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Land-Use Transformation and the Prospects of Spatial Knowledge Concentration: The Case of the Northern Industrial Area of Szombathely

The use of space has changed over time, revealing not only physical characteristics but also ideologies, narratives, and economic and political interests. As a result, spaces go beyond their practical functions to serve as symbols of struggle, power, or visibility, often connected to these broader forces. This paper reviews the spatial characteristics and changes in the land use of the so-called Northern Industrial Area of Szombathely City since the mid-1970s. It explores the area's characteristics, future development plans and their historical antecedents, while studying the spatial concentration of knowledge and its impacts beyond the industrial zone, extending to the city and the wider region. The study indicates that knowledge concentration requires high-quality training and economy-integrated higher education, active stakeholder cooperation, a critical mass of intellectual resources capable of generating and implementing innovation, and an adequate quality of life. It argues that the city's industrial structure must shift from labour-intensive to knowledge-intensive ecosystem through coordinated development efforts, which may improve economic robustness, strengthen regional positioning, raise profitability and competitiveness, and contribute to the creation of a resilient knowledge economy.

Keywords: spatial theory, land use, Szombathely, Northern Industrial Area, industrial park, technology park, knowledge concentration, knowledge economy

JEL codes: O18, R11, O31, R14, R58

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Introduction

This study shows a case analysis of the spatial characteristics and land-use transformations of the Northern Industrial Area of Szombathely City with County Rights, a county seat with a resident population of 76,918 as of 1 January 2025 (Hungarian Central Statistical Office, 2025), from the mid-1970s onwards. It explores the area's characteristics, future development plans, and their historical antecedents, rooted in the past and present, while analysing the spatial concentration of knowledge and its impacts beyond the industrial zone, extending to the city and the wider region. The paper reviews the most relevant literature, analyses the historical and current transformation of the Northern Industrial Area, and evaluates future development plans through the lens of spatial transformation, knowledge concentration, and regional resilience.

Research Question and Objectives

This paper studies whether the transformation of the Northern Industrial Area of Szombathely can be interpreted as a progression from a former military land-use regime towards a knowledge-oriented innovation environment. Particular attention is given to the role of planned Technology Park developments, research and innovation capacities, and institutional cooperation in supporting spatial knowledge concentration and regional economic resilience.

The study defines the following research question: To what extent can the ongoing transformation of the Northern Industrial Area contribute to the emergence of a knowledge-based economic ecosystem in Szombathely and its wider region?

To answer this question, the paper analyses the historical transformation of land use in the area, examines current development processes, and evaluates the relevant future strategic plans.

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Methodology

This study uses a qualitative case study approach to examine the spatial transformation of the Northern Industrial Area of Szombathely and its possible role in fostering spatial knowledge concentration. Following Yin (2018), case study research is particularly fitting for examining complex territorial development processes in their real-world contexts, especially when historical, institutional, and planning-related dimensions are closely intertwined.

The empirical analysis is based primarily on document analysis. The examined sources include local and regional development strategies, urban planning documents, municipal committee materials, resolutions and minutes of the General Assembly of the Municipality of Szombathely City with County Rights (Szombathely CCR), investor-oriented development materials, and relevant press publications. These sources provide information on the area's historical transformation, current status, and planned development.

The analysis follows a thematic approach. Particular attention is devoted to three dimensions: (1) the historical transformation of land use, (2) the institutional and infrastructural conditions of current development processes, and (3) the strategic initiatives intended at strengthening knowledge-intensive economic activities and regional resilience. The empirical findings are interpreted through concepts derived from spatial theory, knowledge concentration, regional innovation systems, and regional resilience literature.

The study has several limitations. It does not rely on primary empirical data collection such as interviews, surveys, or statistical modelling. Consequently, the analysis primarily focuses on institutional intentions, planning documents, and observable development processes rather than on measuring the actual economic impacts of the initiatives examined. The findings should therefore be interpreted as an exploratory assessment of an ongoing territorial transformation process.

Literature Review

The issue of spatiality and territoriality in contemporary social sciences – as Faragó (2018) explains in detail – goes beyond the classical geographical interpretation of space as a physical entity. Spatial transformation can be interpreted as a socially constructed process rather than a purely physical change in land use. According to Lefebvre (1991), space is continuously produced and reproduced through social practices, representations, and lived experiences. Building on this approach, Soja (1996) emphasises the interaction between material, conceived, and lived dimensions of space. From this perspective, the transformation of former military areas into economic development zones can be understood not solely as a physical conversion of land use, but also as a redefinition of the social and economic functions attached to space (Varga, 2024).

Thus, the use of space is not fixed by physical conditions. Instead, it can be seen as a social construct determined by ideologies, economic interests, and political strategies. Harvey (2001) and Massey (2005) note that space is a key arena of the capitalist mode of production, where power relations are continuously reproduced through the interweaving of global and local processes. As a result, spaces frequently serve as symbolic tools for economic competition, visibility, and social control.

