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Article

Suburban Sustainability in Budapest Agglomeration – The Case of Törökbálint

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Abstract: The rapid growth of the metropolitan area around Budapest has led to increased traffic, infrastructure problems, and social and economic issues in the suburbs, making the sustainability of these areas a key topic in professional and public discussions. The article aims to explore the intricacies of sustainability in a suburban town by utilizing the Smart Growth framework, which is highly pertinent in Hungary. The focus of scientific and public discussions revolves around urban planning to curb urban sprawl and enhance public transportation usage. The analysis concentrates on compactness, commute, and community, utilizing quantitative survey data between 2018 and 2023. The findings demonstrate that the town under analysis is dense regarding common and regular services but depends significantly on the central area for more specialized services. The local community is tightly interconnected and shows no evidence of atomization. Commuting patterns show that polycentricity leads to new spatial connections and a growing reliance on cars, even while the quantity of vehicles is still growing. The results indicate that assessing the sustainability of suburbs may not be universally applicable, and examination should be conducted at the town level. Secondly, the sustainability of suburban areas may be distinct from the sustainability of denser, urbanized places.

Keywords: suburbanization; polycentricity; sustainability; commuting; Central Europe; Budapest; community

1. Introduction

The sustainability of suburban development in the vicinity of Budapest, Hungary, and the impact of these suburbs on the overall sustainability of the Hungarian capital have been the subject of vigorous discussions among professionals and in the public media in Hungary recently. Most disputes focus on the adverse effects of commuting and urban sprawl and the inadequacy of infrastructure in the expanding urbanized region.

This paper does not aim to describe and examine the overall sustainability condition of suburban Budapest. The expanse of the suburban area surrounding Budapest is extensive and intricate, and addressing the issue of suburban sustainability is multifarious, making any endeavor to do so overwhelming and pointless. Instead, our focus will be on the town of Törökbálint. We will use high-resolution source data and apply the Smart Growth Theory, a specialized theoretical framework related to New Urbanism and Transit-Oriented Development. Our analysis focuses on a clearly defined set of sustainability factors, namely compactness, commuting, and community, and how they have developed, changed, and are understood. Our attention is directed towards the adverse effects of spatial sprawl, which include the significant migration of people to the outskirts, inadequate infrastructure in newly developed suburbs, and the resulting traffic problems. These issues are currently considered the most pressing challenges urban areas in Hungary face. Our study enhances scientific understanding and policy responses by providing a more comprehensive and tailored approach.

We selected a single-unit, focused, in-depth longitudinal case study as our research technique because this offers a unique, critical, and revelatory understanding [1] (pp. 39-43) of the specifics of the suburbanization process around Budapest. We chose the town of Törökbálint as a unique example where suburbanization occurred quickly following the shift of the transition to a market economy in 1989. The massive and sudden influx of a wealthier population and significant new housing and infrastructural projects marked the period after 1989. An extensive examination of this town enables a clear grasp of local intricacies, specific context, and details, offering depth, enhanced insights, and a deeper comprehension of the subtle patterns, relationships, and underlying mechanisms [1] (p. 40). Conversely, it is essential to exercise caution when drawing general inferences based on a specific locale, such as Törökbálint, as it is not a typical or representative example. Exploring a "typical" suburb in Budapest is intriguing because of the noticeable socio-economic and historical disparities observed throughout the several towns and villages comprising the suburban area, including those near one other.

Nevertheless, the single-unit case study method allows for identifying and analyzing intricate features of phenomena and processes that would otherwise be overlooked in a less thorough examination. This method is beneficial for testing the Smart Growth Theory and its suitability.

2. Aspects of Sustainability of Suburbs

Concerns regarding the sustainability of suburbs emerged relatively recently. Throughout history, city residents have appreciated having a country residence to enjoy the benefits of both urban and rural environments. This allowed them to experience the pleasures of the surrounding areas and provided a refuge from urban hardships and pandemics [2] (pp. 483-487). For many years following the significant suburbanization that began in the latter part of the 19th century, residing in spacious and comfortable homes in less crowded places further away from the noisy and dirty central neighborhoods was considered a way to make privileges once exclusive to the aristocrats more accessible to the general population [3]. The primary reasons for suburbanites were not related to being close to nature or wanting a garden or yard, but rather the yearning for a 'cleaner, healthier neighborhood' [2] (p. 487). During the late 19th and early 20th centuries, suburbanization was seen as a viable, essential, and recommended solution to alleviate the problems caused by extensive urbanization in significant cities [2,3].

The first significant criticism of suburbs targeted the bourgeois boredom and blandness [4] and aesthetical uniformity, monotony, and ugliness [2], where people moved for cheap and spacious housing, good schools, and convenient shopping [5]. The chaotic urban sprawl, especially in larger cities, was considered incomprehensible, where endless rows of subdivisions eradicated nature, one of the prime reasons people moved to suburbs [3]. With the advent of ubiquitous car usage and the appearance of lower-density residential areas in the suburbs, neighborhoods disappeared as organizing factors of community and social integration. Scientific appreciation of such developments suddenly turned negative as they represented the antithesis of cities [2] (pp. 509-511). The automobile was the culprit that converted not just the appealing suburbs into dreadful ones but also transformed and eradicated traditional cities into grotesque, Los Angeles-type mazes [3,6]. More fundamental environmental concerns started to appear in the 1960s as negative consequences of increased traffic, shrinking green areas, rising soil and water pollution, and disappearing flora and fauna were realized, together with the appreciation of green regions and parks [4,7].

Nonetheless, most critical approaches evaded aspects of sustainability. Their assessment concentrated on social homogeneity, exclusion and social isolation, conformity, alienation and loss of community, female subjugation, and excessive mobility. Until recently, they construed massive suburbanization as an expression of greedy capitalism [8] (pp. 291-320). Phillips' influential work on cities and suburbia, first published in 1981, briefly touches on environmental issues but does not explicitly address sustainability [9].

In the late 1980s, new scientific investigations into the relationship between natural and urban environments emerged alongside the growth of green social movements. The differentiation between ecocentric and anthropocentric views towards the environment was established [10,11] and then

extended to green areas [12] and to urban planning [13]. This led to the *New Ecological* and *Human Exemptionalism* paradigms, respectively [14]. Glaeser contends in his influential book [15] that urban living is more environmentally friendly than suburban living due to the increased need for travel and commuting in sparsely populated areas and the higher energy consumption and land use associated with large detached houses. He also discusses why individuals from various social backgrounds are drawn to suburban living and the potential conflicts that strict environmental policies could create.

In recent scientific examinations, several frameworks to incorporate all the environmental, social, and economic factors have been elaborated to study sustainability in the suburbs. They reflect specific aspects and cover different areas in their analysis. Based on ecocentric principles, the *Urban Ecology Framework* zeroed in on the interactions between human activities and the natural environment within the context of built-up areas [16–18]. The suburbs are examined for their effects on the natural environment and ecosystems due to the spread of urbanized areas, the growth of road infrastructure and other amenities, and the increase in human activities [19,20]. This method highlights the constraints on human advancement and economic expansion. The emerging *Urban Political Ecology* paradigm aims to bridge the gap between ecocentrism and anthropocentrism by viewing urban and natural environments as interconnected and inseparable. It examines suburbanization as a form of urbanization of nature, treating urban and suburban areas as part of the same ecosystem rather than distinct entities in general, and it does not prioritize one as more sustainable *per se* over the other, in particular [21] (pp. 151-153).

Founded on anthropocentric principles but with sensitivity to ecological arguments, *Resilience Theory* generally focuses on exploring the urban systems to absorb shocks, their capacity to adapt to changes and disturbances, and to maintain functionality and identity [22–26]. When applied to suburbs, it focuses on how suburban areas may be adjusted to changing societal and economic circumstances [27,28], disasters [29,30], climate change [31–33], and warfare [34,35].

