

**MAPPING URBAN SHRINKAGE: SOCIOECONOMIC AND
DEMOGRAPHIC DIMENSIONS OF URBAN CONTRADICTION
IN SMALL TOWNS IN LATVIA**

**PILSĒTU SARUKUMA SOCIĀLI EKONOMISKĀS UN DEMOGRĀFISKĀS
DIMENSIJAS LATVIJAS MAZAJĀS PILSĒTĀS**

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Abstract

Urban shrinkage is a complex phenomenon affecting many regions globally, with small towns in old industrial regions often experiencing the most severe impacts. This study aims to examine the patterns of urban shrinkage in the small towns of Latvia, focusing on socioeconomic and demographic dimensions. We drew on data from the 2000 and 2021 censuses. Employing hierarchical cluster analysis (HCA), we analysed data from 48 small towns in Latvia. Our research revealed distinct geographical differences in urban shrinkage patterns, highlighting the uneven nature of this process across the country. This study unveils two primary clusters of urban shrinkage. The first is characterised by a combination of geographical location and demographic factors, while the second is mainly determined by the socio-economic indicators considered. Our findings reveal that small towns in non-metropolitan regions, particularly the border regions of the country, exhibit higher levels of population decline and worse demographic indicators. This study contributes to the growing body of literature on urban shrinkage by providing a nuanced understanding of its manifestation in the case of Latvia. Our findings have implications for regional development policies in Latvia and underscore the need for tailored strategies to address the challenges caused by urban shrinkage.

Keywords: *urban shrinkage, small towns, socio-demographic change, census, hierarchical cluster analysis*

Introduction

The phenomenon of urban shrinkage has attracted a great deal of public and academic attention over the past decade (Steinfuhrer & Grossmann, 2021). In many parts across Europe and North America, long-term structural economic and

demographic challenges are leading to decline, with urban and rural areas losing inhabitants, jobs, infrastructure and services. Nevertheless, the current state of knowledge regarding these processes remains uncertain, as research on urban shrinkage has thus far focused on large cities (Martinez-Fernandez et al., 2012; Haase et al., 2016; Mallach et al., 2017). Previous studies have addressed the topic of urban shrinkage broadly. Their main emphases highlight three research strands: identifying the causes and consequences of the process (1), characterising trends (2), and discussing policies related to urban shrinkage, (3) (Haase et al. 2017). The second half of the last century was marked by the onset of a prolonged demographic decline in several regions of the world, mainly in the Global North. Demographic change and population decline were influenced by industrial restructuring, economic downturns, and political changes. Despite the consequences of population decline, as well as growing economic and social challenges, urban shrinkage was not initially singled out by scholars and policymakers as a process to be studied and analysed separately (Marjanovic, 2023). However, over the past decade, shrinkage has become a process that is increasingly studied in urban areas of all sizes, as an increasing number of cities, towns and regions around the world face population decline, which has now become a common urban development trend (Bernt, 2019).

The global financial crisis of 2008 and its consequences for economic development and the political system were major turning points in the context of urban shrinkage. The rising social inequality, the associated increase in public discontent, and the rise of populism have been a pressing issue in society, on the political agenda and in academia (Pike et al., 2023). However, these processes are not evenly distributed across regions and populations. Therefore, the term “left-behind places” is now widely used in research to refer to negative demographic, socioeconomic, and political changes (Fiorentino et al., 2024). This concept is often used in urban, rural and regional studies in the Global North to describe the demographic and socioeconomic changes in old industrial regions and rural peripheries affected by austerity measures, globalisation, administrative and economic reforms, and by technological developments (Gormar et al., 2019; Hendrickson et al., 2018). The term “left-behind places” is sometimes employed as a novel descriptor for processes of urban shrinkage, social inequalities, uneven territorial development, and public discontent, as well as development traps

(Dijkstra et al., 2020; De Ruyter et al., 2021; Rodriguez-Pose et al., 2023; Fiorentino et al., 2024).