The spatial concentration of knowledge has become a key factor in regional competitiveness and innovation in recent decades. Castells (1996) describes contemporary development processes using the concept of the “space of flows”, stressing the importance of knowledge networks and information exchange. The Triple Helix model (Etzkowitz & Leydesdorff, 2000; Asheim & Gertler, 2005) further emphasises the role of cooperation among universities, industry, and government in generating innovation and promoting knowledge-intensive economic activities. Regional innovation systems and learning-region approaches similarly stress the importance of institutional cooperation, collective learning, and knowledge transfer in supporting long-term development (Morgan, 1997; Asheim & Gertler, 2005).

In this context, the spatial distribution of knowledge-intensive services also exhibits a highly concentrated pattern, determined primarily by network/institutional connections, accessibility, and the quality of innovation ecosystems (Szakálné Kanó, 2009). Clusters, science and innovation parks, and technology parks – as institutionalised forms of the knowledge-based economy – play a key role in these processes, as they are highly capable of facilitating knowledge flow, collective learning, and the strengthening of innovation capacities (Porter, 1998; Barta, 2002).

From a regional development perspective, knowledge concentration is closely linked to economic resilience. Regions characterised by related variety, meaning the coexistence of industries with complementary knowledge bases, are generally more capable of generating innovation and adapting to external shocks (Frenken et al., 2007). Boschma (2015) argues that regional resilience depends not only on economic diversity but also on regions' capacity to renew and transform their knowledge structures. Consequently, diversification towards knowledge-intensive sectors can contribute to greater economic robustness and adaptive capacity in the long term.

In addition to the above-mentioned approaches, the literature on regional innovation and knowledge spillovers stresses the importance of geographical proximity and localised learning processes. According to Jaffe et al. (1993), knowledge spillovers are spatially bounded phenomena, meaning that innovation activities tend to concentrate geographically due to the tacit nature of knowledge and the high importance of direct interpersonal interactions. This argument is further developed by Audretsch and Feldman (1996), who demonstrate that innovative activities are highly concentrated in areas where knowledge-producing institutions and businesses are located, thereby bringing out the role of agglomeration economies in supporting innovation.

Defining the Northern Industrial Area

The Northern Industrial Area represents a particularly relevant case for exploring the relationship between spatial transformation, knowledge concentration, and regional development. Over the past five decades, the area has undergone multiple functional transitions, including military, agricultural, recreational, and industrial uses. More recently, it has become the focus of strategic efforts to foster knowledge-intensive economic development through the establishment of a Technology Park and a planned Research, Development and Innovation (R&D&I) Centre.

The entire Northern Industrial Area covers nearly 672 hectares and sits on almost completely flat terrain bordered by the municipalities of Szombathely, Söpte, and Gencsapáti. Figure 1 illustrates the location and boundaries of the Northern Industrial Area within the administrative territory of Szombathely and neighbouring settlements.

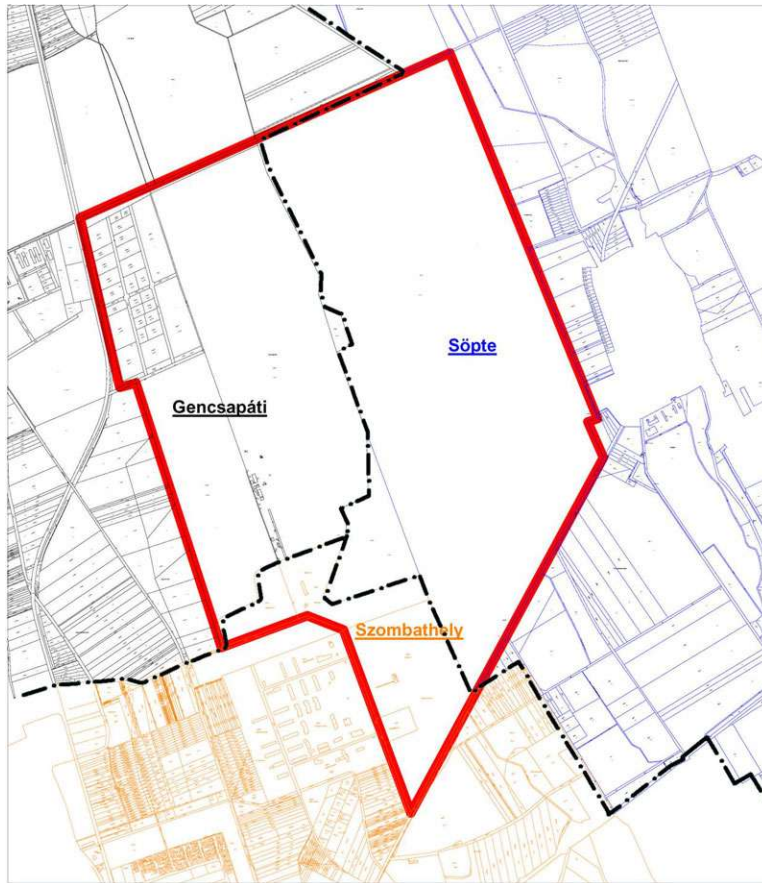


Figure 1: Action Area of the Northern Industrial Area

Source: Szombathely City's Urban Development Concept, Integrated Urban Development Strategy, Amendment No. 1 Consolidated into a Single Document (2017)

The area's large contiguous land reserve, flat topography, key location, and proximity to the urban core of Szombathely provide favourable conditions for industrial and innovation-oriented development. These characteristics help explain why the area has grown into a focal point of the city's long-term economic development strategy.