Approaches belonging to the *Smart Growth Framework* and *New Urbanism* are also based on anthropocentric principles but emphasize compact, mixed-use development focusing on public transit, walkability, and community development to contain urban sprawl [36–41]. Analyses under this framework had primarily concentrated on suburbs before extending their methods to inner urban regions [42,43] or inner suburbs [44,45]. They accentuate reducing urban sprawl, increasing the share of public transportation utilization while decreasing vehicle dependency, and developing walkable, pedestrian-friendly neighborhoods. They advocate for densification at public transportation hubs and the building of compact, multifunctional areas that include integrated residential, recreational, entertainment, and commercial spaces. In addition to physical characteristics, they strongly emphasize community development, social cohesion, and reducing environmental impacts to promote sustainability in suburban living [46,47].

This article utilizes the Smart Growth Framework to examine suburban sustainability in a town within the inner Budapest Metropolitan Region (Hungary) while recognizing the validity and benefits of other approaches. Numerous assessments focus on the planning angle: how sustainability concepts are implemented [48] through a top-down approach. As social scientists, we study the attitudes and behaviors of people that support, change, or hinder initiatives, shaping their social context. We will thoroughly examine three C aspects: community, compactness, and commuting. The critical elements of the Smart Growth Framework can be discussed in detail from a bottom-up approach. We analyze the social processes that shape the environments and limitations of planning and policy operations.

Community is defined as residing in a specific residential area with shared facilities, mutual interests, and a feeling of inclusion. It fosters collaboration among people and social interactions, which are crucial for the well-being of a thriving local society. Suburbanization diminishes social cohesion and decreases the sense of community and social capital. More connected communities tend to be more effective in implementing Smart Growth concepts, including compactness, increased use of public transportation for commuting, mixed housing, walkability, downtown developments, and environmental preservation [49].

Urban sprawl converts undeveloped green spaces into paved residential, commercial, and transportation zones, leading to heat islands and elevated air pollution levels due to the rise in vehicle traffic. *Compactness*, that is, a higher density of built-up areas and mixed-use of various functions in walkable street settings, reduces car dependency, enhances community connections, and decreases the need for new constructions on undeveloped land [40].

Commuting, the regular travel between one's home and work, school, or other destinations usually located in a distant center or subcenter in a suburban setting, plays a crucial role in sustainable development by influencing land use, the environment, transportation systems, and community welfare. Effective commuting plans prevent urban sprawl and decrease reliance on vehicles by encouraging compact, mixed-use development and offering many transit options [50].

Despite attempts to create mixed-use complexes, commuting may persist due to economic factors such as agglomeration and cluster effects that centralize job opportunities and services in metropolitan centers or subcenters. Transit-Oriented Development (TOD) promotes densification near public transportation nodes [51] to reduce commuting strain and decrease reliance on cars [52]. This involves integrating housing, employment, and services into mixed-use complexes [53]. Various forms of rail transit, including standard and light rail, suburban train, subway, and tram, are essential due to their high capacity, resilience to disruptions, and autonomy from road systems. The optimal place for promoting sustainability is near the rail transit hub [54,55]. Artificial intelligence technology, when combined with other methods, provides practical approaches to improve the sustainability of urban areas while maintaining their appeal for businesses and residents globally [56]. Recent European urban development projects have adhered to Transit-Oriented Development concepts. The Budapest metropolitan area has ambitious plans that include TOD components, as outlined in government decisions [57,58].

Critiques of the Smart Growth Theory focus on the possible adverse effects of suburban densification, the development of compact mixed-use areas, and the propagation of public transportation on local communities and vulnerable social groups. Lower-income residents may face challenges to remain due to the increasing housing and retail prices resulting from the influx of more urbanites and more affluent people to the newly densified areas as a form of gentrification [59]. Evolved in a sparsely built, rural environment, the local community may observe densification as a threat to their original way of life: original residents, already menaced by the rapid changes, may express concerns about the further loss of authentic character, while earlier suburbanites perceive it as obliterating the allure and charm that led them to relocate to the area [60,61]. An alternative set of criticisms posits that establishing mixed-use, compact, and densely populated suburban neighborhoods could potentially lead to an escalation in traffic congestion and local air pollution levels [60]. Public transit improvements enhance accessibility and promote further urban sprawl, thus contributing to converting more agricultural land and natural habitat to urbanized areas [62]. The preference for public transportation as the dominant means of commuting may also have adverse effects. Cars may be the most effective modes for many, and employees of lower social status may rely more on personal vehicle usage to access a larger supply of jobs, thus enhancing their bargaining power and, consequently, their income in the post-Fordist economic regional settings [60,61,63].

We selected the Smart Growth Framework because it is relevant to Hungary's most intense policy and urban development discussions and applicable to a broader global audience. We will consider additional frameworks in the debate, specifically the Urban Political Ecology Paradigm and Transit-Oriented Development.

3. Suburban Growth in the Budapest Metropolitan Region and Törökbálint

The suburbanization and urban sprawl around Budapest have been extensively examined in the recent scientific literature using a range of qualitative and quantitative methods across various disciplines. These studies cover a wide range of topics from general ones [64–69] to concerning specific aspects, such as spatial decentralization [70], compactness [71], socio-economic segregation [72], power relations [73], regional planning [74], suburban creativity [61,75], suburban communities [76,77], suburban peripheries [78], post-Fordist polycentric spatial structure [79], effects of COVID

[80], and inner-peripheral [81] and ecological [82,83] sustainability. Only the crucial characteristics needed for comprehending the subsequent analyses will be outlined according to recent accounts [61,69].

3.1. General Patterns of Urban Sprawl

Urban sprawl and suburbanization have been ongoing spatial processes impacting regions around Budapest since the late 19th century. Initially, migration from rural areas to less desirable eastern outskirts coincided with relocating industrial and economic activities to these areas. This trend was partially altered in the early 20th century as wealthier social groups began moving outward to the more desirable western hilly areas. During the interwar period, there was an increased suburbanization trend among the middle class, which expanded to more extensive areas due to the rapid growth of the transit network, particularly tram and train lines [69,84].

During the socialist period from 1948 to 1989, fundamental development elements remained, but significant radical changes also occurred. Throughout the period, Budapest remained monocentric and saw population growth. In 1950, the increase in city limits resulted in suburbs losing their capacity to develop into viable subcenters due to communist urban planning and limited resources. Suburban towns and villages outside the city limits were deliberately left undeveloped, requiring additional essential services and facilities. Urban sprawl and suburbanization primarily impacted the outskirts of the metropolis. Simultaneously, it caused a temporary suburbanization effect with the emergence of weekend homes and garden plots on the outskirts. The dynamics mentioned above led to the development of a suburban area within the city borders that was poorly maintained had low status and was relatively homogenous. Only individuals who were unable to move further inward relocated to that area [61] (pp. 202-203).

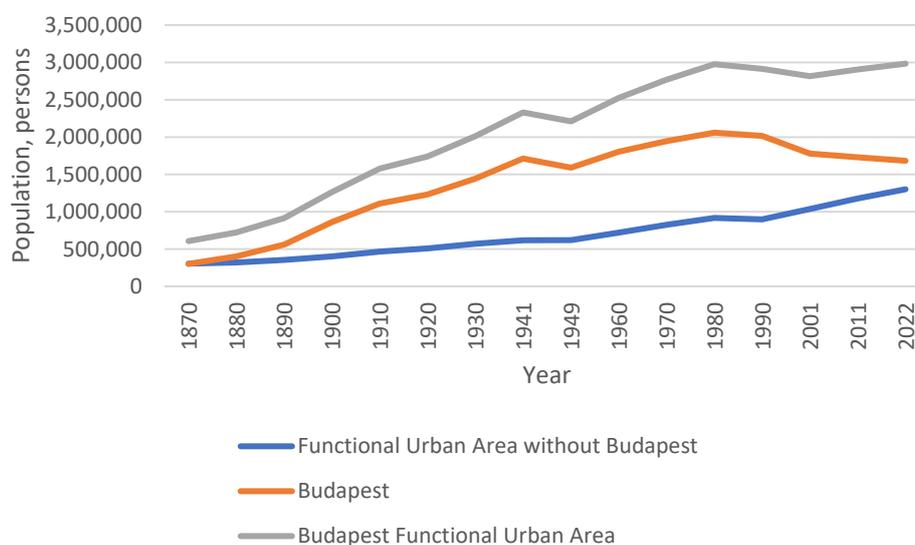


Figure 1. Population growth of the Budapest Functional Area, or the inner Metropolitan Area, between 1870 and 2022. Source: Central Statistical Office of Hungary.