The classification of urban areas into distinct categories, such as cities and towns, is a complex and multifaceted endeavour. Regardless of the criteria and definitions used to distinguish them, small towns are a widespread type of urban settlements, far outnumbering cities. In the majority of countries, small towns play an integral role in urban systems (Grossmann & Mallach, 2021). In many regions, small towns contain a significant proportion of the overall urban population. Nevertheless, there is a paucity of research on small towns, with the majority of studies concentrating on the influence of globalisation and technological advancement on large cities and urban agglomerations. Nevertheless, the effects of globalisation are becoming increasingly evident in small towns as well (Mayer & Knox, 2010). The sustainability of small towns is inextricably linked to their capacity to adapt to change, cope with crises, and integrate into trends of development and change (Lazzeroni & 2020).

The urban system of Latvia is distinguished by a historically established network of small towns (Krišjāne & 2001) that has been shaped and evolved over an extended period. The network of small towns is constituted by settlements with disparate origins and functions. These include former Hanseatic League market towns that were established during the Livonian period, urban centres in predominantly rural regions that acquired town status in the early 20th century, and mono-industrial towns that came into being when Soviet-era industrialisation and immigration policies were in force (Bērziņš et al., 2018). In Latvia, a substantial body of research has been conducted on the development of small towns, the quality of life in different territorial regions, and the socio-geographical differences between cities (Krišjāne, 1998; Krišjāne, 2001; Šķiņķis & Stankeviča, 1999; Krišjāne, 2005). It is important to note, however, that these studies were conducted a relatively long time ago, around the turn of the century. More recent studies on urban shrinkage have concentrated on the Riga metropolitan region (Akmentiņa, 2017). In the field of social anthropology, the phenomenon of rural shrinkage has been examined in the context of the concept of “emptiness” (Dzenovska, 2012; Cimdiņa & Raubiško, 2012; Dzenovska, 2018). In 2021, the urban system of Latvia was comprised of 76 cities and towns, of which 48 were classified as small towns. It is important to note that the urban system is characterised by a strongly monocentric structure, with the capital city, Riga, having a significantly larger population than all

other urban areas. The objective of this study is to examine the patterns of urban shrinkage in the small towns of Latvia, with a particular focus on the socioeconomic and demographic dimensions and the changes that have occurred over the period since 2000.

Data and methods

The data employed in this study are derived from the 2000 and 2021 censuses. The data sets from both census years were provided by the Central Statistical Bureau of Latvia, thus ensuring the requisite quality and compatibility. The data set comprises highly accurate demographic and socio-economic information. For further insight, 12 distinct demographic, socio-economic, and geographic variables that illustrate the nuances of urban shrinkage in each of Latvia's small towns have been identified and selected for analysis (see Table 1). The variables describing the demographic development, population and employment composition, and human capital of the small towns under study were calculated from the relevant census data. To assess the location and geographical proximity of the small towns, we calculated the distance between them and the capital city of Riga, as well as other major cities located in each of the country's regions.

Table 1. **Variables used for hierarchical cluster analysis**

(authors' calculations based on data from the Central Statistical Bureau of Latvia)

No	Description	Measurement Units	Mean value	
			2000	2021
1	Population	number	3419.5	3000.5
2	Years with decreasing population	number	6.0	9.3
3	Median age	number	37.7	46.2
4	Demographic dependency ratio	number	548.6	626.0
5	Ageing index ¹	number	89.9	167.4
6	Share of ethnic minorities ²	%	25.4	20.5
7	Share of university educated ³	%	9.4	23.2
8	Share of employed ⁴	%	43.0	51.1

No	Description	Measurement Units	Mean value	
			2000	2021
9	Share of managers and professionals among employed ⁵	%	22.7	25.1
10	Share of mobile residents ⁶	%	6.2	6.1
11	Distance to the capital city	km	135.4	
12	Distance to the closest large city	km	32.6	

Notes: ¹the ageing index refers to the number of the elderly aged 65 years and over per 100 individuals younger than 14 years old; ²does not include those who have not indicated their ethnicity; ³among adults aged 18 and over; ⁴among adults aged 15 and over; ⁵among adults aged 15 and over, and based on the International Standard Classification of Occupation (ISCO); ⁶includes international migrants, internal migrants and residential moves.

A review of the mean values and changes over time reveals a clear decline in the overall population, and deterioration in all the selected demographic variables. Moreover, the share of ethnic minority groups has also declined, while the level of population mobility has remained constant. Concurrently, there has been a notable increase in the proportion of residents with a higher level of education. Similarly, improvements are observed in the variable of employment and professional qualifications. In terms of geographical proximity, small towns are distributed across all regions of Latvia, with a number situated in remote areas on the country's frontiers. Consequently, the mean distance to the capital city – the country's largest settlement and economic centre – exceeds 100 km. Conversely, the average distance to another large city is approximately 30 km, although this varies considerably across the regions.