The Past of the Northern Industrial Area

Between 1975 and 1976, the Rudolf Garasin Barracks of the 15th Mechanised Infantry Regiment of the Hungarian People's Army were established in Szombathely as a greenfield investment. In addition to the barracks, the military complex included an 800-meter-long electrified shooting preparation track, a 100-meter-long shooting range, and a 1,500-meter-long, 800-meter-wide training area extending across the territory between Szombathely, Söpte, and Gencsapáti. After 1990, the military unit was renamed the Hungarian Defence Forces' 37th Savaria Mechanised Infantry Brigade, and the barracks were renamed Savaria Barracks, although their function remained unchanged. From 1 January 2000, the unit continued to operate as an independent military unit under the name Savaria Training Centre of the Hungarian Defence Forces until its

final dissolution on 31 December 2004. The area thus served as a military training ground from 1975 until 2004 (Jagadics, 2010).

As military activities involved mainly infantry training and vehicle manoeuvres rather than live-fire exercises, no significant contamination or hazardous residues remained after military use. After the closure of the training centre, the former Savaria Barracks was gradually converted into a penitentiary institution and has housed the Szombathely National Prison since 2008. The training grounds themselves, however, became largely unused, so the area between Söpte, Gencsapáti, and Szombathely remained undeveloped, with only scattered concrete surfaces serving as reminders of its former military function.

Recognising the key importance of the area, the Municipality of Szombathely began acquiring former military lands from the Hungarian State at an early stage. In 2000, the municipality purchased a 210,199 m² site in Söpte, formerly used as a military airfield, thereby securing the first substantial land reserve for future development and utilisation of the wider area.

Throughout the following decade, redevelopment progressed slowly. Ownership fragmentation, administrative boundaries, and the wider economic consequences of the global financial crisis delayed the implementation of industrial development plans. Although the establishment of an industrial park had been among the declared objectives of local development policy since 2007, the necessary institutional and territorial conditions for implementation were not yet in place.

During this transitional period, large parts of the area remained temporarily utilised for agricultural and recreational purposes. Livestock grazing became the dominant land use, while a smaller section was used for recreational activities, including paintball facilities. Consequently, the former military training ground underwent a temporary functional transformation towards agricultural and leisure uses. These activities represented an interim solution rather than a long-term development strategy, indicating limited investment resources and an unresolved territorial-administrative situation.

A decisive turning point occurred after 2020, when agreements were reached regarding the gradual transfer of additional land parcels into the administrative territory of Szombathely. This process created the prerequisites needed for coordinated development planning and utility infrastructure expansion. The phased territorial reorganisation enabled the municipality to begin preparing the area for large-scale economic development while simultaneously providing a compensation mechanism for the neighbouring municipality of Söpte.

Essentially, under a 2020 framework agreement, the area is being transferred to Szombathely's administrative jurisdiction in four phases, as shown in Figure 2. Following phase 1, each subsequent phase is initiated once at least 75% of the previous phase has been sold, or the Municipality of Szombathely has received a purchase offer that would affect the next phase(s). This arrangement enables Szombathely to finally begin utility infrastructure development in the area,¹⁶

¹⁶ Based on the Proposal prepared for the meeting of the Committee Preparing for the Transfer of the Area (2021).