The shift to a market economy in 1989 was gradual yet fundamentally altered the scene. Central control significantly decreased, allowing towns to have a high level of independence in decision-making, though to a lesser extent financially. Most of the economy was privatized, and agricultural land was frequently returned to its pre-socialism owners. Budapest was previously a magnet for migrants from rural regions and beyond, but the current tendency has shifted towards the suburbs. The sudden elimination of centralized restrictions on settlements and local independence led to the swift growth of infrastructure and services. Agricultural lands of low value in advantageous areas were promptly reclassified as building plots, opening up opportunities for extensive housing developments. Deficiencies, economic troubles, and social polarization on one side of the city led to

a significant portion of the population moving towards the expanding outskirts, causing a 'suburban revolution' [61] (p. 204). Wealthier individuals moved to the western, northern, and northeastern hilly suburban areas, while those with lower income settled in the southern and southeastern geographically flat outskirts (see Figure 2). Municipalities and private developers released large residential plots in formerly agricultural lands to generate revenue and purchasing power for further local development and services. Many wealthy families with many children moved into towns and villages that originally had older, lower-status populations, causing specific challenges [77]. Simultaneously, the influx of impoverished city dwellers led to conflicts in less privileged areas [85].

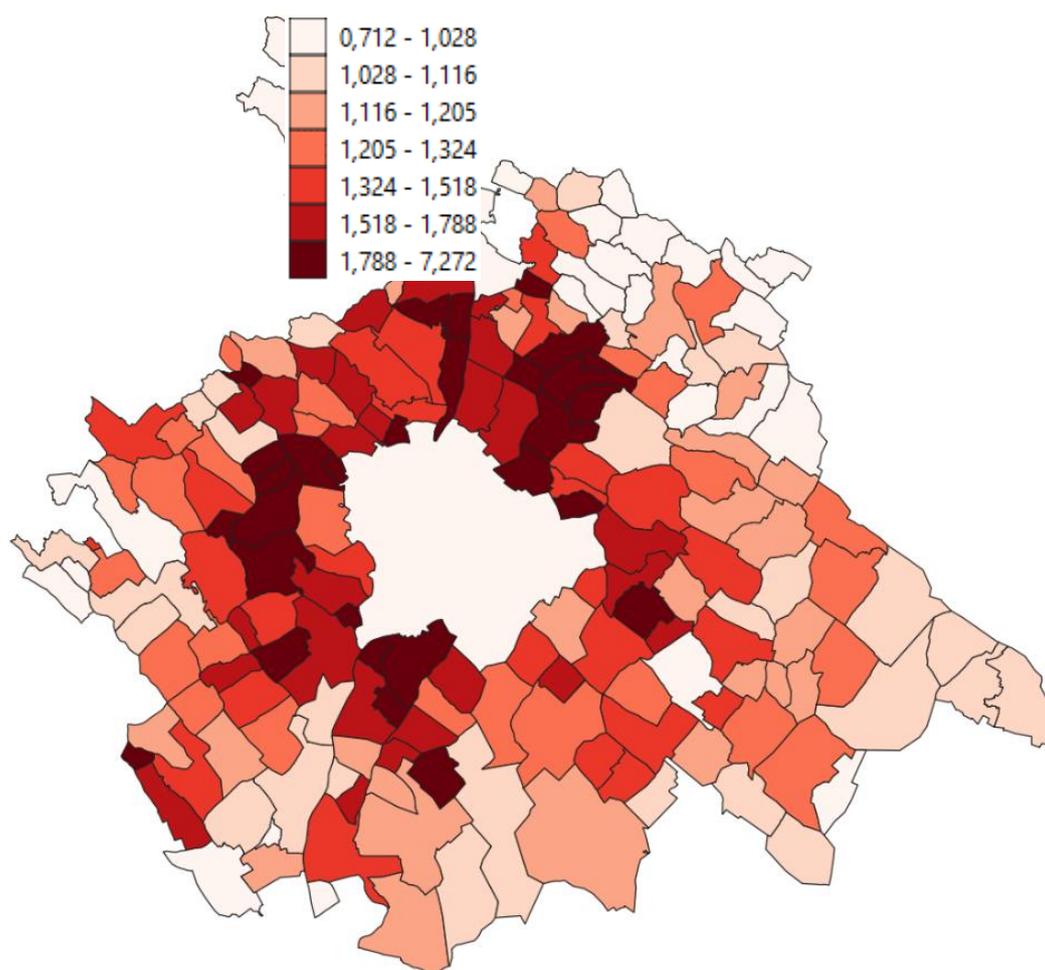


Figure 2. The ratio of population changes in the settlements of the inner Budapest Metropolitan Area between 1990 and 2021. Source: Hétfa [86].

The abovementioned shifts aligned with the transition to a post-Fordist economy, which became noticeable in the late 1990s. A wider variety of economic and commercial activities emerged in specific regions, transforming primarily residential areas and towns into subcenters with a significant need for employment, altering lifestyles and the appearance of the suburban regions both within [70,71] and outside the city boundaries [61] (pp. 205-206). Economic activities attracting employees of different social strata appeared, resulting in the influx of lower-status people to the emerging subcenters, either as daily commuting or moving-in. The primary center, the inner areas of Budapest, retains the best-paid jobs, so commuting to the center remained dominant among the wealthy. To avoid the stress of commuting and ease managing the family, one of the spouses in more affluent families often gives up the well-paid job in the center and opts for a part-time one near the residence, often in an innovative position. Therefore, the massive appearance of creative people rearranges the lifestyle of the communities with new services, community events, and other phenomena [61]. Despite being physically close to the growing subcenters, other towns and villages require

development to improve their residential status and services. Employees in these areas mainly depend on commuting to the capital or the new subcenters [69].

Rapid suburbanization and urban sprawl have impacted environmental sustainability in numerous ways. Besides shrinking animal habitats, the expansion of paved areas has resulted in more extreme weather patterns, the appearance of heat islands in the summer, and flash flooding. The rise in vehicle usage, resulting from commuting and freight traffic, the latter associated with the expanding subcenters, has led to an escalation in air and water pollution and noise levels.

The process of suburbanization had a varied impact on social cohesion. Communities characterized by robust social bonds and a strong sense of collective identity tended to be more effective in maintaining vitality and cohesiveness. On the other hand, many towns and villages, particularly those that were artificially enlarged during the socialist era or had a decline in their educated strata, currently experience a higher degree of social fragmentation and alienation. High commuting and inadequate local services negatively affect local social cohesion as contacts and bonds are made outside the community, and services are used near work or school. However, it is challenging to make broad assertions because various historical, geographic, and socio-economic factors influence the state of local communities [87].

Furthermore, suburbanization frequently leads to inefficient land utilization, increased infrastructure expenses, and decreased economic efficiency as sprawling development spreads out amenities and services, reducing accessibility and increasing dependency on private vehicles for transportation. The demand for social infrastructure, particularly schools and kindergartens, exceeds their capacity. The water pipes, sewerage, and roadways must be more sufficient to meet the growing demand in the developing urbanized region.

3.2. Area of the Case Study

Törökbálint is a town with an autonomous municipality and urban rights located 12.5 kilometers southwest of the center of Budapest, sharing a city limit with the Hungarian capital. The town is easily accessible by car as it is well connected to major motorways M0, M1, and M7, which run through or close to the town. However, these roads have minimal impact on the urbanized portions of the town geographically. Public transit is well-established with a train station; however, buses are the primary mode of mobility. Frequency of bus services recently improved and lines were rearranged to reflect changes in usage. The train station is located near the M1 motorway in an industrial area in the northeastern part of the city with poor connections to residential areas. Therefore, despite the frequent service, train ridership is low. The town is connected to the nearest underground rail terminus, 8.7 kilometers or fifteen minutes away, by frequent bus services.