This study employed hierarchical cluster analysis (HCA) to evaluate the clustering patterns of Latvian small towns based on selected variables and to examine the changes. The fundamental premise of cluster analysis is the grouping of objects with shared characteristics into clusters (Cauce et al., 2021). The primary objective is to generate clusters that exhibit internal homogeneity while maintaining heterogeneity between clusters. HCA is a technique used to identify the underlying structure among a set of studied objects. The process commences with each object designated as a discrete cluster, subsequently merging into larger clusters, thereby reducing the total number of

clusters at each stage (Almeida et al., 2007). The process of clustering data objects is contingent upon the information present within the existing dataset, encompassing both the characteristics of the objects themselves and the interrelationships between them. Hierarchical algorithms are particularly useful in the context of small datasets (Cauce et al., 2021). The analysis was conducted using OriginPro 2024b software, employing all 12 variables for 48 Latvian small towns. This methodology and a closely related set of variables have also been employed in other studies examining processes of urban shrinkage in Europe (Ubarevičiene & van Ham, 2017; Banica et al., 2017; Maly et al., 2020; Eva et al., 2021).

Results of the Hierarchical Cluster Analysis (HCA)

The result of the Hierarchical Cluster Analysis (HCA) is a visual representation in the form of a dendrogram, which illustrates the clusters extracted from the selected variables. The HCA is reflected in two dendrograms, which illustrate the conditions of urban shrinkage in 2000 and 2021. Additionally, the dendrograms suggest trends of urban shrinkage over an extended period between these two years. In both the years under examination, the towns are divided into six urban clusters in accordance with the demographic, socio-economic and geographical variables included (see Figure 1). The identified clusters can be distinguished by their size, with two larger clusters (red and blue) comprising the majority of small towns. The red cluster includes 25 small towns, while the blue cluster includes 17 small towns, representing almost all of the small towns in Latvia.

In the 2000 dendrogram, the similarity coefficient of the two most significant clusters, which encompass the majority of small towns, exceeds the 80% threshold, indicating a high degree of similarity. Among the smallest clusters, the one formed by the towns of Aizpute and Lielvarde is of particular interest, exhibiting a similarity of over 60% with the two largest clusters. The dendrogram identifies three additional clusters, each comprising one or two towns. These clusters, which form a distinct group from those described above, exhibit characteristics that are incongruent with the typical attributes of small towns. The towns of Aizkraukle and Sigulda are considered a unified cluster. Additionally, the towns of Olaine and Salaspils are situated within distinct clusters. Salaspils is the most dissimilar town in the cluster group, exhibiting a similarity coefficient of less than 40% with the other towns. The towns of Olaine, Aizkraukle and

Salaspils (to a lesser extent) were mono-industrial towns when they were established during the Soviet era. It seems reasonable to suggest that the aforementioned towns have undergone a process of differentiation, resulting in the emergence of distinct clusters. Nevertheless, in terms of population size and economic development indicators, these towns are larger than the other small towns in Latvia, particularly those located in non-metropolitan regions.

