

Connections Between Basic Infrastructure and Industrial Commons in Hungary

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Abstract: Pisano and Shih have written about the „industrial commons” for the first time in 2012. It means a critical mass of buyers, suppliers, competitors, infrastructure, educated workforce and universities and other educational institutions in a geographical area. Industrial commons arise from a self-strengthening cycle, whereby companies want to be as close to their buyers as possible, which pulls along their supplier network. Their theory was based on their own – American – experience but world’s economy is different. For example in East-Central Europe the whole economical system was lagged behind the market and they tried to do their best to keep up. The question lies ahead: is there any possibility to change the direction and make the „industrial commons” for themselves? The most spectacular element of this system is the basic infrastructure. Having public roads, railways or river ways could make a city – or even a region – rich and wealthy but lacking such elements of infrastructure could make them poor. In my presentation I would like to point out that governments can go upside down within the „industrial commons” and decide where to invest first.

Keywords: industrial commons, basic infrastructure, East-Central Europe, regional development, industrial development

Introduction

The purpose of my study is to present the infrastructural situation of Hungary in the 21st century, with special regards to basic infrastructure, through an American economic concept. After reviewing the relevant literature on the subject, I examine the views on infrastructure and the different schools of thought in this respect. Then, by means of the relevant Hungarian data, I would like to present what opportunities the current government has for developing its economy instead of a bottom-up system fundamentally based on the situation prevailing in the USA. Due to the scale and magnitude of the topic, I am only dealing with the road network as a part of the basic infrastructure, as they are spectacular and quite

expensive investments that can only be realised with the involvement of the state in the planning, financing and implementation of the projects concerns.

1 The Concept of Industrial Commons

Pisano and Shih (2012) call industrial commons a critical mass of suppliers, customers, competitors, skilled labour, universities, and infrastructure that belong to the same industry and are located in a particular geographic area. While Porter (1993) emphasized competition between competitors, Pisano and Shih focus on the symbiotic relationship between economic and state actors within the industrial commons.

The formation of industrial commons was described by the two authors as follows. Companies want to be close to their customers, which attracts suppliers. If a new competitor enters the market, its most logical game-theory move would be to settle in the vicinity of its existing rival system. This will attract additional suppliers and skilled labour to the area, and sooner or later the universities and infrastructure that will serve it will emerge. This virtuous circle then will work spontaneously.

A key feature of industrial commons is that every economic entity benefits from its existence due to the fact that it provides a larger workforce and thus allows knowledge to flow between companies. Because of the concentration of the supplier system, for example, in accordance with the five forces by Porter (2008 [1979]), competition become fiercer, which will decrease the cost of the company's raw materials and reduces their bargaining power.

The process of formation also shows how an industrial commons can disintegrate. An economic downturn or, for example, outsourcing may result in the above process stopping or even reversing (Pisano & Shih, 2012). Suppliers and skilled workforce usually move on when companies go out of business or stop operating. Declining labour supply and increasing bargaining power of suppliers will result in intensified industry competition (Porter, 2008 [1979]). This can be an incentive for companies to outsource or can cause companies to go bankrupt. Similarly to the evolution of industrial commons, their decline is a self-reinforcing process, but a vicious circle this time.

The best example for this in Hungary is the automotive industry, which I have previously analysed for this purpose (Duczon 2019). It becomes clear, that in order to develop the national economy, it may be necessary to develop infrastructure within the country, which may attract new companies to the country or reduce tension between different regions within the country. Infrastructure plays an important role in the life of a company, as Pisano and Shih (2012) noted in their model, because the absence of it makes it almost meaningless to establish

a company in a particular geographical unit. This is almost in line with the European Union's White Paper on Transport, whereby a well-built infrastructure can contribute to the prosperity of the regions of the Earth and has a stimulating and economic impact. (White Paper, 4)

Following the change of regime, several car factories have been established in Hungary. They include Opel (Szentgotthárd) and Suzuki (Esztergom), followed by Audi (Győr), Mercedes-Benz (Kecskemét) and most recently BMW (Debrecen). From the number of factories, it is easy to see that Hungary has become a favourable location for the automotive industry, because over the years a serious system of supplier has been established. This began the development of industrial commons, which later became a self-accelerating, productive process.