It is part of a town trio that constitutes the highly developed subcenter within the inner Budapest Metropolitan Area, hosting significant office, commercial, and logistic activities. Budaörs, a neighboring town, hosts an important commercial center in Hungary due to the affluent population in nearby areas of Budapest. Törökbálint also features significant shopping centers on its outskirts, located along the M0 and M1 motorways, attracting a diverse clientele from a larger region.

Törökbálint provides a distinctive chance to explore the three C dimensions of sustainability. It has had tremendous development after shifting to a market economy, accompanied by a significant influx of high-status immigrants dramatically altering previously developed neighborhoods. It has also seen extensive agricultural grounds transformed into construction sites, resulting in low-density dwellings. Nevertheless, it has maintained a robust local community and identity. The city is located in close proximity to the capital, which significantly influences the local society and service network. However, it is also remote enough to maintain its distinctiveness and character. Vigorous economic activity contributes to a stable financial foundation for municipal growth, resulting in outstanding infrastructure supply [61].

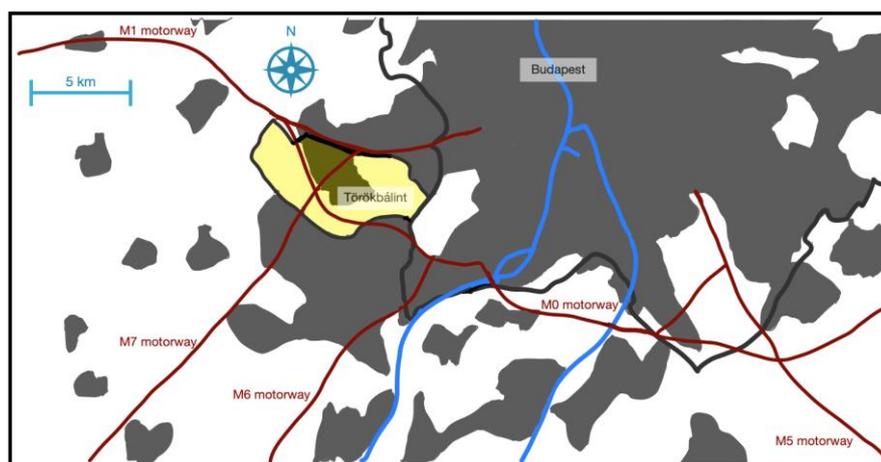


Figure 3. The urbanized areas of the inner southwestern Budapest agglomeration and the location of Törökbálint colored in yellow. Map drawn by the authors.

The town covers 29.5 square kilometers, with 8.9 square kilometers designated as the urbanized area. Along the M0 and M1 motorways, the northern and western sections have predominantly industrial, commercial, or service functions. Due to historical factors, the town center, which includes the Catholic church, town hall, and cultural center, is at the southernmost point of the urbanized area. It is surrounded by hills in two directions, limiting expansion towards the northern and northeastern areas only. At the end of 2022, the area's population was 14,741, living in 5,244 housing units. The housing supply primarily comprises detached houses, with a few semi-detached and terraced buildings available. The average population density is 1,656 individuals per square kilometer, falling between the average in the United States (1,050) and in Western Europe (2,400) [88].

The population of the area has been steadily increasing, with a growth of 50% from 1990 to 2022, as shown in Figure 4. In the 1960s and 1970s, most migrants were lower-skilled workers, but currently, most are higher-status migrants [77]. The town displays spatial and social heterogeneity due to significant gentrification in the original rural core areas and intricate social development in the neighborhoods built throughout the 1960s and 1970s. Geographically and artistically isolated, the northeastern suburb, established in the mid-1990s, is considered one of the most prestigious areas in Hungary.

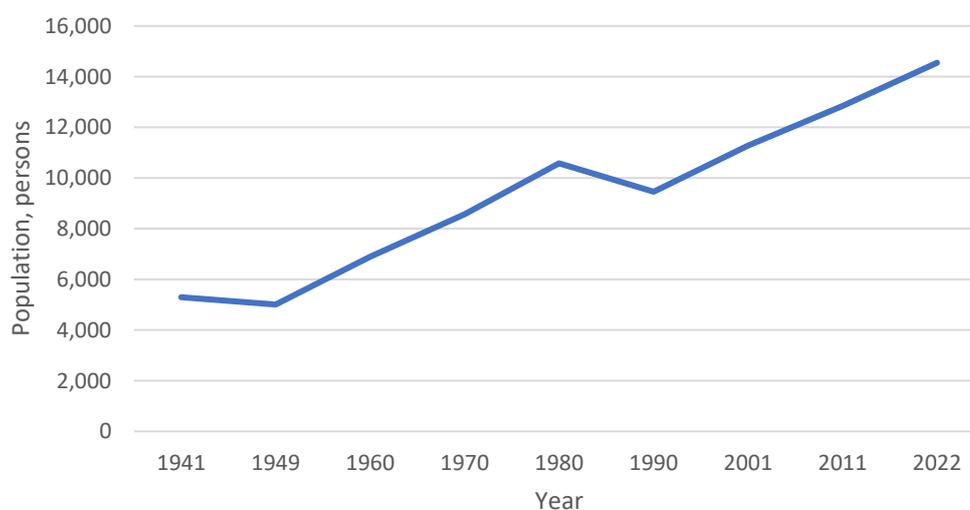


Figure 4. Population growth of Törökbálint between 1941 and 2022. Source: Central Statistical Office of Hungary.

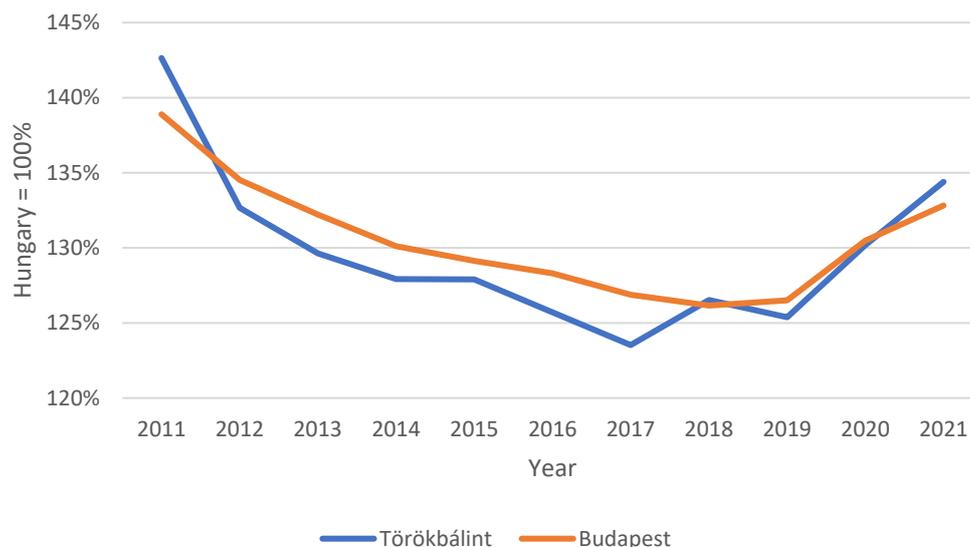


Figure 5. Average gross income per head in Törökbálint and Budapest compared to Hungary between 2011 and 2021. Source: Central Statistical Office of Hungary.

The town boasts one of the most educated populations in Hungary outside of Budapest, with a high average income. The average age is low because of the arrival of many young families with many children. Unemployment is low, and the labor force participation rate is high. The historic core is located on the southern fringe of the town, while the main residential districts are situated to the north and northeast. The south and southeastern edges are sparsely populated areas with limited services and accessibility. These regions were formerly allotment gardens established during the socialist era. [61].

The amenities and public services are high-quality, including well-known educational and athletic facilities. Conversely, the main streets do not have metropolitan amenities, stores, or recreational options. Shopping is primarily done at neighboring shopping malls and major food chains.