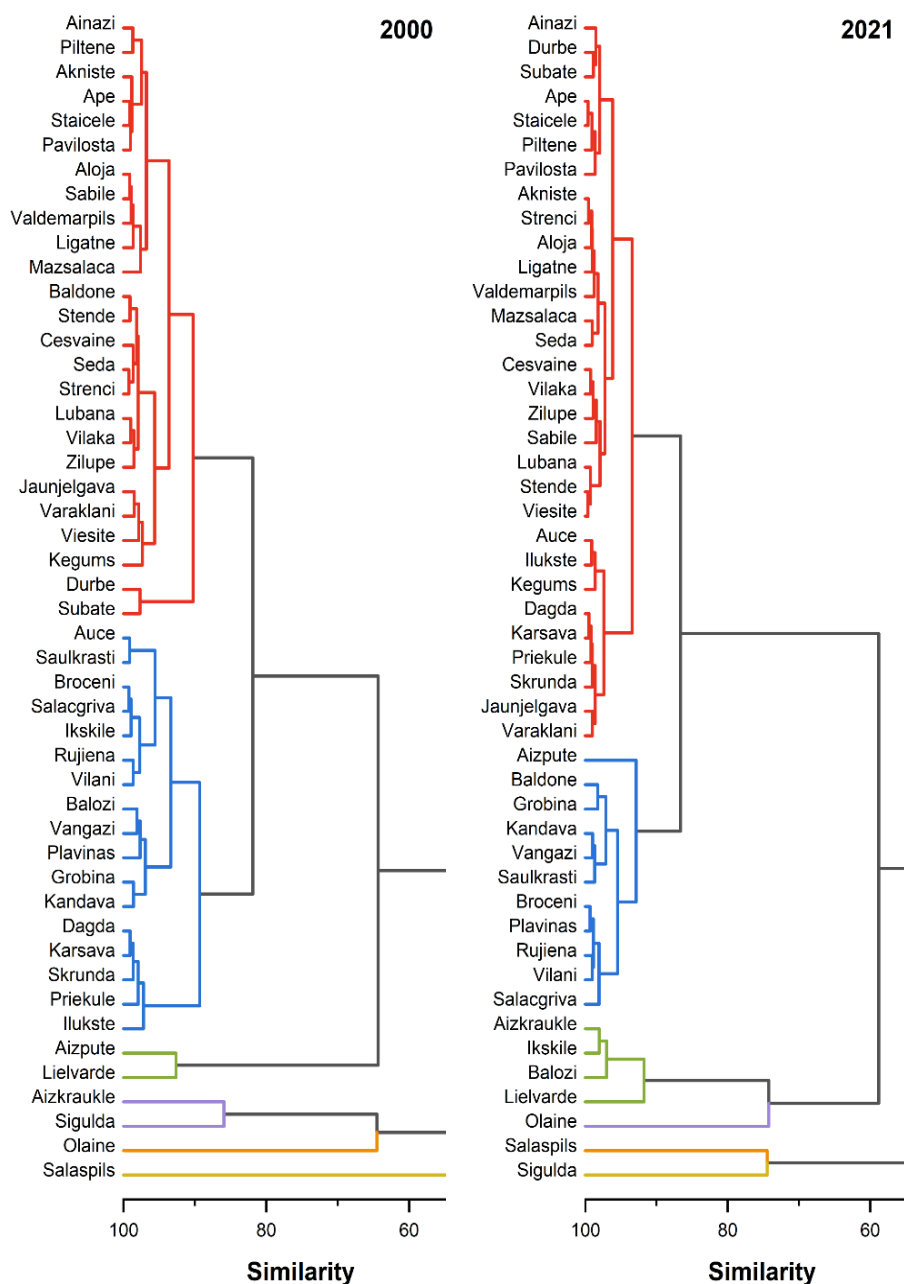


Figure 1. Dendrograms and division of small towns into six clusters (authors' calculations based on data from the Central Statistical Bureau of Latvia)

A review of the 2021 dendrogram reveals that the cluster classification remains largely unchanged, with six distinct groups still evident. Similarly to the dendrogram of 2000, the first and second clusters encompass the majority of Latvia's small towns. In 2021, the first cluster encompassed a greater number of towns than in the year 2000, while the second cluster included a smaller number of towns. The third cluster is comprised of four small towns: Aizkraukle, Ikskile, Balozi and Lielvarde. The aforementioned towns of Olaine, Salaspils and Sigulda form discrete clusters.

The following section will examine the geographical distribution of the small towns. The results for the year 2000 indicate that the majority of small towns in the Vidzeme region are situated within the first cluster. In the Latgale, Zemgale and Kurzeme regions, a mixed distribution was observed between the first and second clusters. The Riga metropolitan region features towns from nearly all the clusters, as illustrated in Figure 2.