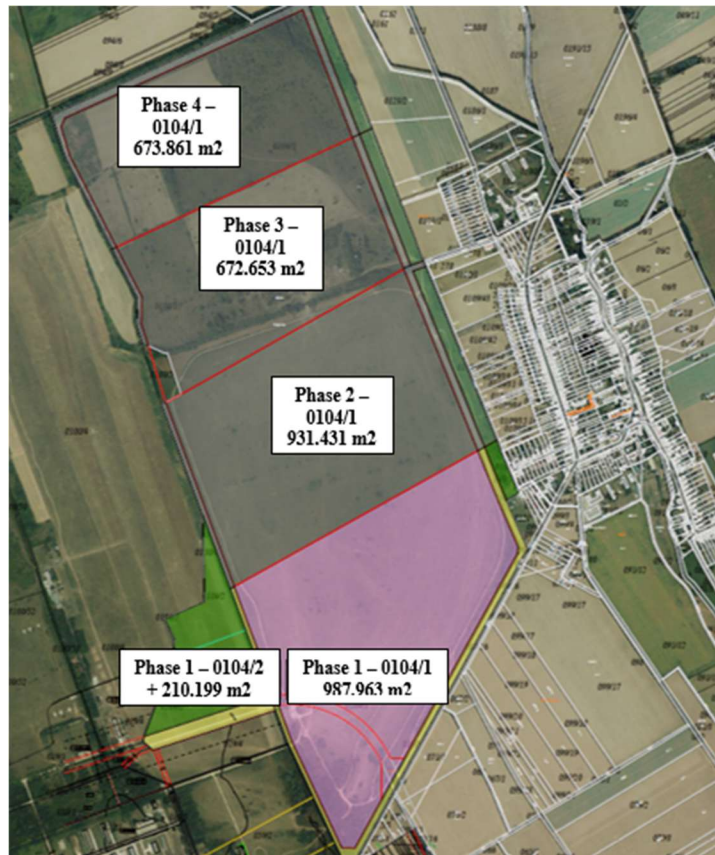


Figure 2: Schedule for the Transfer of Land

Source: Appendix to the Proposal prepared for the meeting of the Committee Preparing the Transfer of Land (2021)

The area also contains a small sports airfield and a waste-sorting facility. However, further developments will require major infrastructure investments and the construction of public utilities. As a first step, developments were carried out between 2016 and 2020 using European Union Territorial Operational Programme grant funds, but only within the administrative territory of Szombathely CCR. Therefore, the provision of public utilities to the areas recently transferred to Szombathely is an extremely important issue for the future.

Viewed through the lens of spatial transformation, the history of the Northern Industrial Area demonstrates how territorial functions can be repeatedly redefined in reaction to changing political, institutional, and economic priorities. The transition from a military training ground to agricultural and recreational uses, and subsequently to industrial and innovation-oriented development – as shown in Figure 3 – illustrates a long-term process of spatial reconfiguration rather than a simple change in land use. In this respect, the Northern Industrial Area demonstrates how formerly specialised military spaces can be integrated into broader urban and regional development strategies.



Figure 3: Functional evolution of the Northern Industrial Area since the mid-1970s

Source: own compilation based on municipal development documents, land-use history, and the planned development path of the Northern Industrial Area

The Northern Industrial Area Today

The Northern Industrial Area is currently classified as an economic-industrial zone. It is entirely owned by the Municipality of Szombathely CCR, and the first phase of territorial transfer from Söpte has already been completed. However, more than 75% of the land transferred in the first phase has already been sold, and purchase offers have also been received for subsequent phases, which means that preparations for further land transfers are underway.

The first major successful investment in the area was the construction of Schaeffler Savaria Ltd's second manufacturing facility in Szombathely. The handover took place in September 2021. The new factory was built as a greenfield investment on 30 hectares, including a 15,000 m² production hall and an e-mobility research and development centre, and created approximately 150 jobs.

In August 2021, Galambos Holding Ltd. from Vép purchased more than 14 hectares of land from Szombathely CCR to establish a multimodal logistics centre as a greenfield investment. As part of the investment, logistics warehouses with truck parking lots have been built, and according to plans, the site will also be connected to the industrial rail line to be constructed during the second phase of development. The 13.000 m² facility, completed in 2024, has become a major attraction for companies planning to invest in the Northern Industrial Area, as its complete logistics services can support businesses operating there.

In 2022, another logistics service provider, DOMINO Trans Ltd. from Veszák, acquired 7 hectares for another logistics facility. The 5,000 m² warehouse logistics centre, operational since 2025, offers state-of-the-art traditional and flexible storage and logistics solutions.

Infrastructure development – including road connections, railway access, and utility networks – is currently a top priority for the city leadership of Szombathely. Figure 4 shows that the M87 2x2-lane expressway heading toward Kőszeg/Vienna will pass directly alongside the industrial area. The expected completion date for construction is 2030, as is the case for the 2x1-lane Route 89 and the planned new interchange at their intersection, which will connect the Northern Industrial Area directly to the M86 expressway toward Győr and Budapest. The image also clearly shows the industrial railway line, for which a construction period of approximately 30 months should be anticipated, as well as the small electrical substation located in the lower-right corner of the area, from which the electrical supply to the plots can be established. Rainwater drainage is provided by the brooks Bogács Stream and Kozárborzó, and the groundwater table in the area ranges from -3.5 to -5.0 meters.¹⁷

¹⁷ Based on the non-public presentation prepared by the Municipality of Szombathely CCR for investors (2021).

