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Transportation Effects on Spatial Structure of Hungary

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INTRODUCTION

On account of its geographical situation Hungary, as a meeting-point of transcontinental transport, has a significant transit function and it is the place where the communication channels linking Western and Eastern Europe as well as Northern and Southern Europe converge. To make use of a technical term: Hungary is a „ferry-country". Also because of the above mentioned endowment in comparison with the socio-economic development level of the country a high-standard railway-network has been built which proved to be an unusually strong spatial structure-shaping factor. In this paper I am going to give a brief survey of the characteristic features of the interaction between the transport network and the general regional structure.

MONOCENTRIC SPATIAL STRUCTURE BROUGHT ABOUT BY TRANSPORT AS A HISTORICAL HERITAGE

Hungary is one of the European countries having the most concentrated settlement structure. Its capital is a metropolis with 2 million inhabitants. From among its other cities the biggest ones (*Debrecen*, *Miskolc*) are only one-tenth of the size of Budapest, therefore they are unsuitable for fulfilling the role of „counterpoles" as designed originally by the regional planners. In addition to this, the capital has a much greater weight in the economy, trade, foreign tourism, education and culture than it might be suggested by the 1:5 proportion of the number of inhabitants (its share in the industry has declined from the 54% of 1938 to 25% by now as a result of the decentralisation efforts). The innovation activities have been concentrated here in every period and nearly completely. In the non-industrial sectors decentralisation has been next to nothing. In the information society taking shape nowadays the provinces once again will not stand the chance to catch up with the national centre often referred to a bit rudely as *hydrocephalous*.

The unheard of magnitude of settlement and economic-intellectual concentration, the unhealthy capital-centredness have come into being as a result of several factors. From the geographical aspect, an argument may be that the configurations of the terrain and the natural endowments, the basin-character (the centripetal force lines of the economy and the

settlements have „predisposed" the *Carpathian basin* which has an area of over 300,000 square kilometres to have a centre somewhere in the middle) has promoted this concentration as much as the historical endowment as a result of which the economico-social forces of the backward country existing within the framework of a semi-feudal rural society were not sufficient for the formation of further cities. In the final account, however, it is the establishment of definitely radially structured trunk lines and arterial roads. (In France the railways starting from Paris are linked by transversals built in the peripheries, therefore the railway network is radial-arched, while in Hungary it is only radial because of the lack of transversals.) This network form, however, is neither a „natural endowment" nor *deus ex machina* but rather the result of a deliberate action motivated by political considerations.

Having lost its independent statehood, Hungary was part of the *Austrian Empire* until 1867. In the middle of the 19th century, accordingly, the first railway network plans served the interests of the Austrian Empire. The railways were planned in the direction of *Vienna* and *Triest*, the only Austrian port, detouring *Pest-Buda* (which was not more densely populated than *Debrecen city* in those days) in the interest of exporting the Hungarian agricultural products.

Out of these plans, however, only a few tracks were realised and most of the network (in the *Alföld* which is the Hungarian name of the *Great Hungarian Plain)* had become completely Budapest-centred already prior to 1867. With the *Compromise* having been concluded with Austria in 1867 and the relative independence of Hungary the economico-political conditions for the assertion of the Hungarian national interests were created. For a while, however, the orientation and structure of the network that would serve the best interests of Hungary were not clear. In the Great Hungarian Plain, which played a decisive role in agricultural exports, such railways would have served most directly the interests of the landowners of the Great Hungarian Plain (in the southern part) which would have established the shortest haulage facilities in the direction of the countries beyond Austria or partly of the western countries to be reached by sea. This would have been in the best interest of releasing economic dependence on Austria. The *Nagyvárad* (now *Oradea*)*–Szeged–Eszék* (now *Osijek*) section of the *Alföld–Fiume* (now *Rijeka*) *Railway* and the *Bátaszék–Dombóvár–Zákány* section of the *Danube–Dráva Railway* were built with this purpose in mind.