2 Definition of infrastructure

Today, infrastructure is one of the most widely used and much disputed concepts of economic development. The original meaning of the word in Latin means base structure, basic structure or simply the basis or fundament of something. In the modern sense of the world, it usually has technical connotations, as it will be seen later. The use of the term became widespread dominantly during major wars, such as during the Second World War in the United States while, according to other opinions, as early as during the Napoleonic wars. To supply the huge armies in the 19th century, some special transport solutions were needed that required long-term strategic planning. This is how the construction of various roads - paved macadam roads and later railways - has gained momentum, which is still play indispensable and important role in economic activities. Researchers and experts agree that the development of infrastructure can have a major impact on the social conditions of a certain area (country, region, settlement), both in positive and negative sense (Brodorits, 2004, 6-7).

The concept of infrastructure has been the subject of several in-depth studies by economic experts and continues to be a topic of debate for experts in the field. Due to the numerous definitions, it may be necessary to classify them at some level, as they represent relatively well-defined thematic units.

The American school of thought considers infrastructure mainly as a material-technical concept. According to Hirschman, due to the scale of the infrastructure, it can be considered as "social overhead capital" because without it, no economic activity (e.g. production) can be pursued. In this sense, it not only covers technical content but also includes other measures necessary for economic functionality (e.g. legal regulations, public health, etc.) (Árva, 2014: 4-5).

On the other hand, the German school of thought also highlights the underlying institutional and humane-resource issues of economic activities. In Jochimsen's

view, not only material infrastructure but also institutional (1) and intellectual infrastructure (2) are required for an efficient (economic-production) system to function. The former includes all the traditions and customs of economic production. The latter contains knowledge made up of individual skills and experience and its various corporate dimensions (Brodorits, 2004, 9-10).

Using the results of the two schools of thought, there is a so-called structural school which is striving to achieve unity. According to J. Tinbergen, infrastructure is the basic structure all production is based on, and as such, it is considered a superstructure. Metastructure is found between the two, and, in accordance with his analysis, it represents the institutional-spiritual sphere of the system. This is due to the fact that structuralist researchers do not consider it possible to create a global infrastructure, because that would result in the loss of unique characteristics related to a specific place (Brodorits, 2004, 11).

The mini encyclopaedia of economics, compiled in this spirit, illustrates the concept as follows. Infrastructure is "the collective name for economic conditions (road network, transport, ports, utilities, public education, etc.) that do not directly participate in the production process but indirectly influence the development opportunities of production" (Brüll – Varsádi 1972, 170).

According to Kőszegfalvi (2009), infrastructure is one of the key elements of economic development. His theories, divide them into two major parts. The first is the so-called technical (land-based) infrastructure, including transport, transportation, energy, water and sanitation and sewage systems, as well as communications and telecommunications network and facility systems. The other one, social (human) infrastructure includes housing, trade and catering facilities, healthcare, educational and cultural institutions; various facilities for sports, mass recreation and leisure.

2.1 Basic infrastructure

Taking the different approaches in consideration, it became evident how diverse approaches the experts apply when targeting each segment of the infrastructure. However, it may be necessary to use a single firm concept, rather than a wide variety of definitions requiring technical and engineering background. An excellent example of this is the widely used system of conditions known as "basic infrastructure", which includes essential things which are in fact essential for pursuing any economic activity. Accordingly, the following technical conditions are included here:

- Road network (road, fixed track, [railway], airways, waterway)
- Water supply and Sewerage system (drinking-water network, sewage network)
- Power management (gas and electric grid)

The development of basic infrastructure plays a major role in the competitiveness of a country. As one can see, it contains basic requirements without which production is almost completely unthinkable. Its development can make a major contribution to the development of a settlement or region whereby it can decrease the fragmentation of the national economy and improve the quality of life of its citizens (Brodorits, 2004).

Development of infrastructure can have a strong impact on several sectors at the same time, as its development and maintenance can act as an industrial common attracting different suppliers and workforce. A typical example of this was railroad construction in the 19th century, where the emerging railway network in fact gave a new momentum to the development of mining and heavy industry. In today's sense, infrastructure development can be considered not only in the short term, but also in the longer term. By building the basic infrastructure, old companies can gain a competitive advantage (for example, by building a new access road) and attract new settlers to the markets.

