive picture of the current urban structure in any town. The idea is to view towns, especially their urban structures, from a different perspective, through inverse urbanism (Haluzík, Pokorný, Storch, Meduna, Ajvaz, Pauknerová, Buřková, Říha, Sádlo, Juřičková, Gibas, Pokorná, Schmelzová, Epos 275, Lacinová, Šturma, Špoula, Veselý, 2020). From that point of view, we can discover the many unused areas interwoven in the urban structure and creating gaps in the urban fabric. They are difficult to label because they can fulfil their primary function and still appear as vague areas without any function at all. The feeling of emptiness of terrain vague is caused by the surplus of perceptions, not the lack of them (Boeri, 1998). The spaces with their many characteristics are inherent to every city in the world, which has led to using various terms to describe them. As Sergio Lopez-Pineiro writes in his book *A Glossary of Urban Voids* (Lopez-Pineiro, 2020), there are over 200 regularly

used terms to name unused areas. Some of them are pop-science rather than academic terms.

Terrain vague was firstly used by Catalan architect Ignasi de Solà-Morales (de Solà-Morales, 1995), who defined it as areas dominated by nature with remnants of buildings where “the memory of the past seems to predominate the present” and only “few residual values seem to survive”, represented by “marginal spaces, industrial areas, ports, unsafe residential neighbourhoods, contaminated places” (de Solà-Morales, 1997, p. 24). Karen A. Franck (Franck, 2014) even argues that public spaces are distinguished from terrain vague only by the state of abandonment. Terrain vague is the strange configuration of buildings and their remnants, overgrown greenery, and clues to the past (and sometimes present) uses. Regardless of the fact whether the site is an empty building, its remnant, an empty plot, or some combination of them, they are frequently abandoned, deteriorating, and possibly overgrown. This term perfectly describes the complex relationship between architecture and the current town where paradoxes between negative and positive influences on towns, the need to revitalize these areas but refusal of interventions often meet. In terrain vague, the present

and the past meet, it being the last uncontrolled area in towns with remarkable potential (de Solà-Morales, 1997).

This type of spaces, which American landscape designer Roger Trancik (Trancik, 1986) called lost spaces, emerged in northern America during the second half of the 20<sup>th</sup> century. Trancik defined them as “undesirable urban areas that are in need of redesign – antispaces, making no positive contribution to the surroundings or users”. (Trancik, 1986, p. 3-4) Their existence is caused by deindustrialization, high dependence on individual automobile transportation, the design of open space areas during the Modern Movement, functional zoning dividing the city, and unwillingness of both the public and private sector to take responsibility for public spaces. Our interconnectedness in the world has led to extensive parking lots, roads, highways, airports, and buffer zones near them. Non-places, as defined by French anthropologist Marc Augé (Augé, 1995), are the product of globalization, increasing dependency on car transportation and tourism (e. g. landscape in protection zones of highways, gas stations). Citizens and passers-by do not identify with these spaces, which, as a result, become underutilized. Based on this, we can state that place identity or lack of it is a strong determinant of whether a space will or will not become a non-place (Augé, 1999).

We can relate the above-mentioned buffer zones to the term voids or urban voids, which “are not just mere gaps in the urban landscape, but also leftover buffer zones without clearly defined functions and boundaries.” (Jonas, Rahmann, 2014). Authors mention voids when referring to areas near transport corridors, reclamation sites, “fragmented strips of land” and “fantasy play spaces” (Jonas, Rahmann, 2014, pp. 99, 143) in the case study of Tokyo. They defined the typology of voids in Tokyo based on their spatial appearance and emergence mechanisms: “residential sites prior to construction, sites undergoing zone readjustment, demolition sites, deserted buildings, and reclaimed land” (Jonas, Rahmann, 2014, p. 116). Anna Jorgensen (Jorgensen, 2014) suggests that there is no difference between regulated and unregulated or wild spaces but rather “a continuum ranging from “wilderness” to apparently ordered spaces” (Jorgensen, 2014, p. 2). They exist at all scales, from pavement cracks to more extensive urban landscapes, woodlands, river corridors or brownfield sites. Urban wildscapes have environmental protection potential when properly managed (Nassauer, Raskin, 2014). Another name for urban wildscapes in scholarly literature is wastelands (Lynch, Carr, 1979), sometimes referred to as brownfields or contaminated areas. Other commonly used terms are urban fallow or vacant land used to describe unused urban areas, or white areas and SLOAPs – “Space Left Over After Planning” describing unintended gaps in urban fabric (Doron, 2007).