These transversal tracks undoubtedly served direct regional interests, our exports of agricultural produce and through them the increase of

our export proceeds represented a national interest in the final account. Nevertheless from among the railway development alternatives the alternative which ranked first was soon the one which would also have allowed for the transformation of the Hungarian capital into a European metropolis being able to compete with and counterbalance Vienna within the *Monarchy*. This aspiration was served on the one hand by the construction of new state trunk lines (the *Alföld–Fiume Railway* among others) towards *Budapest* capable of competing efficiently with the lines of the private companies by means of halting the construction of the transversal railways having been started and diverting the traffic towards the capital by means of tariffs. In this action the Budapest lobby of the milling industry took a prominent part.

The excessively one-centred development of our railway trunk lines continued until the early twentieth century. By that time Budapest had advanced to a metropolis „having a really firm footing feet" and the dominance of the milling industry came to an end.

Upon the pressure of the disadvantages of the unhealthy centralisation and limited traffic throughput of the railway stations of Budapest, the government promoted the traffic detouring the capital by means of the completion of the formerly started transversals from the first decade of our century and by building a new transversal.

As long as the objects of the assertion and confrontation of the imperial and national interests were the trunk lines, the (regional, provincial, local) territorial interests of lower category mainly appeared when the branch lines or rather the so-called suburban railway lines were to be established.

It was the counties that represented the provincial interests. The main efforts of the county policy in the age of Dualism were directed at maintaining the administrative territorial integrity in spite of the changes having taken place in the territorial structure of the economy and the gravity zones. The unconditional respect for *status quo* was given priority over realities. The only exception to this was when territorial expansion was possible at the cost of the neighbouring county. Hostile behaviour was seen in the planning of any railways which led from the respective county towards the seat or other centres of the neighbouring county and whenever there was a possibility that some part of their county might belong to the gravity zone of the central settlements of the neighbouring county and get disannexed later on.

In connection with the under-urbanisation of Hungary in nearly all the counties not only was the county seat the largest settlement by far but

also because of the weakness of the economic energies, it was not possible for the other central settlements to grow to a size similar to that of the county seat. The dominance of the county seats had an impact to this effect in the exercising of a monocentric county policy, among others by means of the county seat-centred development of the transport network as well as by the prevention of the centres with secondary towns from obtaining a better transport position.

In the comparatively moderate complementary railway constructions carried out after 1945 we cannot point out marked regional interests but rather sectoral, more specifically heavy industrial ones. (Short bylines were built to link mines, large industrial combinates, cement-works with the railway network.) At the same time the routing of our motor ways having been built from the 1960s exclusively in a monocentric structure is not free of the dominance of certain territorial interests either. For example, in the designation of the motor way along *Lake Balaton* mainly the interests of the capital were taken into account by the Budapest Designing Office. The motor way was located in the nearly contiguously built-up linear foreign tourism agglomeration situated along the lake or on its outskirts because the carriage of the inhabitants of the capital who are disproportionately interested in the „use" of *Balaton* as compared to their number can be facilitated and made faster in this way. The former disadvantageous regional structure (excessively centred on the strip of land around the lake) has been conserved and this may be the main adverse effect of the high performance line of communication. The actual preservation of the provincial interests of *Somogy county* and of the viability of the settlements in the depression zone — lying a long way from the lake-shore — would have been served by a motor way situated at least 18–30 kilometres from the shore which not only would have relieved the burden from the viewpoint of the traffic and the environment but would also have established a new development „passage in the hinterland".

The historically inherited monocentric transport structure of the country has not been eliminated up to now. On the other hand, in the past decades the necessity of the further development of a transversally directed transport bypassing the capital has been acknowledged on several occasions in accordance with the decentralisation efforts of the regional policy. In reality, however, from the two bridges with mixed traffic crossing the border between Budapest and *Yugoslavia* on the one in *Dunaföldvár* the railway passenger traffic has been discontinued while the increase of its freight traffic faces a technical obstacle: the weakness

of the track. Although the bridge in *Baja* town is situated more favourably from the aspect of transversal traffic, its railway has only medium performance.