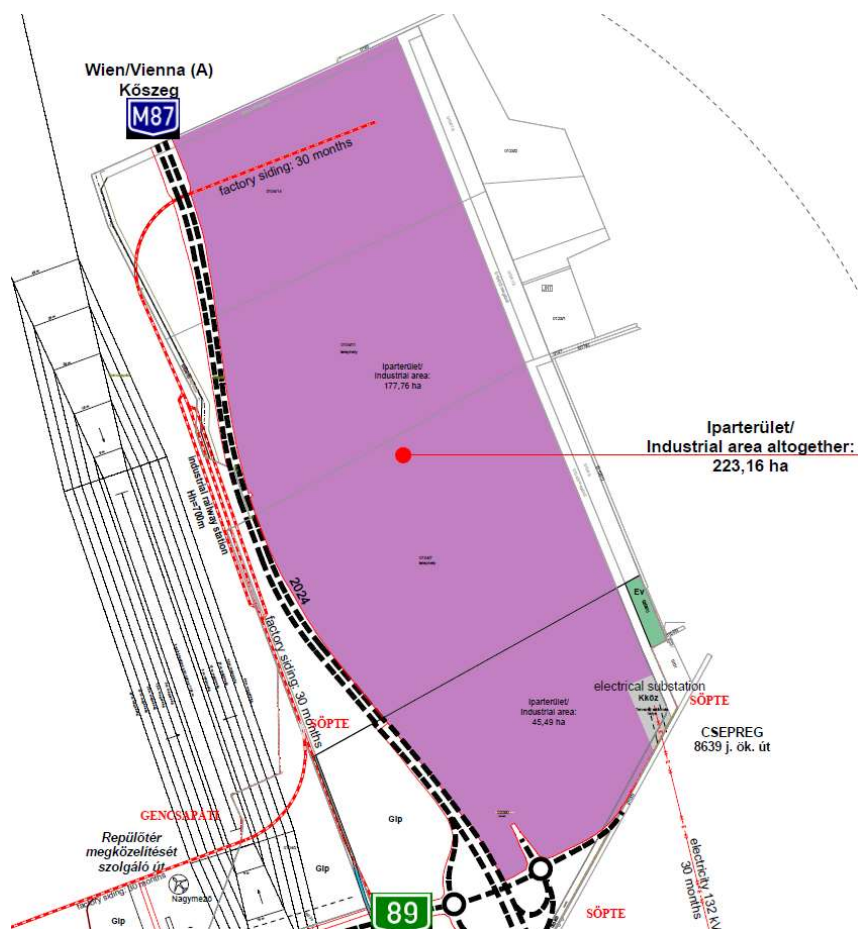


Figure 4: Planned infrastructure developments in the Northern Industrial Area

Source: own compilation based on the non-public presentation prepared by the Municipality of Szombathely CCR for investors (2021)

Although the Northern Industrial Area cannot yet be considered a fully developed knowledge hub, several current developments indicate the emergence of knowledge-concentration processes, as shown in Table 1. The establishment of Schaeffler's highly automated production facility and e-mobility R&D centre represents a turn towards more knowledge-intensive industrial activities. At the same time, the Technology Park status and the preparation of an R&D&I Centre suggest an institutional effort to strengthen innovation capacities and facilitate cooperation among businesses, higher education institutions, and public actors.

Table 1: Key Development Projects Supporting the Transformation of the Northern Industrial Area (2021–2024)

Investment	Year	Function
Schaeffler Plant II + E-mobility R&D Centre	2021	Production + R&D
Galambos Logistics Centre	2021	Logistics
DOMINO Logistics Centre	2022	Logistics
Technology Park status	2024	Innovation infrastructure

Source: own compilation

From the perspective of the Triple Helix model (Etzkowitz & Leydesdorff, 2000), the area is gradually developing beyond a traditional industrial park. Current developments steadily integrate industrial production, research and development, higher education cooperation, and public-sector strategic planning. Although these interactions linger at an early stage, they provide the institutional foundations necessary for future knowledge concentration.

The ongoing diversification of economic activities is also relevant to regional resilience. The expansion of advanced manufacturing, logistics, and planned healthcare-related activities may help reduce the city's dependence on a single industrial sector and increase its adaptive capacity in the face of upcoming economic obstacles (Boschma, 2015; Frenken et al., 2007).

Recent developments indicate that the preconditions for knowledge concentration are gradually emerging in the area. While the area cannot yet be regarded as a fully developed knowledge-intensive innovation ecosystem, recent investments, planned institutional developments, and improving infrastructure indicate a gradual transition toward a more knowledge-oriented progression pathway.

The Potential Future of the Northern Industrial Area

The Municipality of Szombathely CCR applied for Science and Technology Park status for the Northern Industrial Area, together with the existing Claudius Industrial Park, initiating the preparatory phase in December 2020 with the explicit aim of establishing and sustaining a resilient knowledge economy in the long term. In the case of the Northern Industrial Area, the positive evaluation of the application simultaneously granted the Industrial Park status in a single step.

According to the 2016 report “Overview of Industrial Parks Operating in Hungary,” a Science and Technology Park (STP) is a subtype of industrial park established primarily to promote the development of knowledge-intensive enterprises engaged in technological innovation and research and development.

However, Government Decree 799/2021 (XII. 28.) created two distinct categories by splitting the STP designation: Science and Innovation Parks (classical university-based science parks), eligible for application by universities, and Technology Parks (TP), that can be established by municipalities or municipally owned companies. The Northern Industrial Area obtained the TP status in 2024.

Barta (2002, p. 112) similarly characterises such formations – at the time still referred to as STPs – as “(...) enclosed or delimited spaces where offices, research institutes, laboratories and modern corporate buildings are concentrated in a high-quality environment.” However, he additionally emphasises that an STP or TP can only be truly successful and fulfil its role in knowledge concentration within regional development if it does not operate in isolation or focus solely on its own profitability, but rather promotes the development of the prerequisites for collective learning in the region, and participates in this process itself.