The common denominator of the emergence of unused areas are political and socioeconomic changes after transitional periods (e.g. post-communism, deindustrialization, urban shrinkage), which all the above-mentioned authors refer to. However, geographic, political and cultural nuances play a huge role in defining and naming unused areas. In Central Europe, there are few studies focusing on terrain vague within the context of post-communist cities after the 1950s (Cosgrove, 2012; Grešáková, Tabačková, 2020; Hábllová, 2019; Haluzík, Pokorný, Storch, Meduna, Ajvaz, Pauknerová, Bušková, Říha, Sádlo, Juříčková, Gibas, Pokorná, Schmelzová, Epos 275, Lacinová, Šturma, Špoula, Veselý, 2020; Moravčíková, Szalay, Haberlandová, Křišteková, Bočková, 2020; Neumann, Zuchowicz, 2019; Petri, 2019). The Czech research on terrain vague is closest to ours because of the similar urban development strategies during the Czechoslovak Republic era. A. B. Hábllová (Hábllová, 2019) summarizes many terms regarding nonplaces, as she named them, in her book *Nemísta měst* (Non-places of cities). She describes them as

transit, landfill, temporary and virtual spaces emphasizing the transience, meaning constant emergence and disappearance of the nonplaces. However, she does not study any specific town or typology of nonplaces in the Czech Republic.

In their book *Město naruby*, Haluzík et al. (Haluzík, Pokorný, Storch, Meduna, Ajvaz, Pauknerová, Bušková, Říha, Sádlo, Juříčková, Gibas, Pokorná, Schmelzová, Epos 275, Lacinová, Šturma, Špoula, Veselý, 2020) identify terrain vague in their case study city - Prague. They refer to the term, as defined by de Solà-Morales (de Solà-Morales, 1995), but use Prague's social, economic, and political context to describe it. According to the authors, the existence of terrain vague is the result of six emergence mechanisms relating to the lack of activity, contemporary masterplans and unfinished fragments of designs, traumas materialized after revolutionary political changes. They recognize that “the character and number of terrain vague has changed with spatial-historic, socio-economic and current globalization social contexts in which they have developed and emerged.” (Haluzík, Pokorný, Storch, Meduna, Ajvaz, Pauknerová, Bušková, Říha, Sádlo, Juříčková, Gibas, Pokorná, Schmelzová, Epos 275, Lacinová, Šturma, Špoula, Veselý, 2020) The term brownfield does not include the vast variety of neglected areas we see in modern towns, but the term terrain vague includes (among others) brownfield areas. Therefore, in our research we will use the term terrain vague as defined by de Solà-Morales (de Solà-Morales, 1995; de Solà-Morales, 1997), because it best describes all visible and non-visible qualities of neglected areas that we encounter.

As we have been mapping terrain vague in model towns for three years during doctoral research, we recognized the need for creating a typology of terrain vague. The model towns of Humenné, Strážske and Vranov nad Topľou (Fig. 1) were chosen for their close geographical location, similar regional characteristics, and the fact that in each of them there was a chemical factory that influenced the similar growth and decline of urban structure since the second half of the 20<sup>th</sup> century until the present. Currently, these towns have declining population, which means they are “shrinking towns” (Hajduková, Sopirová, 2021b). The lack of job opportunities, their low quality (and low pay) and environment pollution are the causes of migration into more prosperous regions (Rumpel, Slach, 2014). The migration from our model towns within the country is mainly headed to Bratislava, Trnava and Nitra regions (Kakaš, Káčerová, 2012). The typology of terrain vague will provide us with a better understanding of areas that are unused, underdeveloped, and poorly designed. The identification of emergence mechanisms will help us understand the process behind the emergence of terrain vague and thus to design strategies to tackle their negative impacts more quickly.