Our biggest foreign trade partners can be found partly in the north-eastern, partly in the east-western directions, therefore in the foreign trade transport of the southern half of the country the shortest route is the one via Budapest. This fact in itself is good enough reason to build a bridge over the Danube which would not interfere with the internal traffic of the metropolis, somewhere between *Dunaújváros* town and Budapest. The transport of this bridge would be considerably greater than that of the bridge planned to be built in the region of *Szekszárd* town (leading the Southern Motorway to the Great Hungarian Plain) because at this point the transport may be strongly divided with the neighbouring Baja Bridge (*Figure 1*).

The balance of the regional relations proves that in the country which turned out to be one-centred the demand for goods and passenger transport is of much lower intensity between the peripheral areas of the country than between Budapest and the provinces. With this argument it was easy to put off the advocates backing the development of transversal traffic. Yet there is no hope for the functional relations to become deeper without an adequate direct traffic link. It would be possible to break this *circulus vitiosus* only if the transport development policy tried to meet the demands for transport.

Neither the establishment nor even the partial discontinuance of the traffic network (under the aegis of the national traffic concept) is free of the assertion of various territorial (county, local) and sectoral (traffic, industrial, agricultural) interests.

On the basis of our investigations which cannot be detailed here on account of space we can give the following reply to the question (raised by us concerning the criterion of the economical operation of the railway lines) of economicalness from the viewpoint of the government, or as the interest of the national economy, public service or business efficiency, is that the national economic interest should be the main consideration even under the conditions of a regulated market economy (involving regional interests as well) being capable of maintaining a social net.

In the process covering 25 years which led to the discontinuance of some 700 railway lines of standard gauge and of approximately the same number of narrow gauge lines can be divided into three periods. The first period from 1959 to 1968 eliminated the short by-lines having been cut off by the state frontier and this was the period when the fewest changes

in the network could be registered. The second longer period was marked by the „Traffic Policy Conception" of 1968 which clearly formulated the necessity of the differentiated development of our railway network. The liquidation of the feeder (branch) lines in the internal parts of the country was also commenced. From the mid-1970s liquidation slowed down gradually and in the early 1980s hardly any further lines were wound up.

The consequences of the discontinuance of lines, however, have some significance beyond the issue of traffic itself, therefore, the second block of secondary effects is constituted by the effects having occurred in the economic development in the production sphere.

While in Western Europe the road traffic was able to compensate for the railway lines with a high substitution value to such an extent that the diversion of traffic to the public highway merely resulted in the reduction of the value of the premises without being compelled to close down the plants, in Hungary the railway discontinuances made impossible or uneconomical the transport-intensive industrial production.

The transport-intensive plants (brickworks, flax-mills) located on a large amount of local raw materials and based on local workforce were closed down, thus the utilisation of local raw materials delivered with difficulty had to be abandoned in the end.

Certain sylvicultural and agricultural bulk raw materials tied to one place, such as wood and fruits are so much valuable and in demand that now they reach the remote processing industry by means of the more expensive road haulage.

The operation of some plants processing also local raw materials was not discontinued after the closure of the railways because they manufacture products not to be substituted (brickworks and mills producing special products).

The plants having obtained a position at the end of the by-lines as a consequence of the discontinuances of lines (in *Zalaszentgrót, Nagyatád* towns) can carry out their traditional railway conveyances in a roundabout way.

Between *Nagyatád* and *Barcs* town, two intermediate-grade centres of *Somogy county*, the chances of economic or other kinds of co-operation became less favourable. In the maintenance of the relations of both towns with the gravity zone and other regions considerable difficulties arose as a result of the railway transport having become one-sided.

The railway caused undesirable changes in the agriculture and the supply with agricultural products.

In some places the structure of the agricultural production was modified because the intensive agrarian cultures producing masses of haulage-intensive produce (e.g. sugar beet, flax, potatoes) were terminated or reduced.

The diversion of the railway transport onto the public road, the rise in the prices of haulage deteriorated the supplies of vegetables, fruits and dairy products offered by the small producers on the markets of the affected towns and it also contributed to the unusually rapid increases in the market prices. The inhabitants and holiday-making buyers of *Kaposvár*, *Pécs*, *Baja*, *Sárvár*, *Barcs* towns and of the western shore of *Lake Balaton* were affected the most adversely.