Thus, the Northern Industrial Area represents a new development zone, which, according to the socio-economic programme of Szombathely adopted in 2020, could be driven forward by the Schaeffler investment in the same year, which has since become operational, and to the north of it, approximately 600 hectares of land are available for further development. A key objective of the city leadership is to attract companies operating outside the dominant automotive industry to settle alongside the major automotive manufacturers in Szombathely, whose knowledge-intensive activities could help diversify the city's industrial structure, thereby enhancing its economic stability and resilience.

The city's ten-year economic and urban development programme, “Szombathely2030 – Towards a Resilient Knowledge Economy” (Barta, Bokányi et al., 2021), goes a step further by explicitly stating that the dominance of large automotive manufacturers in the city has resulted in a single-pillar industrial structure, rendering the city's economy vulnerable. Its industrial structure is predominantly labour-intensive, making it highly exposed to processes of automation, digitalisation, and robotisation – i.e., industrial restructuring – as well as to the economic impacts

of the COVID-19 pandemic, which have even more accelerated this process. The Szombathely2030 programme was conceived precisely to respond to these challenges. It highlights, on the one hand, the cruciality of continuous, bidirectional communication with manufacturing companies to assess their needs, and, on the other hand, the need to provide high-quality R&D&I and educational support to facilitate their adaptation. This approach will enable the generation of high-quality, crisis-resistant jobs and allow knowledge-intensive elements to be integrated even into traditionally labour-intensive industries.

However, to improve the stability and knowledge intensity of the city's industry, diversification is critical, especially through the establishment of a strong second pillar to serve as a diversification sector. This role is assigned to the healthcare industry, based on the region's long-standing traditions of thermal baths and sports rehabilitation, the stable institutional system operating in the area, and its proximity to Austria, while also responding to European Union and national development priorities. To facilitate the settlement of healthcare industry manufacturers, it is necessary to provide a dedicated R&D&I and educational background focused on this sector, which has been incorporated into the relevant programme elements (Bokányi, 2021).

To realise these objectives, the planned key project of the Szombathely2030 is the establishment of a Research, Development, Innovation and Education Centre (R&D&I Centre) in the Northern Industrial Area. This project would serve as shared infrastructure and stimulate further development, meeting the knowledge-intensive demands of existing and future businesses. To ensure effective cooperation in the implementation phase, in September 2021, six organisations signed a cooperation agreement: the Municipality of Szombathely CCR, Eötvös Loránd University, the University of Pécs, Óbuda University, the Institute for Transportation Sciences, the Chamber of Commerce and Industry of Vas County, and the Pannon Business Network Association.

The institutional structure emerging around the proposed R&D&I Centre closely reflects the principles of the Triple Helix model (Etzkowitz & Leydesdorff, 2000). The planned cooperation among universities, public institutions, business actors, and intermediary organisations seeks to create an environment in which knowledge generation, knowledge transfer, and innovation can reinforce one another, as shown in Figure 5. It illustrates the planned institutional framework supporting knowledge concentration in the Northern Industrial Area. The proposed R&D&I Centre has a central position within the emerging network, linking higher education institutions, public actors, and private-sector organisations. In this respect, the Northern Industrial Area represents not only an industrial development project but also an attempt to establish a regional innovation ecosystem.

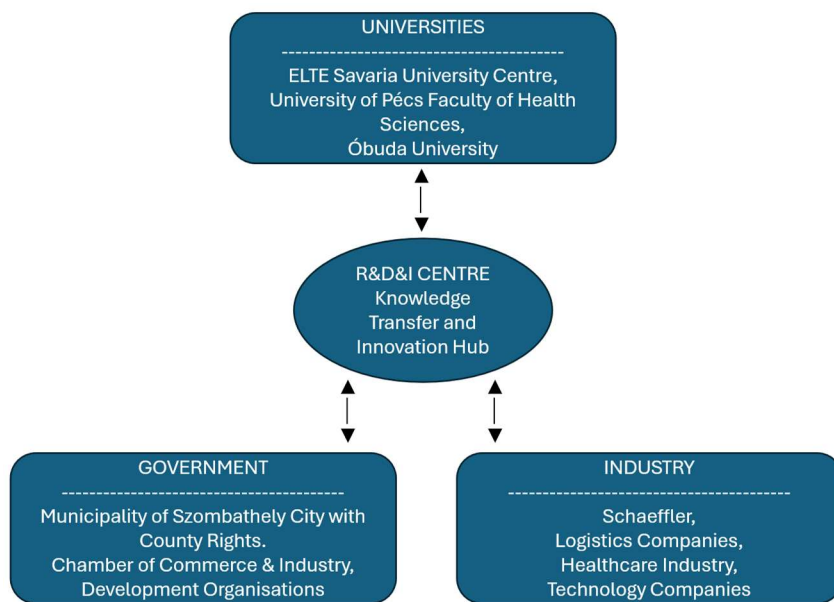


Figure 5: Conceptual model of the institutional framework supporting knowledge concentration in the Northern Industrial Area

Source: own compilation based on Etzkowitz and Leydesdorff's Triple Helix model and the planned R&D&I Centre partnership network

The participating universities contribute expertise in healthcare, digital technologies, advanced manufacturing, and workforce development, while creating a business-oriented educational environment and introducing programmes that offer dual Hungarian-foreign degrees.