Fig. 1. The location of model towns (Source: Authors, 2023)

## MATERIALS AND METHODS

Our paper aims to create a typology of terrain vague and to identify the emergence mechanisms of terrain vague in the

context of post-communist, post-industrial small and middle-sized towns in Slovakia using the case study towns of Humenné, Strážske and Vranov and Topľou. Our focus is on the development of urban structures after the Czechoslovak coup d'état in 1948 until the present and the terrain vague originating in this period (Fig. 2). We use the combination of field survey (Debord, 1958) and desktop analysis (Kropf, 2017) to map terrain vague using an ortho-photo map and cadastral map in the freeware program QGIS, described in more detail in previously published papers (Hajduková, Sopiřová, 2021a; Hajduková, Sopiřová, 2021b). Mapping (Tab. 1) and evaluating (Tab. 2) of terrain vague in model towns was based on set criteria. We use the results to create a typology of terrain vague and to identify the emergence mechanisms. It is important to state that despite the set criteria, phenomenological aspects like perception of vagueness, state of abandonment, etc. play a huge role in mapping and

evaluating terrain vague. The focus is mainly on the communist and post-communist period and effects of key factors influencing the development of urban structure (Hinse, 2014) with an emphasis on typical development in that period. The typology could be later generalized and used in all small and middle-sized towns in Slovakia with similar post-industrial background. Furthermore, it is necessary to evaluate the mapped terrain vague and partially categorize it. We use partially modified methodology for identifying emergence mechanisms as set by Haluzík et al. (Haluzík, Pokorný, Storch, Meduna, Ajvaz, Pauknerová, Buřková, Říha, Sádlo, Juřčková, Gibas, Pokorná, Schmelzová, Epos 275, Lacinová, Šturma, Špoula, Veselý, 2020) that suits our research and the context of model towns. Because of our phenomenological view of terrain vague, we did not set any criteria.

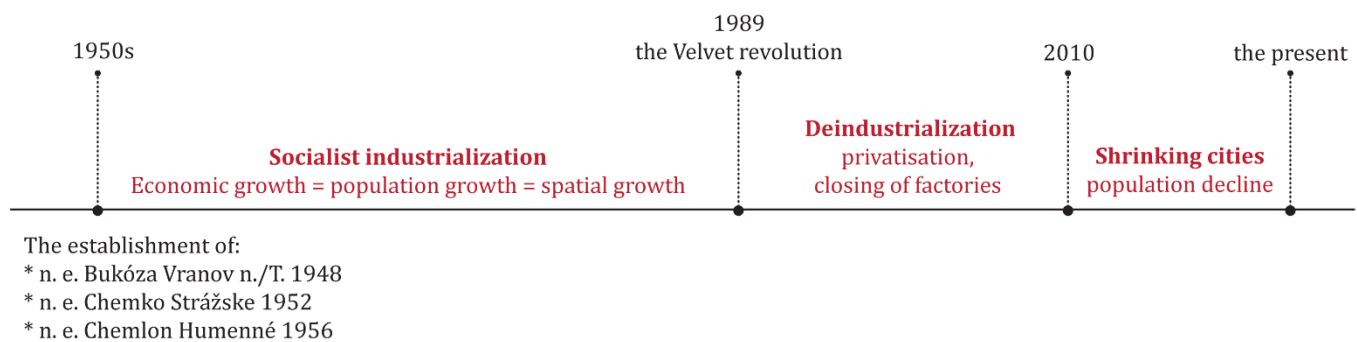


Fig. 2. The timeline of key historical events that have affected the development of urban structure in model towns. (Source: Authors, 2023)