An essential aspect of sustainability discussions is the specific attributes of car usage, revealing a somewhat surprising scenario. Car penetration in some regions of Hungary may be challenging to measure accurately due to the use of company cars by high-ranking employees for personal use, which are registered to the company's location. The growing number of children in the area may also impact the results. However, the overall trend is clear. In Törökbálint, the number of cars increased from 448 in 2011 to 489 in 2022, while in Hungary, it rose from 299 in 2011 to 426 in 2022. Thus, the relative car penetration is decreasing despite the national average showing significant growth (Figure 6). Despite this growth, these figures remain relatively low compared to other European Union countries.

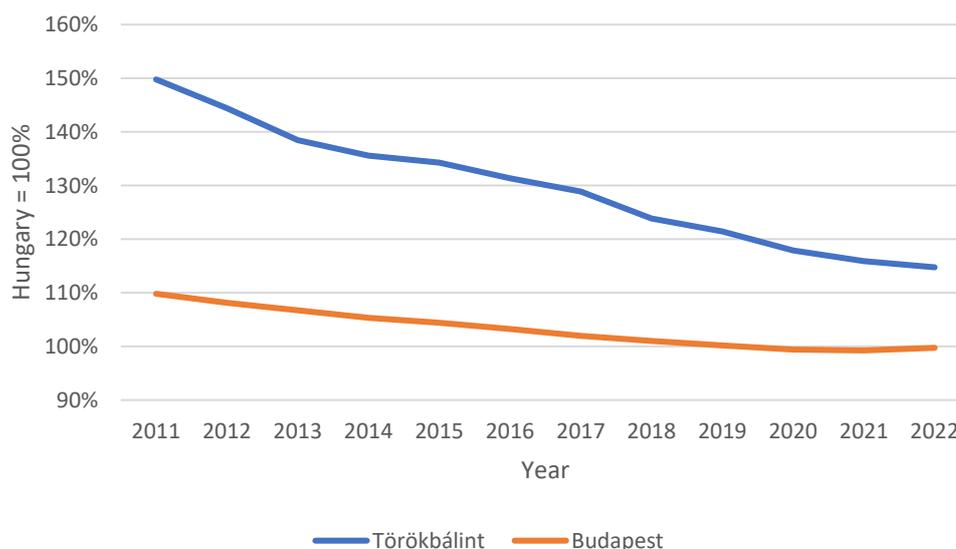


Figure 6. Car penetration in Törökbálint and Budapest compared to Hungary between 2011 and 2022.
Source: Central Statistical Office of Hungary.

4. Materials and Methods

We utilized primary databases from a single town in the suburban area of Budapest to assess and comprehensively examine sustainability in the suburbs. This investigation may require a comprehensive grasp of the situation across the entire Budapest suburban area. Due to its intricate socio-economic and geographical characteristics and extensive scale, creating broad statements would be difficult. Such efforts could oversimplify the situation and trends, leading to superficial arguments that, while backed by data in general, might be inaccurate or misleading in specific locations.

For the analysis, we use a large pool of survey data gathered in two major waves, 2018 and 2023. The questionnaire survey was conducted using probability sampling, ensuring high reliability. During the first wave in May 2018, a survey with a sample size of 1002 respondents was performed that represented the town's adult population by gender, age, and neighborhood with a margin of error of $\pm 3.1\%$ at a 95% confidence level. The 2023 wave consisted of a survey in June and July. The sample size of the survey was 705 respondents representing the town's adult population by gender, age, and municipal constituency with a margin of error of $\pm 4\%$ at a 95% confidence level. In 2018 and 2023, the same questionnaire consisted of 43 questions. The survey questionnaires were interviewed in person, and respondents were chosen using random walk sampling [89] to evade uncertainties and deficiencies in the population register and enhance territorial representativity. To supplement the random walk sampling within the household, respondent selection was based on the Leslie Kish grid [90].

The period of five years between the two waves allows a limited longitudinal comparison, but the circumstances during the waves were significantly dissimilar. In 2018, Hungary experienced steady, relatively meaningful economic growth and a rise in living standards for five years with a positive outlook. In contrast, the pandemic between early 2020 and early 2022, the war in Ukraine from February 2022, and the resulting economic hardships, falling living standards, and rising inflation rates significantly altered people's attitudes, capabilities, and behavior. Therefore, the databases gathered during the two research waves enable the scrutiny of attitudes, behavior, and phenomena and test hypotheses under different economic situations in the same locality.

The research was requested and financed by the Municipality of Törökbálint. The authors participated in the compilation of the questionnaires, the development of the sampling methods of the two surveys, and the primary analysis of the databases of both research waves within formalized contracts with the Municipality of Törökbálint. The host of the databases, the Mayor of Törökbálint,

granted access for the authors of this article to perform scientific analyses on the databases and publish results together with processed data but reserves its right to restrict the availability of the primary data, especially regarding the transcripts of the focus group interviews and the raw survey data files.

The municipality commissioned the questionnaire to assess overall satisfaction with the municipality, including satisfaction with services, environmental quality, and the local community and events, to identify gaps and problems and to prioritize possible ways for future development. However, it was made clear when designing the questionnaire that it would be used for academic purposes primarily to study suburban development, and the set of questions was designed to satisfy both purposes fully.

The research included a qualitative component, consisting of interviews with key actors and decision-makers in the municipality and focus group interviews (5) with heads of public institutions, NGO leaders, and entrepreneurs to interpret the questionnaire results and get an insight into some specific aspects. Due to the qualitative nature of the method, the focus group interviews are not statistically representative of the views of the population living in the area and were therefore used to complement the representative survey and reinforce the validity of the research. Interviews were Interviews were not used in the present study.

Concerning ethical issues, participants in the research were informed that their participation was voluntary and anonymous. The data is stored on two password-protected computers. The video recorded during the focus group interviews was deleted after the transcript was produced.

As for the analysis of the survey results, in addition to the frequencies and descriptive statistics of the responses on habits and attitudes, two-way contingency tables were used to profile the behavior of each socio-demographic group and neighborhood. The results were tested by Pearson's chi-squared test ($p < 0.005$).

5. Results

In this paper, we do not aim to present the entire survey comprehensively but instead focus on three often criticized aspects of suburban living within the Smart Growth framework: 1) compactness, the quantity and quality of local services; 2) car use: mobility habits and modal split; 3) community: participation in local community activities and relations with the neighbors ('the 3 Cs').

5.1. Compactness – Quantity and Quality of Local Services

Previous research found [61,69,91] that one of the typical problems of rapidly growing agglomeration settlements is the quantity and quality supply of services and commercial units. A detailed examination of the provision of commercial and human services, specifically focusing on identifying deficiencies in the supply, was conducted with a 22-item list in the questionnaire.¹ Respondents were asked to evaluate the availability of services within their respective neighborhoods, rating on a scale of 1 (bad) to 5 (good). The means of the rating for each service are shown in Figure 7.

In addition, we were also interested in the locales where respondents access services, i.e., how far they travel out of the municipality to access various services, thereby contributing to heightened vehicular congestion.²

¹ The relevant questionnaire question was: "Please rate from 1 to 5 the availability of shops and services in your area, where 1 - there are not enough shops/services in the area, 5 - the area is well provided for in this respect!"