The centre intends to place greater emphasis on R&D&I by establishing research and skills development labs, implementing applied research services, and creating a unique development, demonstration, and testing environment focused on the healthcare industry at the Central European level. The latter, focusing on complex rehabilitation, would integrate households, nursing homes, thermal baths, and virtual hospital infrastructure into a single, interconnected system. The project is planned to be implemented in multiple phases and is expected to provide shared infrastructure for research, training, and innovation-related activities.

The planned R&D&I Centre is expected to serve as a shared innovation infrastructure and may function as a driving force for further knowledge-intensive development. However, its long-term contribution to regional innovation performance will depend on the successful implementation of the project, the establishment of stable institutional partnerships, and the ability to attract both research-oriented companies and highly qualified human capital.

Current plans show a strategic effort to move beyond the traditional industrial park model towards a more knowledge-intensive development path. While many of the proposed initiatives remain in the planning phase, the institutional, infrastructural, and organisational foundations necessary for future knowledge concentration are gradually being established.

Conclusion

The analysis points out that the transformation of the Northern Industrial Area can be interpreted as a gradual transition from a military land-use regime to a knowledge-oriented development direction. Over the past five decades, the area has undergone several functional transformations, including military, agricultural, recreational, and industrial uses. More recently, the emergence of research and development activities, the acquisition of Technology Park status, and the planning

of an R&D&I Centre indicate a major shift towards knowledge-intensive economic development. All these major milestones are listed in Table 2.

Table 2: Major milestones in the development of the Northern Industrial Area

Year	Milestone
2000	First land acquisition
2007	Industrial Park concept
2009	Additional land acquisitions
2020	Framework agreement with Söpte
2021	Schaeffler Plant II + E-mobility R&D centre
2021	Galambos Logistics Centre
2022	DOMINO Logistics Centre
2024	Technology Park status
Planned	R&D&I Centre

Source: own compilation

Regarding the research question, the study shows that the ongoing transformation of the Northern Industrial Area could significantly contribute to the emergence of a knowledge-based economic ecosystem in Szombathely and the wider region. The contribution is currently indirect and preparatory rather than fully realised. While the establishment of a Technology Park, the planned R&D&I Centre, and the emerging network of institutional partnerships indicate a clear strategic direction, the long-term outcomes of these projects will depend on their successful implementation and the ability of local actors to sustain cooperation and attract knowledge-intensive activities.

From a spatial-theoretical perspective, the case illustrates how the functions attached to a specific territory can be continuously redefined through changing political, economic, and institutional priorities. The observed transformation supports the argument that space is not simply a physical container but a socially produced and continually reconstructed phenomenon (Lefebvre, 1991; Soja, 1996). The Northern Industrial Area, therefore, does not represent only a land-use transformation process but also an institutional and economic reconfiguration of territorial functions.

As Reznitz (2002) argues, industrial development can contribute to knowledge-based economic transformation only when it is embedded in a wider institutional environment characterised by higher education, innovation capacity, and active cooperation among economic and public actors. The case of the Northern Industrial Area supports this argument. The long-term success of the Technology Park and the planned R&D&I Centre will depend not only on physical investments but also on the ability of local stakeholders to maintain effective cooperation and generate synergies between industry, education, and innovation.

Current developments demonstrate the growing importance of institutional cooperation in supporting knowledge concentration. The planned cooperation among universities, businesses, public actors, and intermediary organisations reflects key elements of the Triple Helix model and the learning-region approach. Although a fully developed knowledge ecosystem has not yet emerged, the institutional foundations for future knowledge generation and transfer are gradually being established. This denotes a significant shift from the situation described by Szakálné Kanó (2009), when the Szombathely micro-region played only a marginal role in the spatial distribution of research and development activities in Hungary.

At the same time, the long-term success of the proposed development path cannot be taken for granted. International experience suggests that technology parks and innovation districts achieve sustainable outcomes only when infrastructure development is accompanied by continuous investment in human capital, research capacity, entrepreneurial activity, and institutional

cooperation. Consequently, the future performance of the Northern Industrial Area will depend not only on physical development projects but also on the ability of local and regional actors to attract and retain knowledge-intensive activities. Nevertheless, the case demonstrates how the coordinated transformation of a former military area can contribute to regional resilience, economic diversification, and the gradual emergence of a knowledge-based development path.