Tab. 1. The criteria for mapping of terrain vague. (Source: Authors, 2023)

Category	Criterion	Description
Quantitative	Area	minimum area is 10 m <sup>2</sup> , maximum area is unlimited (max. up to 70% of the built-up area)
Qualitative	Location within the town	mapping terrain vague only in the built-up area (within the actual borders of the built-up area)
	Non-utilization rate of objects and areas	recording objects and areas that have at least 50% of the area unused (percentage of the land area), the important factor is the actual functional use of the object or area, regardless of the function assigned by the masterplan,
	Vagueness rate	the elusiveness of the space or object, its form, function, etc.

Tab. 2. The evaluation criteria for terrain vague. (Source: Authors, 2023)

Category	Criterion	Description
Quantitative	Area in m <sup>2</sup>	small – 10-399 m <sup>2</sup> , medium – 400-800 m <sup>2</sup> , large – 801 m <sup>2</sup> and more
Qualitative	Current use / former use	% rate of active functional use (if it no longer fulfils the original function)
	Location within the town	the center, the inner and outer city, and a periphery
	Terrain configuration	steep slope, slope deformations, waterlogged areas, inundation areas <sup>1</sup>
	The construction and technical condition of the buildings (if relevant)	satisfactory, partially satisfactory, and unsatisfactory
	Buildability	buildable and non-buildable
	Period of emergence	from the 1950s to the present by decades
	Environmental burdens according to the Information Portal	

		of the Ministry of Economy SR
Qualitative	Registered National Cultural Monuments and Landmarks	according to the Register of National Cultural Monuments and local government websites
	Ownership structure	private, state, municipal, institutional, unknown or in restitution
	Masterplan regulation	functional use
	The transformational potential	Scenarios “A”, “B”, “C” and “D” <sup>2</sup>

<sup>1</sup> according to the State Geological Institute of Dionýz Štúr in Slovakia

<sup>2</sup> according to the Real Estate Cadastre in Slovakia; scenarios were defined in previous research (Hajduková, Sopiřová, 2022b)

### Mapped and omitted phenomena

Even though many spaces could be identified as terrain vague (e.g. parking lots, green spaces in industrial areas), we decided to exclude them because of their low importance for our research. Car parking is part of every city, regardless of the country and its size. The issue is not the appearance of parking lots, the size or area, but long-term neglect of parking policies and public transport. Parking lots (Fig. 3) are just a consequence, and rather than improving their appearance, it is necessary to lower the dependence on car transport, which will ultimately lead to fewer parking lots. In contrast, terraced garages are easily identified issues forming larger zones in any city with a potential for transformation into a more effective parking solution. The society shifted from the need to park in a private garage to parking as close to the house, workplace, shopping mall, etc. as possible. Owning a car is now easier than before. The same applies to industrial areas and their green and paved spaces. They may seem vague to the employees there, but in the bigger picture they do not affect the city image, because they are part of industrial zones with limited right of entry. However, neglected industrial areas are a citywide issue, so we include them in our mapping.



There are also some specific types of architecture or spaces from the examined period, such as heat distribution exchangers, nurseries, medical facilities (health centres, hospitals), school facilities, public amenities (e. g. shopping centres, cultural centres, etc.) that we did not include in our typology, but they were part of the mapping process. They often fulfil their function, and in many cases, they have been reconstructed or transformed for other functional uses, therefore we decided to omit them from our typology and include specific sites only if they are completely or partially neglected in one of the 9 types. When mapping terrain vague, we identified surplus of specific areas with a little occurrence in model towns such as military areas, unfinished objects, unused sport fields and uncultivated landfills. Their presence is more of a coincidence than a rule, thus we identified them with one of 9 types in our typology.