In 2021, the Riga metropolitan area continued to exemplify the greatest diversity of clusters of all the regions. As illustrated in Figure 2, the initial two clusters encompass the majority of the small towns. The number of towns belonging to the first two clusters has remained relatively steady between the two years studied, with a slight decline from 42 to 41. The first cluster can be more comprehensively elucidated by demographic variables, including the median age, ageing index, number of years with declining population, and geographical proximity. The second cluster can be more comprehensively elucidated by socio-economic indicators, including the proportion of university graduates, the share of employed individuals, and the proportion of managers and senior professionals. A comparison of the two dendrograms reveals a notable decline in the number of towns that can be distinguished as separate clusters or groups. These towns exhibit a distinct divergence from the typical characteristics observed in the majority of small towns, which tend to demonstrate a higher degree of clustering. In the year 2000, there were only two towns of this description; by 2021, however, the number had grown to three distinct towns. The most effective method to illustrate this phenomenon is by examining the values of the similarity coefficient for the town of Salaspils in comparison to the other towns. The cluster group that demonstrates the most notable divergence from the primary cluster group in both years encompasses the towns of Sigulda and Salaspils. In contrast, the socio-demographic indicators of the cities of Aizkraukle and Olaine have become increasingly aligned with those of the initial two

clusters. In light of these observations, it can be posited that the socio-demographic situation has become increasingly homogeneous across the majority of the towns over time, as evidenced by the expansion of the first cluster.

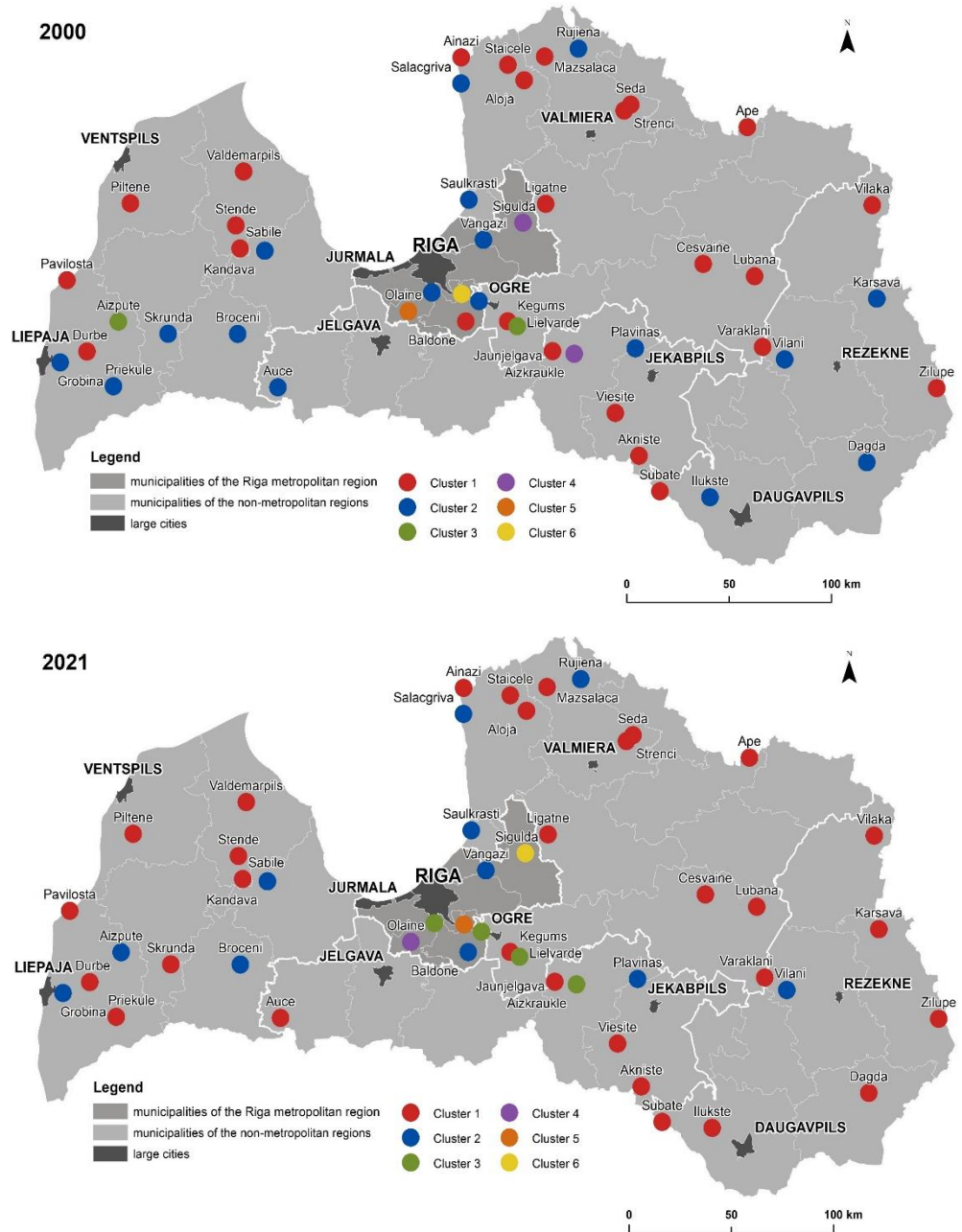


Figure 2. The geography of the small towns representing the different clusters (authors' calculations based on data from the Central Statistical Bureau of Latvia)