2.2 Road network

A special feature of transport infrastructure is that it has a point and line-like structure at the same time. In this sense, public roads and fixed track systems (railways) represent the first category, while the second category includes air and waterways. Taking a closer look, however, they are not clear either: while a ring road or junction, as the name implies, can break the linear character of roads; an air corridor or the water itself gives room and flexibility to the latter category (Brodorits 2004).

The European Union (EU) policy has paid particular attention to the improvement of European transport conditions, which was made possible by the TEN-T programs mentioned above. In the 2014-2019 period, the European Commission subsidized 45 projects, granting EUR 1.1 billion (1.07 billion from the Cohesion Fund) was added. Three further programs in the territory of Hungary but without Hungarian beneficiaries, were subsidized by granting EUR 35.9 million. The majority of the tenders realised under CEF (Connecting Europe Facility) were actual implementation works (20 projects), there were 11 studies and the rest (14) included both. The figure below shows the amount of the subsidies concerned.

Table 1. CEF Transport funding per transport mode

	Million euro	Number of projects
Rail	860	11
Road	133	10
Inland Waterways	83,3	13
Air	15,6	11
Total	1091,9	45

Source: CEF Transport Grants, 2014-2019

It is clear from the statistics that the railways benefited the most from the four major means of transport, with 80% of the total subsidy being given to it. The development of public road network, which is relevant for the aim of this study, had a relatively modest share of almost 10%. However, the development of inland waterways required the highest number of projects (EUR 83.3 million), which may be the consequence of the concept of environmentally-friendly transport and the opportunities lying in the utilisation of domestic rivers. The European Commission has provided 86% of the total funding for the development of rail and waterway transport, which is an excellent opportunity to tackle the challenge of green transport, one of the EU's objectives. (CEF Transport Guide, 2019).

Road infrastructure can therefore play a key role in the rise of industrial commons. In this system, each element has its own task. Expressways and main roads represent the main bloodstream, i.e. the development and maintenance of them are of paramount importance for various economic activities (trade, services) and tourism itself. Main and secondary roads can represent a major economic potential, especially for agricultural operators, as their development and maintenance can facilitate access to their lands and the transport of products. The role of the local, lower level roads in this structure is the involvement of local communities in the main bloodstream. This is also significant because, in many cases, this can be the only way out of the unfavourable economic and social processes for micro-regions. The labour force tend to migrate from the settlements permanently, leaving only the elderly people at home. As a result, these areas may lose out on large investments, thus they impeded the emergence of industrial commons. Development of public roads can help to enable typically small settlements to join main roads.

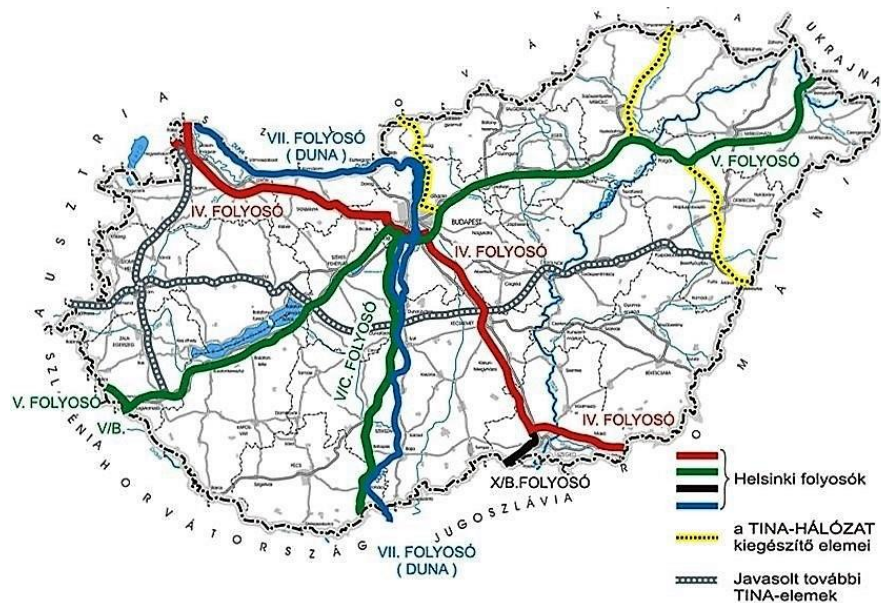
It is evident from this that the state can contribute to the economic activities of certain regions from top to bottom and determine its future path of development through developing the road infrastructure. Here, too, the saying goes, anyone who is left out of this development plan may miss out on economic investments that could even determine the future of a region.