**Fig. 3.** Parking lot in Humenné, Slovakia, with terraced garages in the background. (Photo: Romana Hajduková, 2021)

## RESULTS

The processes of creating a typology and identifying the emergence mechanisms cannot be separated, thus we can link at least one emergence. When defining every individual type, we took into consideration the underlying emergence mechanism.

### Typology of terrain vague

While creating a typology of terrain vague (Tab. 3, 4), we decided to use some terms defined in scholarly literature (urban wildscapes, white areas, voids, vacant land), with 3 types dedicated to green spaces (residential greenery, public green spaces and restricted (campus) green spaces) and lastly, to use a descriptive name – terraced garages. This approach allows us to capture the diversity of terrain vague, while also classifying it into distinct categories. It will help us better understand the dynamics of the urban structure and the way these different types interact with one another. They were derived from initially more than 30 types identified throughout the urban structure of model towns. Their description is based on a set of typical characteristics and the emergence mechanism.

Areas completely dominated by nature that are excluded from construction because of terrain configuration are urban wildscapes. Under the term white areas we understand transportation protection zones, which are formally planted with some greenery. Voids (Fig. 4) represent a wide range of spaces difficult to describe in one word (instead of naming it descriptively as abandoned entries, abandoned atriums, etc.) (Fig. 5), but all being underutilized transit areas with similar appearance. We identified the variety of abandoned areas (even

brownfields) that are commonly described as vacant land. Although we use the term vacant land to describe currently buildable land that is undeveloped. Such spaces may be present in industrial, residential or mixed-use areas and they may be privately or publicly owned with possibility of intensifying urban structure in built-up areas. They are often seen as liabilities and rarely utilized to their full potential. The name of the type of unused buildings and land is self-explanatory, describing areas with at least 50% of unused areas.



**Fig. 4.** The back side of Námestie Slobody in Humenné, Slovakia. A shopping mall on the right and a leisure centre on the left. (Photo: Romana Hajduková, 2021)



**Fig. 5.** The Cinema Chemik in Strážske, Slovakia, and its entry area. (Photo: Romana Hajduková, 2021)

Other 3 types are related to green spaces in urban environment are divided into residential greenery, public green spaces and restricted (campus) green spaces. We paid special attention to green spaces due to their significant share in the urban environment, generally neglected appearance, and potential for revitalisation. Specifically, residential greenery is an integral part of housing estates, but often abandoned due to the lack of maintenance, and also low interest of inhabitants. It significantly affects the overall image of housing estates and residential environment. Public green spaces are often perceived as areas where no activity is allowed, therefore inhabitants lose their interest in them and local governments lack funding. And restricted (campus) green spaces play an important role mainly in educational facilities (e. g. schools and kindergartens), but a very small role in industrial zones. This can lead to healthier, more attractive and liveable cities. The above-mentioned types

were chosen according to the availability and primary function of green spaces. The last type are terraced garages with a high share in urban areas forming entire zones, therefore we decided to use a descriptive name. Placing terraced garages in the type of unused buildings and land would not provide a comprehensive

picture of how the entire zones of terraced garages are affecting urban structure. To address this issue, we need to consider terraced garages as a whole and their impact on the urban environment.

**Tab. 3.** Summarized types of terrain vague with the definitions, examples and emergence mechanisms. (Source: Authors, 2023)