² The relevant question was: Typically, where do you access the following services? (Everyday shopping, bulk shopping, Medical care, Administration (document office, post office, etc.), Meeting friends and recreation, Family activities)

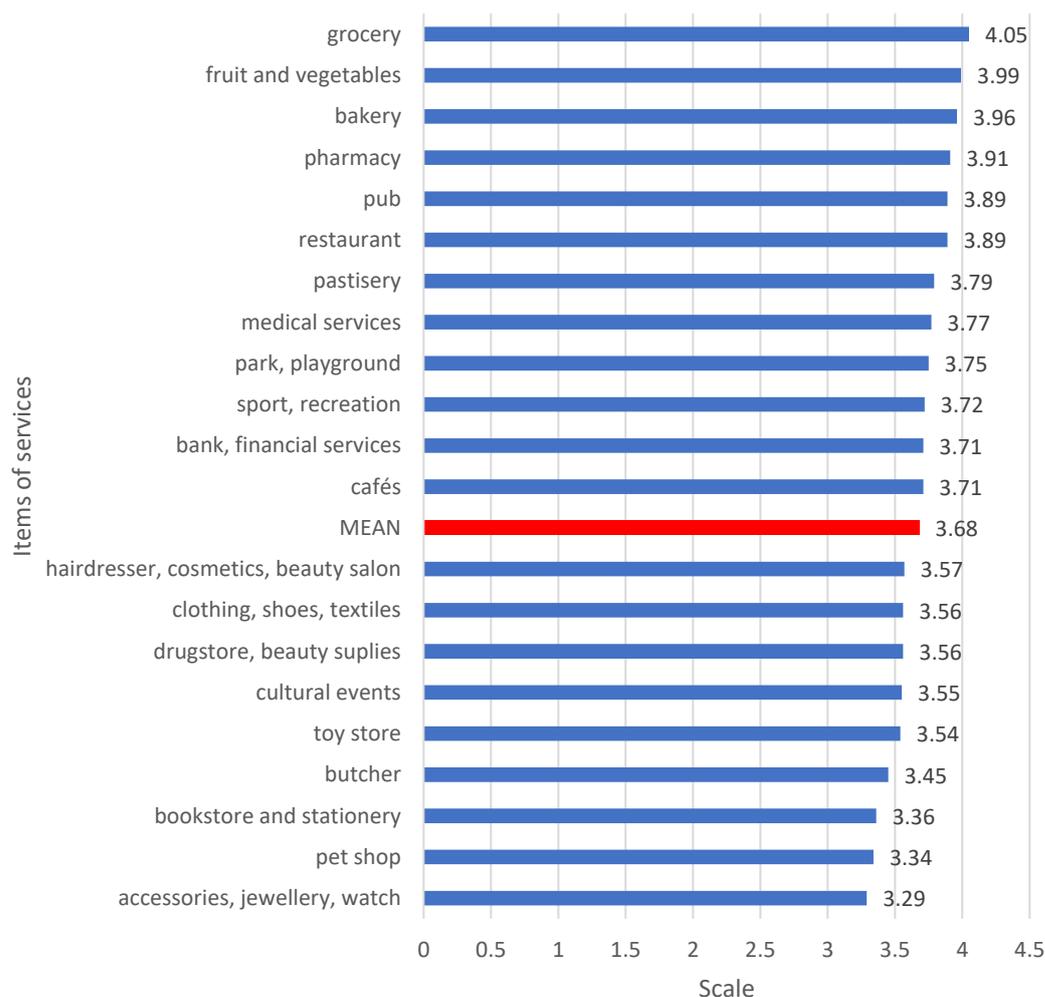


Figure 7. Satisfaction with local services (1 – bad to 5 – good). Source: Törökbálint survey, 2023, N=705.

Respondents were generally satisfied with the human infrastructure services. According to the 2018 survey, 60% of respondents can manage their daily needs within the locality of Törökbálint, and 65% were satisfied with the quality of educational institutions, which means that they do not or predominantly do not have to move away from the settlement, i.e., they do not generate a daily commute to the capital. Based on the average ratings, the overall perception of the availability of essential services such as grocery, fruit and vegetable stores, bakeries and pharmacies, cultural events, parks, playgrounds, and catering (restaurant, pastry shop) is positive, ranging between 3.7 and 4.0. This positive rating marks a slight improvement over the five years from 2018 to 2023, when we measured averages between 3.5 and 3.9. Identified gaps include 'urban specialty shops' encompassing watches, jewelry, accessories, clothing, shoes and textiles, toys, books and stationery, and drug and beauty stores. Nevertheless, there are significant disparities within the settlement: some parts of the town exhibit well-established service provisions, whereas others (especially the outskirts and allotment gardens) experience a deficit in amenities.

In practice, the respondents primarily access services in two areas: in Törökbálint and the capital. Törökbálint serves as the primary location for medical services utilization – 87%, compared to the 65% measured five years ago – and administrative activities – 92% compared to the 60% measured five years ago – the significant rise results from the recent opening of a medical center and public administration center in the newly erected townhall. As for shopping habits, more than 70% of the respondents do their daily shopping in Törökbálint, and only a minority of those who (presumably due to their daily routine) do their daily shopping in other settlements, mainly in the neighboring

Budaörs, where significant malls and other commercial facilities are located. The dynamics shift, however, when considering weekly purchases, as approximately one-third of the respondents favor shopping in Törökbálint. In contrast, one-third opt for a shopping center in Budaörs. Notably, for social interactions such as meetings with friends and family events, locations beyond Törökbálint have assumed a slightly augmented role (18%). However, most respondents continue to engage in these activities locally – most of them taking place at home. Supplementary insights from focus group interviews that complement the questionnaire revealed that neither youth, young adults, nor middle-aged individuals find recreational opportunities locally. Although they have a favorable view of the Sports Center and the developments around the lake, they feel that these do not have sufficient appeal compared to the wide range of services the capital offers. It is typical for young people to arrange meetings in a café in a gentrified inner area of Budapest accessible by public transportation in fifteen minutes rather than meeting in a local entertainment facility. However, stylish restaurants and artsy pubs have begun to appear in town, mainly serving the better-off, older clientele.

5.2. Car Use: Commuting and Modal Split

More than one-third, 39% of respondents, may be categorized as commuters on at least workdays during the week, reflecting a slight increase from the 35% recorded five years ago. An additional 14% commute to the capital frequently, compared to the 10% reported half a decade earlier. Thus, more than half of respondents have a strong connection with the capital, an 8% increase compared to 2018.³

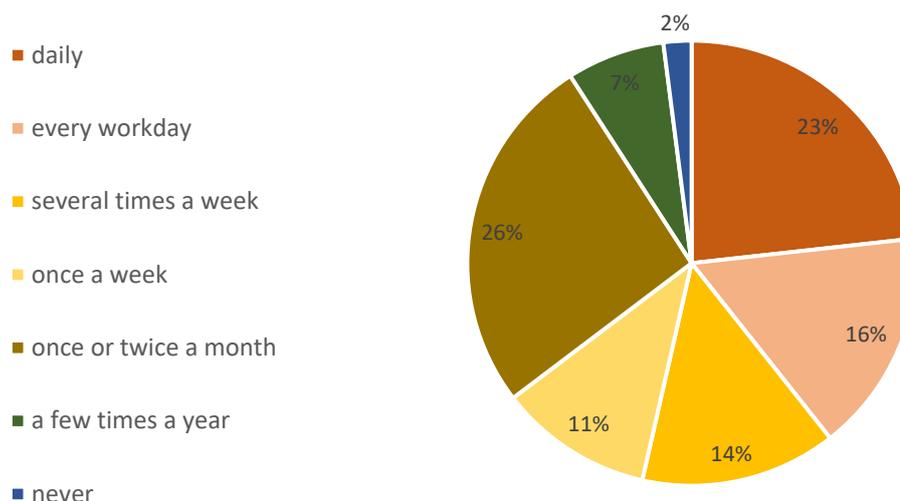


Figure 8. Frequency of commuting to Budapest, percent. Source: Törökbálint survey, 2023, N=705.

Commuting is widespread among residents living on the outskirts of the town, where over 78% of respondents commute to Budapest daily. Younger respondents have a more intensive relationship with Budapest: almost two-thirds of those aged 18-24 and half aged 25-59 commute to the capital on working days. Individuals of higher socio-economic status demonstrate a more robust link with the capital, regularly traveling to Budapest for work and leisure.

The predominant mode of transportation for more than two-thirds of respondents is by car, representing a notable increase from 53% recorded five years ago. Conversely, 22% opt for public

³ The relevant questionnaire question was: How often do you visit the capital? (Daily/Every weekday/Several times a week/Once a week/Once or twice a month/Once a month or less/A few times a year/Once or twice a year at most.

transport, indicating a decline of 11% compared to the 33% reported half a decade earlier, while 11% either walk or cycle.⁴

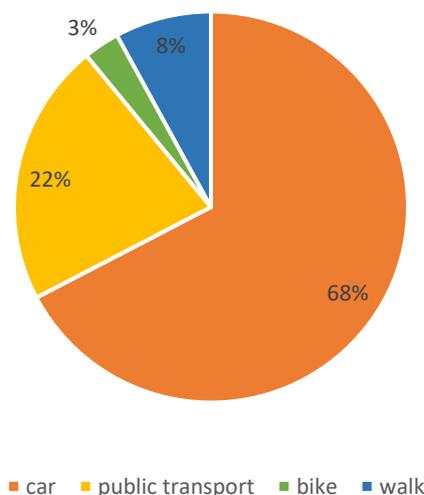


Figure 9. Distribution of the most frequently used mode of transport, percent. Source: Törökbálint survey, 2023, N=705.