Conclusion

The population of Latvia's small towns experienced a persistent decline between the years 2000 and 2021. In comparison to other urban areas with larger populations, small towns in Latvia tend to exhibit more unfavourable demographic development. Several demographic variables characterise Latvia's small towns, including negative net migration, a higher median age than the national average, a high demographic burden, and an elevated ageing index compared to the national scale. Conversely, the proportion of the population with higher education has increased, while the proportion of ethnic minorities has decreased in all small towns since the year 2000. However, both indicators illustrate significant discrepancies between the towns included in the analysis. Some of the urban areas, which are predominantly former mono-industrial towns with a history of industrial decline, continue to exhibit a relatively high proportion of ethnic minorities.

A comparative analysis of socio-demographic variables reveals that the majority of small towns in the Riga metropolitan area exhibit distinctive characteristics when compared to other small towns in non-metropolitan regions. These include a higher rate of population growth, positive net migration, a shorter period of population decline, a higher share of employed persons, and a higher proportion of well-educated individuals. The study employed a hierarchical cluster analysis (HCA), which yielded the emergence of two urban clusters. These clusters encompass the majority (42 out of 48) of small towns. The first urban cluster is attributed to demographic characteristics and geographic proximity to the capital city, Riga, and other major cities. The second cluster of small towns is primarily attributable to the socio-economic indicators utilised in the study. In both years, at the beginning and at the end of the period spanning 2000 to 2021, neither of the two clusters included any of the small towns. Two medium-sized mono-industrial towns, Aizkraukle and Olaine, form another cluster due to their distinct demographic and socio-economic characteristics. Similarly, other towns, such as Salaspils and Sigulda in the Riga metropolitan region, have exhibited a persistent divergence from the rest of Latvia's small towns over the course of the period under review. This study demonstrates that small towns situated outside the Riga metropolitan region, and particularly those located in the frontier areas to the north, east and south, are experiencing more pronounced urban shrinkage as a consequence of unfavourable demographic trends.

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Kopsavilkums

Pilsētu sarukšana ir sarežģīta parādība un ietekmē reģionus daudzviet pasaulē, bet vissmagāk skar mazās pilsētas agrākajos rūpnieciskajos reģionos. Pētījuma mērķis ir analizēt pilsētu sarukšanas ģeogrāfiskās likumsakarības Latvijas mazajās pilsētās, koncentrējoties uz sociāli ekonomisko un demogrāfisko rādītāju izpēti. Darbā izmantoti 2000. un 2021. gada tautas skaitīšanas dati. Pielietojot hierarhisko klasteru analīzi (HCA), pētījumā aplūkotas 48 Latvijas mazo pilsētu sociāli demogrāfiskās attīstības tendences. Pētījums atklāj ģeogrāfiskās atšķirības pilsētu sarukšanā, uzsverot šī procesa nevienmērīgo raksturu valsts reģionos. Veiktā analīze atklāj divus galvenos pilsētu sarukšanas klasterus. Pirmo raksturo ģeogrāfiskā novietojuma un demogrāfisko faktoru kombinācija, bet otro galvenokārt nosaka aplūkotie sociāli ekonomiskie rādītāji. Pētījumā noskaidrots, ka mazās pilsētas ārpus Rīgas metropoles reģiona, bet jo īpaši valsts pierobežā, nelabvēlīgas demogrāfiskās attīstības rezultātā sarūk straujāk. Darbā aplūkotais mazo pilsētu piemērs papildina līdz šim veiktos pētījumus par pilsētu sarukšanas procesiem. Pētījuma secinājumi ir noderīgi, meklējot risinājumus reģionālās attīstības politiku izaicinājumiem Latvijā.

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