References

- Asheim, B. T., & Gertler, M. S. (2005). The geography of innovation: Regional innovation systems. In J. Fagerberg, D. Mowery, & R. Nelson (Eds.), *The Oxford handbook of innovation* (pp. 291–317). Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780199286805.003.0011>
- Audretsch, D. B., & Feldman, M. P. (1996). R&D spillovers and the geography of innovation and production. *American Economic Review*, 86(3), 630–640.
- Barta, B., Bokányi A. et al. (2021). SZOMBATHELY2030 – A válságálló tudásgazdaság megteremtéséért. Szombathely. <https://m.szombathely.hu/kozgyules/e-kozgyules/kulonleges-jogrendi-idoszak-polgarmesteri-dontesek-2021-januar-1-tol/d199319/> Search engine: Google. (Date of access: 08 April 2021.)
- Barta Gy. (2002). Tudományos parkok: intézményesült tudásközösségek a térségfejlesztésben. In Buzás N., & Lengyel I. (szerk.), *Ipari parkok fejlődési lehetőségei: regionális gazdaságfejlesztés, innovációs folyamatok és klaszterek* (pp. 109–124). JATEPress, Szeged.
- Bokányi A. (2021). *A válságálló tudásgazdaság megteremtése Szombathelyen*. Edutus Egyetem, Tatabánya.
- Boschma, R. (2015). Towards an evolutionary perspective on regional resilience. *Regional Studies*, 49(5), 733–751. <https://doi.org/10.1080/00343404.2014.959481>
- Castells, M. (1996). *The rise of the network society*. Blackwell.
- Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and “Mode 2” to a triple helix of university–industry–government relations. *Research Policy*, 29(2), 109–123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4)
- Faragó L. (2018). Bevezető. In Faragó László (szerk.), *Kortárs térelméletek kelet-közép-európai kontextusban* (pp. 6–32). Dialóg Campus Kiadó, Budapest.
- Frenken, K., Van Oort, F., & Verburg, T. (2007). Related variety, unrelated variety and regional economic growth. *Regional Studies*, 41(5), 685–697. <https://doi.org/10.1080/00343400601120296>
- Harvey, D. (2001). *Spaces of Capital: Towards a Critical Geography*. Routledge. <https://doi.org/10.4324/9780203821695>
- Hungarian Central Statistical Office (2025). 50 largest settlements in Hungary, 1 January 2025. Hungarian Central Statistical Office (KSH). https://www.ksh.hu/stadat_files/fol/en/fol0014.html Search engine: Google. (Date of access: 22 June 2026.)
- Jaffe, A. B., Trajtenberg, M., & Henderson, R. (1993). Geographic localization of knowledge spillovers as evidenced by patent citations. *The Quarterly Journal of Economics*, 108(3), 577–598. <https://doi.org/10.2307/2118401>
- Jagadics, P. (2010). *Savaria katonai története*. HM Hadtörténeti Intézet és Múzeum, Budapest.
- Lefebvre, H. (1991). *The Production of Space*. Oxford, Basil Blackwell.
- Massey, D. (2005). *For space*. Sage.
- Morgan, K. (1997). The learning region: Institutions, innovation and regional renewal. *Regional Studies*, 31(5), 491–503. <https://doi.org/10.1080/00343409750132289>
- Porter, M. E. (1998). Clusters and the new economics of competition. *Harvard Business Review*, 76(6), 77–90. <https://hbr.org/1998/11/clusters-and-the-new-economics-of-competition>

- Rechnitzer, J. (2002). Az ipari park, mint a regionális politika eszköze. In Buzás N., & Lengyel I. (szerk.), *Ipari parkok fejlődési lehetőségei: regionális gazdaságfejlesztés, innovációs folyamatok és klaszterek* (pp. 77-92). JATEPress, Szeged.
- Soja, E. (1996). *Thirdspace. Journeys to Los Angeles and other real and imagined places*. Blackwell, Oxford.
- Szakálné Kanó, I. (2009). A tudás-intenzív szolgáltatások térbeli eloszlásának vizsgálata Magyarországon. In Hetesi E., Majó Z., & Lukovics M. (szerk.): *A szolgáltatások világa* (pp. 201-222). JATEPress, Szeged.
- Szombathely – A holnap városa legyen a jelen valósága. Szombathely a III. évezred 3. évtizedében. Szombathely Megyei Jogú Város társadalmi-gazdasági programja (2020). <https://m.szombathely.hu/onkormanyzat/koncepciok-tervek/projektek/d195720/> Search engine: Google. Date of access: 24 May 2021.
- Szombathely megyei jogú város településfejlesztési koncepciója, integrált településfejlesztési stratégiája I. számú egységes szerkezetbe foglalt módosítás (2017). <https://www.szombathely.hu/onkormanyzat/koncepciok-tervek/telepulesfejlesztes/d58758/> Search engine: Google. (Date of access: 18 January 2022.)
- Tájékoztató a Magyarországon működő ipari parkok helyzetéről (2016). Budapest. http://www.szantostarsa.hu/uj/templates/dokumentumok/280_08-06-11.pdf Search engine: Google. (Date of access: 20 January 2022.)
- Varga, Á. (2024). A tér, a hely és a lépték megjelenése a gazdaságföldrajzi kutatásokban. (The appearance of space, place and scale in economic geography research). *Észak-magyarországi Stratégiai Füzetek*, 21(1), 36-50. <https://doi.org/10.32976/stratfuz.2024.4>
- Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods*. Sage.