44% of respondents use a car daily, while 17% use a car several times a week and 15% do not. Frequent car usage is particularly prevalent among the upper social status groups: two-thirds of them use their vehicles at least once a week. Notably, individuals aged 25-59 demonstrate a higher car use, with approximately 60% considered frequent users. Car use is particularly prevalent on the outskirts and in allotment gardens. Regarding public transportation, buses operated by the capital's public transport company, which extends a comprehensive service in Törökbálint, are more commonly utilized by individuals with lower financial status, constituting approximately 21% of regular users, in contrast to 16% and 9% among those of medium and highest social statuses, respectively. The younger age groups predominantly utilize buses: the 18-24 age group emerges as the most frequent users, constituting approximately 46% of regular passengers. This proportion decreases sharply with age, with the oldest age group accounting for less than 10% of passengers who use the bus at least once a week.

The focus group participants considered the traffic situation critical. They felt that the morning and afternoon rush hours, mainly, were when traffic paralyzed the city, especially around institutions and major routes.

5.3. Community – Participation in the Community and Trust in the Neighbors

The findings of several studies underscore the significance of local identity, place attachment, and positive interpersonal relationships with neighbors as pivotal elements contributing to a settlement's long-term success and livability. The overwhelming majority of the population likes living in Törökbálint, with 90% of respondents expressing a favorable opinion of the municipality⁵. Survey participants reported strong relationships with their neighbors, with the vast majority knowing them relatively well and demonstrating considerable trust (rated on a scale of 1 to 5) both

⁴ The relevant questionnaire question was: How often do you travel long distances by car/local public transport/ long-distance bus/train/cycle/walk?

⁵ The relevant questionnaire question was: "Do you like living here? Please rate from 1 to 5, where 1= Not at all, 5= I like it very much"

in their immediate neighbors (average 4.12) and in the population of Törökbálint in general (average 3.94).⁶

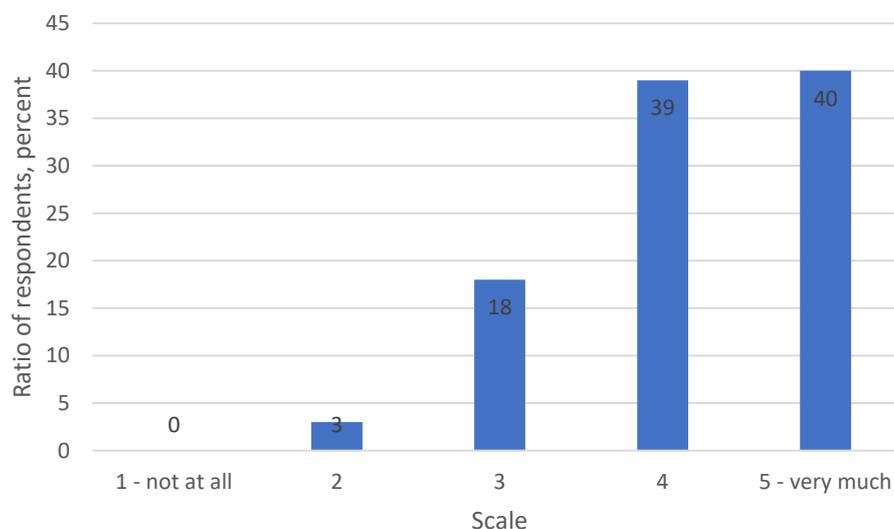


Figure 8. Trust in neighbors, percent. Source: Törökbálint survey, 2023, N=705.

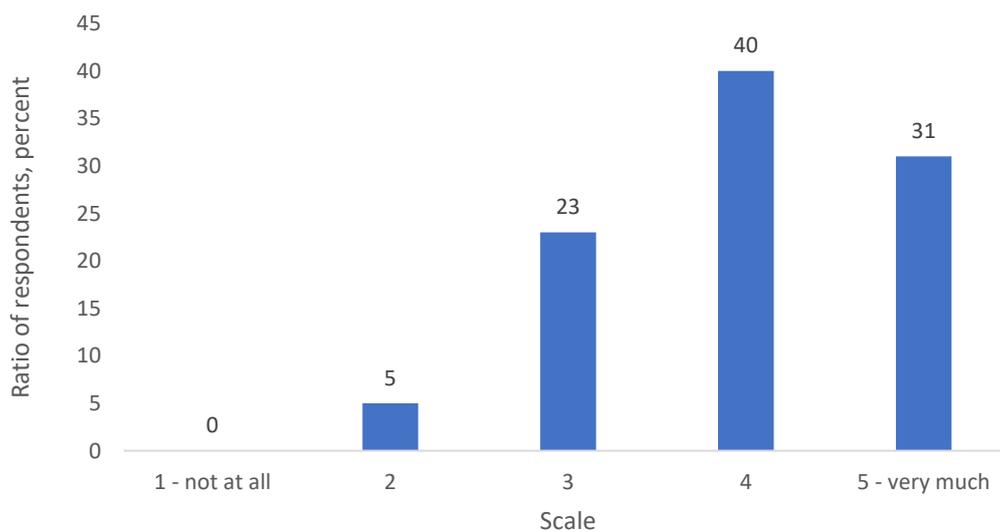


Figure 9. Trust in the residents of Törökbálint, percent. Source: Törökbálint survey, 2023, N=705.

The municipality's history can explain this strong level of trust: despite the rapid and enormous changes caused by suburbanization, the local community still displays characteristics deeply rooted in its rural and 'Swabian' past. This heritage is also an attractive factor for newcomers, regardless of their ethnicity [61].

Furthermore, a notable proportion of respondents (59%) indicate that their primary social network comprises friends and acquaintances within Törökbálint, while 16% maintain social connections predominantly external to the municipality. There is a significant correlation between a

⁶ The relevant questionnaire questions were: Please grade from 1 to 5, as we do in school: 1 not at all, 5 very much. 1.) How much do you trust your neighbours, the people in your neighbourhood? 2.) How much do you trust the people in your settlement?

circle of friends and acquaintances and social status, aligning with national and European trends: individuals with higher levels of education and financial status tend to possess more extensive networks of acquaintances.

6. Discussion

When analyzing compactness, the results delineate a somewhat unexpected picture. Professional consensus in Hungary holds that suburbs heavily rely on the center for shopping and entertainment. The leaders in the municipality essentially agree with such views. The survey data prove that the residents of Törökbálint mostly frequent local shops and services or do the shopping in the malls and stores of adjacent Budaörs, which is about five minutes by car and travel to the city only for exquisite or specialty goods and services. The overwhelming majority of residents are satisfied with the local human infrastructure, that is, educational and healthcare facilities, and use them in town. Concerning compactness, the town shows preferential characteristics.

On the other hand, its historic center lacks an urban street view. Despite its traditional milieu and conventional functions, it serves less as a hub for locals, despite the presence of town hall, churches, and cultural center. Consequently, a high level of compactness does not entail a more urbanized structure. The outcome is akin to the ripe suburbs in North America with a highly developed but spatially dispersed commercial sector [70], where a historic but downgraded town center plays no significant role in this development phase.

Entertainment and recreational opportunities are where the town cannot compete with the capital's wide range and sophisticated offers. The economy of scale in these sectors plays a more critical part. The venues and services of the capital lie too close and available where more demand allows the development of more complex and classy ones. The suburbs and the central city may not be regarded as two entities separated one from the other; they are interdependent and intertwined where both use the infrastructure and facilities of both the suburbs and the center [92].

The community of Törökbálint shows vigor and strong social bonds that challenge the standard view of suburban areas as atomized, alienated, and disruptive societies. It performs better than most more urbanized areas in Hungary, creating fewer problematic issues with sustainability than other, denser areas.