The National Transport Infrastructure Development Strategy, issued in 2014, detailed the government's views on infrastructure development. Programs using both Hungarian and European Union funds can contribute to the country's

economic competitive edge and create new opportunities for the Hungarian economy. The most prominent of the operational programs for 2014-2020 is ITOP (Integrated Transport-Development Operative Program); its first priority is the development of International (TEN-T) road accessibility.

The first pan-European transport development was decided on in the 1990s, with the aim of involving countries outside the Union - the East. After lengthy negotiations, the European transport ministers adopted the new, multimodal corridors in 1997, named after the city where the related decision was made in: Helsinki. Five of them pass through Hungary, such as Corridor IV. (Berlin - Budapest - Istanbul axis), Corridor V (Venice - Trieste - Budapest - Lvov), Corridor V / C. (Plocse - Sarajevo - Budapest); Corridor VII (Danube) and X / B. (Budapest - Belgrade) (Fleischer, 2002). Fleischer (2002) pointed out at an early stage that the Hungarian transport structure, which is in fact a single-centre on (Budapest), faces serious challenges, therefore we cannot accept the European efforts that make these challenges even more severe. In his opinion, Hungarian needs can be helped by North-South and East-West type developments, which could both alleviate the burden of Budapest and the resort towns around Lake Balaton, and respond to local needs (such as the Szolnok-Veszprém motorway).

Figure 1. The Helsinki corridors



Source: LogSpeed. Logistics, freight forwarding and transportation. <http://www.logsped.hu/hf.htm>

Following the EU accession of the region (2004), the perception of these routes has changed since they are now part of a common EU strategy. That was the

beginning of the rise of Trans-European Networks (TENs), which are based on national land-based infrastructures. Developing and coordinating them can increase cohesion and mobility within the European Union, which was one of the prime conditions of the organization (free movement) (Kisgyörgy, 2014).

An important goal is the interconnection of different means and directions of transport through the development of intermodal nodes (IMN). They intend to connect different transport systems in several ways, thereby increasing the competitive edge of the area and connecting them to the economic circulation. The following nodes are going to be built in the country: Eger, Kaposvár, Miskolc, Nyíregyháza, Székesfehérvár, Tatabánya-Bicske (Homolya, 2017).

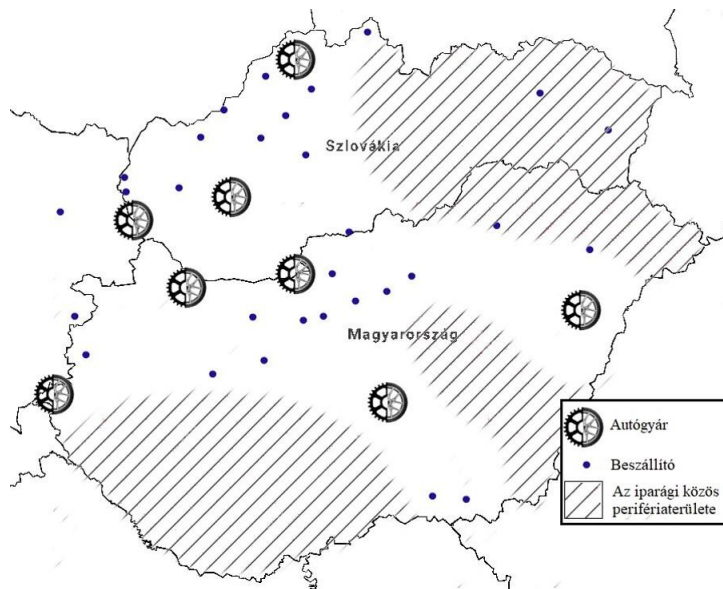
2.3 The Hungarian public road network

The construction, operation and maintenance of public roads is considered to be a very costly investment and the sector is therefore subject to state intervention. Well-constructed roads have a slow return; therefore local governments can only monitor traffic roads of local character.

The tasks of the state related to infrastructure are very broad. They include the operation and maintenance of the existing road network. They can provide resources for this in different ways: on the one hand they can help investments with renovation programs (from domestic or EU sources), and on the other hand, they provide funds from the fees related to road maintenance. The length of the toll-road network in 2017 consisted of two major sections. The first includes the expressways (motorways), which were then about 1350 kilometres long. The second part is made up of toll roads for trucks, which were 6,849 kilometres in the same year (Homolya, 2017).