Type of terrain vague	Definition	Example (areas included in the type)	Emergence mechanisms
<b>Urban wildscapes</b>	Areas taken over by nature. Spaces with overgrown greenery, anemochoric greenery, etc. that have not been developed for various reasons, e. g. slope deformations, steep terrain, flood areas, etc.	Urban wildscapes, steep terrain, flood areas	The cycle of urban development (Areas excluded from construction)
<b>Vacant land</b>	Vacant land and urban fallows in built-up areas of towns which are suitable for development.	Urban fallow, vacant land	The cycle of urban development (Spatial reserves)
<b>Unused buildings and land</b>	Areas with 50% of unused area (% share of the land area) at minimum	Unused industrial, agricultural and military areas and objects (brownfields), unfinished objects (long term), unused sport fields, non-reclaimed landfills	Political and socio-economic changes (Deindustrialization), The cycle of urban development (temporarily) unused objects)
<b>White areas</b>	Buffer zones of transport and technical infrastructure, flooded areas, accompanying greenery of transport and technical infrastructure and watercourses	Accompanying greenery of transport and technical infrastructure, accompanying greenery of watercourses, abandoned waterfronts	Unintended product of urban planning (Places (deliberately) deprived of a function)
<b>Voids</b>	Transit areas (supply, entry and exit zones of buildings), Areas with the potential for a public space, spatially undefined parking lots	Abandoned transit areas near buildings (public amenities), abandoned entries, abandoned atriums (schools, hospitals)	Unintended product of urban planning (Place without function)
<b>Residential greenery</b>	Publicly accessible residential greenery in residential areas including housing estates	Residential greenery	Unintended product of urban planning (Remnants of the urban-renewal days)
<b>Public green spaces</b>	Publicly accessible green spaces excluding residential greenery and public parks	Public green spaces (excluding parks), accompanying greenery around public amenities	Unintended product of urban planning (Remnants of the urban-renewal days)
<b>Restricted (campus) green spaces</b>	Campus green spaces accessible to certain groups of people (employees, patients, kids, and parents)	School, industrial, hospital campus green spaces	Unintended product of urban planning (Remnants of the urban-renewal days)
<b>Terraced garages</b>	Terraced garage areas with associated parking and transport areas	Terraced garage (area)	Political and socio-economic changes (Socialist industrialization, deindustrialization)

**Tab. 4.** Evaluation criteria for terrain vague types with marking of occurrences of criteria for every type. (Source: Authors, 2023)

Evaluation criteria / Type of terrain vague	Urban wildscapes	Vacant land	Unused buildings and land	White areas	Voids	Residential greenery	Public green spaces	Restricted (campus) green spaces	Terraced garages
<b>Location within the town</b>	The centre	•	•	•	•	•	•	•	•
	The inner city	•	•	•	•	•	•	•	•
	The outer city and a periphery	•	•	•	•	•	•	•	•
<b>Terrain configuration</b>	Steep slope, slope deformations	•		•					
	Waterlogged and flood areas	•							
	None		•	•	•	•	•	•	•

<b>The construction and technical condition</b>	Satisfactory			•						•
	Partially satisfactory			•						•
	Unsatisfactory			•						•
	No objects	•	•	•	•	•	•	•	•	•
<b>Buildability</b>	Non-buildable	•								•
	Buildable		•			•	•	•	•	
<b>Period of emergence</b>	1950s	•	•		•	•	•	•	•	•
	1960s	•	•		•	•	•	•	•	•
	1970s	•	•		•	•	•	•	•	•
	1980s	•	•		•	•	•	•	•	•
	1990s	•	•	•	•	•	•	•	•	•
	2000s	•	•	•	•	•	•	•	•	•
	2010s	•	•	•	•	•	•	•	•	•
	2020s	•	•	•	•	•	•	•	•	•
	Unknown									
<b>Ownership structure</b>	Private		•	•		•	•		•	•
	State	•	•	•	•	•		•		
	Municipal	•	•	•		•	•	•	•	
	Institutional		•	•		•		•		
	Unknown and in restitution	•	•	•	•	•			•	•
<b>The transformational potential</b>	Scenario "A"			•						•
	Scenario "B"	•	•	•	•	•	•	•	•	•
	Scenario "C"		•	•		•	•	•		•
	Scenario "D"			•					•	•