While the compactness and community analyses offer a positive view of the town's sustainability, commuting and car usage patterns depict a more multifaceted situation. As Figure 6 shows, the car penetration in the town is not growing in line with the country's trends. The usage of vehicles has grown significantly recently, and the intensity of commuting to the capital has also increased despite the recent significant developments in public transportation affecting the area. Such tendencies contradict the positive tendencies of compactness. Strong polycentric development affects the suburban area around Törökbálint dually. Commercial shopping and other opportunities and services have started to flourish, as have other economic activities. Such services and businesses create a substantial demand for low- and medium-paid labor that commute to the subcenter from other suburban towns and villages and the capital [61], usually by car, due to the less effective public traffic connections among suburban areas. However, highly educated professionals must still commute to the center for high-paying jobs, usually by car. Polycentric development, thus, increases compactness on the one hand but contributes to the increase of commuting by building up new, more complex spatial connections, where the commuting needs of the low-income employees play a yet not fully considered factor [93].

Törökbálint is no longer a residential suburb heavily reliant on Budapest for work, shopping, and entertainment while being rural in layout and character as it was thirty years ago. It has significantly urbanized, and the influx of a wealthy population and relocation of economic activities have their mark on the local society. Despite the momentous changes, local community and identity remained salient and robust. One of the factors that helped avoid atomization and alienation is the ethnic past, but the local building code that does not allow dense developments seems to prove another significant contributing factor. Other communities with similar backgrounds and geographical situations that could not resist the pressure of property developers to construct

multistorey residential projects in outer areas suffer more from the negative consequences of suburbanization on their communities.

On the other hand, beautifying the historic center and upgrading its service and entertainment opportunities has long been on the agenda. The center functions as a symbol of local identity and community, a link to historical origins. Its peculiar geographical positioning at the southernmost periphery of the town poses a hindrance to its effective development. The major limitation is the need for more consumers and passers-by. Paradoxically, relocating the suburban bus terminal a decade ago had a positive impact on the overall livability and quality of the town center.

Nevertheless, it concurrently diminished the user base, resulting in a decrease in the pool of prospective consumers and closures of shops and other services. Densification of some areas of the town center with condominiums and shopping and entertainment complexes is on the agenda to ease the pressure on the housing market, help young locals set up their households, and provide and widen the consumer base. The proposition is fiercely debated, mainly along the arguments the critics of Smart Growth state: that densification will substantially impact the local character, alter the demographic makeup of people, and lead to an increase in traffic congestion.

The Budapest Metropolitan Area possesses a robust and expansive railway infrastructure, albeit with limited integration into the public transit network of the central areas of Budapest. The railway operator primarily prioritizes non-suburban train services, apart from select lines in the northern and eastern parts of the agglomeration. Furthermore, the provision of intermodal transit hubs within the city is limited and needs to be more developed. In the case of Törökbálint, like other neighboring towns, the positioning of the station in the primarily industrial northern region does not align with the requirements of commuters, as demonstrated by the extremely low train ridership.

The current strategy for agglomeration railway development is to optimize the utilization of existing railway lines through constructing intermodal hubs in the central city, integrating rail lines in lieu of terminals, and establishing additional stations in both inner and outer regions [58]. Its realization would significantly improve train usage conditions and increase the share of the trains in the modal split in the area around Törökbálint, reducing vehicle traffic. Nevertheless, the implementation of this initiative is currently being impeded by political disagreements and fiscal constraints. The initiative fails to adequately consider the matter of railway station relocation. The local administration suggests shifting it to the western vicinity, close to residential areas, education, and sports facilities.

Conversely, the official strategy advocates for an eastern relocation, aligning with the nearby town of Budaörs. Implementing this concept would offer a more sustainable solution for the train stop that accommodates many customers. Additionally, it could be integrated with the eventual endpoint of the projected subway line extension and subsequent bus terminal.

Implementing policies to foster sustainable suburban development has seriously been hampered by the need for more cooperation among various municipal and governmental actors. Many organizations have been established, subsequently rendered ineffective, to coordinate development initiatives within the agglomeration region in the last hundred years [69,84]. The analysis of the causes of the failure goes beyond the limits of this paper. Here, it suffices to argue that the lack of a compelling and legitimate consultation forum is a serious obstacle to improving the situation effectively, thus enhancing the sustainability of suburbs.

The unique characteristics of Törökbálint make it challenging to apply these observations to a broader range of suburban communities. However, it supports the claim that urban and suburban areas may not be as fundamentally different regarding sustainability as the Urban Political Ecology of Suburbanization expresses [21]. The sustainability of suburbs is somewhat complex and other in various areas and may not be separated from related issues in more urban, denser areas. Moreover, the situation is changing with new aspects appearing in different communities. The sustainability of communities, therefore, is to be assessed in progress and in a context where urban and suburban areas may be judged failed or good performing.

7. Conclusions

Our analysis focused on a defined set of sustainability factors, namely compactness, commuting, and community, and how they have developed, changed, and are understood in a select suburban town near Budapest. Our results show that even if the town lacks a dense urban core, the traditional, low-density, small-town fabric can perform quintessential tasks quite effectively. The level of compactness of the town regarding the customary location of shopping and other services is advantageous as they are primarily performed locally or in adjacent suburban towns. However, the situation could be more favorable, considering that more delicate, sophisticated facilities, such as recreation and entertainment, are still used in Budapest, although significant advancements have been detected. Compactness and growing job opportunities, the latter stemming from the post-Fordist economic transition and improved public transport services, do not necessarily lead to a lower rate of commuting or declining care usage. On the contrary, the usage of automobiles for commuting has significantly increased recently, parallel to the decrease in public transport ridership. On the other hand, the local community shows unmistakable signs of vigor, both on neighborhood and higher community levels.

Our study showed the values and limits of the Smart Growth approach. Further factors, such as local history and desires of a community, need to be considered as residents, stakeholders, and local decision-makers are dynamic actors in shaping their surroundings and future. For instance, the development of an urbanized center with a more appealing townscape and more commercial units, shops, and cafés together with condominiums that could offer demand for such services in the historic town center has been on the agenda for a long where small steps have already been taken in this direction [61].

Due to its unique features, lessons learned from the case study of Törökbálint may be generalized with a strict limitation over other suburban settlements around Budapest. Other towns and villages display strikingly different characteristics where similar scrutiny would probably lead to different conclusions. The complexity of the suburban belt of Budapest, with more than two hundred towns and villages, would render such a generalized examination unachievable, but further studies and comparisons with other towns would shed more light on the complexity of the sustainability of suburbs. Using the Smart Growth framework and focusing on the three Cs of sustainability limit the scope of our research and offer valuable, in-depth insight into the challenges, factors, and means of attaining more sustainable urban sprawl in the suburbs.

7.1. Possible Directions for Future Studies

The present study has limitations due to the scope of aspects analyzed and the choice of the case study. Thus, one possible direction to expand the validity of the interpretation and deepen the scrutiny is to replicate the identical research in additional cases that possess unique characteristics differently but remain pertinent to the theoretical framework of Smart Growth. This may include towns in the Budapest Metropolitan Area or from other prominent urban centers in Eastern Central Europe. It is vital to note that the case study methodology strictly limits generalization, no matter how many additional cases we add. Each town has its historical background and unique features that make comparison difficult or too complex.

Expanding the scope of the study towards a more holistic analysis offers another possible scenario. The case of Törökbálint may be further deepened by including aspects of the other frameworks detailed in the theoretical part of this paper. National regulations, regional development agendas, and policies that have impacted the formation of the town, as well as the system and alteration of the local and county government system and regional coordination agencies, may be included in the analysis. Assessment of local stakeholders, involvement of the residents, and local techniques of citizen participation with qualitative methods may supplement the examination of the local community.

Environmental considerations, including ecological resilience, climate change adaptation, natural resource management, and biodiversity, provide a different perspective on suburban sustainability. Adding technical elements, such as the utilization of smart city solutions, artificial

intelligence, novel platforms, methodologies, and the anticipated impacts of transit-oriented developments, may offer another practical alternative perspective.

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