Due to the state's influence, it also responsible for design and construction. Its purpose is to enforce national economic aspects, which may have several elements. From the economic point of view, the most important aspect is to ensure adequate competitiveness and the establishment of industrial commons as mentioned above. The essence of top-bottom organization in the formation of industrial commons is that government decision-makers can use the infrastructure to attract investors to the country to develop the national economy with a multiplier effect. An excellent example of this is the formation of the Hungarian and Slovakian automotive industrial common.

Figure 2. The Automotive Industrial Common of Hungary and Slovakia and its Peripheral Area



Source: edited by the author himself based on data by Invest in Austria (2018), Slovak Investment and Trade Development Agency (2018) and Hungarian Investment Promotion Agency (2012).

The figure clearly shows the geographical location of the automotive manufacturing capacity. In my previous work (Duczón 2019) I have already presented a detailed analysis of this. From our point of view, it is worth paying attention to the peripheral areas of the country. As industrial commons evolve, there is a tendency to have parts of the country that do not benefit from them. They include the southwest and northeast of the country, which do not fit into the existing structure. Therefore, it is a priority task for the state to ensure that these regions are somehow involved in this system. This could be achieved by the development of education or, for example, through a series of infrastructure reforms.

The government therefore intends to develop intra-country mobilization in several ways in order to reduce lagging regions and increase economic investment. This could include connecting county seats and towns with county rights into the motorway network. A good example of this was taking motorway M6 to Pécs. The next step could be the extension of the various existing motorways to the national borders, whereby transnational - regional - economic relations could be developed, too. In addition to maintenance tasks, improvements and developments are also needed, including the construction of bridges, bypasses and 2x2-lane highways as part of the national strategy.

Table 2. The Key Data of the Hungarian road infrastructure in 2017

Indicator / dimension	Length of motorways per 100,000 inhabitants (km)	Length of expressways per 100,000 inhabitants (km)
Central Hungary	4,9	14
Central Transdanubia	18,7	24,7
Western Transdanubia	12	33,4
Southern Transdanubia	26,3	38,2
Transdanubia	18,8	31,7
Northern Hungary	12,3	15,3
Northern part of the Great Plains	11	13,5
Northern part of the Great Plains	14,2	17,2
The Great Plains and the Northern areas	12,4	15,2

Source: Figures in the table have been calculated by the author based on 2017 data by CSO.

It can be concluded from the data that Southern Transdanubia is the worst in terms of motorways (26.3 km of motorway for 100,000 inhabitants), followed by Central Transdanubia (18.7 km for 100,000 inhabitants). Northern Hungary, mentioned above regarding automotive industry, boasts better conditions in this respect, with having 12.3 km of motorways for a hundred thousand people in 2017. It can be stated that Transdanubia, especially its south-southwest corner, has a significant disadvantage in the development of motorways, which cannot be mitigated even by the industrial unit located in the western part of the area (Szentgotthárd, car factory). A similar trend can be observed in terms of expressways. Southern Transdanubia has the worst situation once again (38.2 km for one hundred thousand people), followed by Western Transdanubia (33.4 km for one hundred thousand people). In contrast, Northern Hungary boasts better figures in the same indicator: it has 15.3 km of expressways per 100,000 inhabitants. Taking a closer look at the 2017 data, one can have a better understanding of the strategic vision behind government development programs such as Intermodal nodes. It also draws attention to the regional disparities that the government must pay attention to if it is to avoid destabilizing the country.

Conclusion

Based on the ideas of Pisano and Shih, it can be concluded that the Hungarian infrastructure development contributes to the establishment of industrial commons. The Hungarian government is actively involved in the creation of such structures, which can simultaneously increase the country's competitive edge and bring the different regions of the country closer to one another. The European Union's development programs and subsidy systems can contribute to the development of a country's competitiveness. This will enable them to be integrated into the European market and then into the global market. One of the best examples of this is the development of the Hungarian basic infrastructure, especially the issue of road network development. Comparing the regions, it became evident that without the development of the road network or the maintenance of the existing one, there could be parts of the country which may be left out of the great economic developments. Therefore, the state must take active initiatives to ensure that these lagging areas should not disappear for the economy, on the contrary, improve their situation through various proposals.

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