### Emergence mechanisms of terrain vague

In our research, we identify 3 main emergence mechanisms (Tab. 1), which we further divide into 2 to 3 subcategories. We chose this approach based on the key factors influencing the development of urban structures since the second half of the 20<sup>th</sup> century until the present. There are only 3 main emergence mechanisms, because subcategories describe specific events, not the mechanisms themselves. The first emergence mechanisms are political and socio-economic changes in the context of post-communist, post-industrial towns: socialist industrialization (1948-1989), deindustrialization (1989 – the present) and urban shrinkage (2010 – the present). They have had the opposite impact; socialist industrialization served as a catalyst for economic, demographic and spatial growth (Fig. 6), while deindustrialization and urban shrinkage have directly caused an overall decline. In some cases, we cannot completely identify the emergence mechanism because of the mutual connection and continuity in the processes. The construction of terraced garages is linked to positive economic growth, but at the same time to the lack of cars. Their moral and physical depreciation is linked to the higher availability of cars and the need for frequent and quick accessibility. For those reasons, we identify both socialist industrialization and deindustrialization as the emergence mechanism for terraced garages. The same applies to unused

buildings and land, but due to the high number of industrial brownfields, we will identify them only with deindustrialization.

The second emergence mechanism is an unintended product of urban planning with the following subcategories: remnants of the urban-renewal days, places (deliberately) deprived of a function, places without function. These processes are closely related to spatial planning and a contemporary image of an ideal industrial city. Remnants of the urban-renewal days and places without a function emerged between 1948 and 1989, when only fragments of proposals were finished or there was not enough money for the whole concept. Places (deliberately) deprived of a function are, in contrast, the result of a (too) consistent effort to organize cities leading to protection zones near transport and technical infrastructure. With these mechanisms, identification is clear because the common denominator is spatial planning. All the above-mentioned types of terrain vague related to green spaces (residential greenery, public, restricted (campus) green spaces) are part of the subcategory remnants of the urban-renewal days. These areas are mainly located near objects of public amenities and in campus areas and only intended to fill in the "residual" areas after the design of buildings and pedestrian routes (Fig. 7). They were designed without any activities in mind; therefore, they are neglected. As regards residential greenery on housing estates and near single apartment build-



ings, there is a lack of areas with benches and playgrounds. On the contrary, greenery in protection zones has clearly defined functional uses in the masterplan, which is the root of many issues (Fig. 8). We identify them as places (deliberately) deprived of function. Places without a function represent previously mentioned transit areas (for suppliers, visitors, assembly areas), entry (or exit) areas in front of public amenities such as cinemas, without the qualities of public space and unregulated parking lots.

The last emergence mechanism is the cycle of urban development, which is inherent to every town regardless of the context. It is a common, even inevitable part of the urban development of cities as living, constantly evolving organisms. This category includes unused buildings and objects, spatial reserves and areas excluded from construction. The emergence of unused objects is a common phenomenon (Fig. 9), until they are not neglected for a long period of time and do not emerge suddenly in huge numbers (e. g. industrial brownfields after deindustrialization). They can be abandoned family houses, small shops, etc. The occurrence of vacant (undeveloped) land in built-up areas, providing a spatial reserve for further development without big obstacles (e. g. land in restitution, suitable regulation by masterplan), is also common. Places excluded from construction have usually an obstacle in the form of terrain configuration or a watercourse, including slope deformations, steep terrain, flood areas and other.



**Fig. 6.** The Hostel Chemik in Strážske, Slovakia - view from Obchodná Street. (Photo: Romana Hajduková, 2021)



**Fig. 7.** The left-over vacant land on Hospital grounds in Humenné, Slovakia. (Photo: Romana Hajduková, 2022)



**Fig. 8.** Greenery accompanying the local watercourse called Lieskovec in Humenné, Slovakia. (Photo: Romana Hajduková, 2021)



**Fig. 9.** The closed Ice Cream shop in Vranov nad Topľou. (Source: R. Hajduková, 2022)

Tab. 5. Summarized emergence mechanisms, subcategories, and the definitions. (Source: Authors, 2023)

Emergence mechanisms	Definition	Subcategory	Definition
<b>Political and socio-economic changes</b>	The results were directive measures or drastic changes (shocks) with a significant impact on the development of the urban structure, the economy of the state and cities, as well as demographic development	Socialist industrialization	The catalyst for economic, demographic, and spatial growth
		Deindustrialization	Economic, demographic, and spatial decline, emergence of unused areas
<b>Unintended product of urban planning</b>	Related to the urban planning and the inconsistent realization of designs	Remnants of the urban-renewal days	Fragmented realization of spatial designs or unfinished designs due to the lack of finance
		Places (deliberately) deprived of a function	Functional use limited by the masterplan
		Place without function	Designing of transit, entry, exit, parking areas, unspecified residual areas
<b>The cycle of urban development</b>	Inherent for all cities, regardless of their context, it is a common, if not inevitable, part of the development of cities as living, constantly evolving organisms	(temporarily) unused objects	Objects and areas stuck between former and new functional use, under the condition that the loss of function did not occur suddenly (in extensive areas) and is not long-term
		Spatial reserves	Vacant land, urban fallows with the potential for development
		Places excluded from construction	Areas unsuitable for development due to terrain configuration or other limitations

## DISCUSSION AND CONCLUSION

Creating a typology of terrain vague and identifying its emergence mechanisms (Tab. 5) is crucial in cities that in a relatively short period of time have experienced many key historical events significantly affecting urban structure development. Such examples are our model towns of Humenné, Strážske and Vranov and Topľou located in eastern Slovakia. After 1948, the socialist industrialization and establishment of chemical factories were the catalyst for economic, demographic and spatial growth. Unfortunately, events after 1989 led to an overall decline with negative effects on urban structure. The negative development led to a population decline placing the model towns into the category of “shrinking towns”.

In this study, we aimed to create a typology of terrain vague and identify emergence mechanisms specific to our historical context. Based on mapped results, we created the typology of terrain vague consisting of 9 types and identified 3 main emergence mechanisms. After identifying too many specific spaces, we decided to merge them into 9 types that provide enough variety for their description. These types are easily identified in every model town. Predictably, 6 out of 9 are related to some type of green space, 2 types represent buildings and developed areas and 1 type represents paved open spaces. Therefore, we can assume that under-maintenance and lack of activities in green spaces are the main issue in model towns. Moreover, the potential of green spaces has not been realized, which leads to a decrease in the quality of life in model towns (Hajduková, Sopiřová, 2022a).

The identified emergence mechanisms are related to the way terrain vague is formed due to a combination of the key socio-economic and political changes, urban planning, and the urban development cycle. By analysing the existing terrain vague, we were able to determine the emergence mechanisms and their subcategories. Subsequently, we defined 3 main emergence mechanisms with 2 to 3 subcategories for each of them. For

every type of terrain vague we identified at least one emergence mechanism, and for some types there is a combination of a few of them.

We can compare our results with research of the city of Prague (Haluzík, Pokorný, Storch, Meduna, Ajvaz, Pauknerová, Buřková, Říha, Sádlo, Juřičková, Gibas, Pokorná, Schmelzová, Epos 275, Lacinová, Šturma, Špoula, Veselý, 2020), which is from geographical, cultural and economic perspective closest to our research. Authors tried to explore the different types of terrain vague within the city of Prague, and while they were able to recognize 6 distinct categories, they did not provide a more detailed typology. Other authors researching terrain vague in Slovak cities did not create such a typology (Moravčíková, Szalay, Haberlandová, Křiřteková, Bočková, 2020; Greřáková, Tabačková, 2020).

The typology can be a basis for further research related to terrain vague potential in model towns, which we partially examined in our previous research (Hajduková, Sopiřová, 2021b; Hajduková, Sopiřová, 2022a; Hajduková, Sopiřová, 2022b). Then, we can formulate strategies for terrain vague redevelopment (recommendations for municipalities) in the context of all small and middle-sized towns in Slovakia that were greatly affected by socialist industrialization. Municipalities of model towns can use the results as a basic document for spatial planning that recognizes the unused areas suitable for redevelopment that may lead to sustainable spatial development.

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