In consideration of the long-term perspectives the large-scale agricultural plants invested a lot of money in the formation of the railway platforms. Nevertheless, they were not compensated for the loss of the facilities. At the same time the cost of the industrial products used in agriculture (chemicals, soil-improving material) became more expensive.

The lack of railways generated did not leave foreign tourism and rural tourism, that is the spread of „second homes" unaffected either. The railway connection of the spas — *Harkány*, *Sárvár* and *Bükfürdő*, famous all over Central Europe — have lost one direction each. The discontinuance of the suburban line between *Pécs–Harkány* reduced temporarily the popularity of *Harkány*, a health-resort of national significance, and the gravity zone of *Csokonyavisonta*, a watering-place which was also left without a railway line, was reduced, too. Elsewhere, since it is possible to travel to the zone of weekend cottages only by the more expensive buses, a lot of people sold their plots and weekend cottages. In spite of its shortness the significance of the *Veszprém– Alsóőrs* railway line was given by the long-distance transit passenger traffic both in the summer bathing season and in autumn (at vintage time), being used by the inhabitants possessing properties on the northern shore of Balaton as well as by the vacationers of the zone around *Győr* city. Its discontinuance deprived the inhabitants of North Transdanubia of the cheapest and most comfortable means of reaching *Lake Balaton*.

In addition to the direct economic consequences of the lack of railways reduced the value of the settlements as places of habitation, hindering qualified labour form settling down there. Its consequence is typically revealed mostly in the postponement of the development of population infrastructure, and within this, in the moderately higher prices of housing construction. The demographic-social effects are closely related to the issues above, thus to the reduction in the value of settlements as

places of habitation, too. The discontinuances of railway tracks have afflicted most seriously the strata living under the most unfavourable circumstances, namely the people in the lower income brackets, the elderly, the women and members in the families of the manual workers without private cars.

Making decisions relating to the discontinuance of railway tracks even the main aspects of regional planning were ignored. Looking at *Figure 2* we can see that it took place on a larger scale precisely in the peripheries, in the disadvantaged regions (mostly with low productivity) or flat territories covered with sand or pebbles in *Zselic, Southern Somogy, Vas* and *Zala counties* etc. being a step which caused impoverishment for both the inhabitants and the farms. Particularly striking is the situation of Southern Somogy. Signs of insensitiveness on the side of the Hungarian State Railways (*MÁV*) to the local and regional county interests are shown by the fact that three branch-lines of meridional direction linking the *Dombóvár–Gyékényes* and *Pécs–Barcs* main lines were discontinued, the railway, as it were „withdrew" from the provinces. From the aspect of regional planning it was a serious mistake to afflict this region in a concentrated way, and deprive a region of the railway where the profitability of agriculture is very low and the economy- and population-stabilising means should have included, among other, the improvement of the traffic.

With the rerouting of traffic onto the public road the costs of transportation multiplied and instead of offering the promised „civilised" passenger traffic, the superannuated population had to make do with the much more expensive buses of lower comfort level which ran unreliably.

Since the regional system of recent bus services, the direction, length of their lines deviate from those of the former railways at several points, the accessibility conditions of the central settlements have been modified to the most diverse extent and according to different signs in the individual areas the limits between the gravity zones, the territorial proportions of the intensity zones within the gravity zones were also changed (e.g. within *Zala* and *Békés counties*).

The tertiary effects of the discontinuances influencing the whole national economy are revealed in the prevention of decentralisation, the undesirable territorial differentiation of the economic-demographic potential, the emptying of certain areas and the strengthening of the cumulative agglomerative tendencies. Both tendencies cause the increase of the social costs.

In the last analysis the selective development of the Hungarian railway network (reconstruction and electrification of the trunk lines, and at the same time the discontinuance of a part of the branch-lines) contributed to territorial concentration, strengthening the position of the high performance development axes and promoting the increase of the territorial disproportionateness.

REGIONAL CHARACTERISTICS OF PASSENGER TRAFFIC ON THE BASIS OF INTER-SETTLEMENT TRAFFIC CONNECTIONS

Below is given a survey (restricted solely to traffic for public use) of the regional peculiarities, structure of the long-distance and gravity zone passenger traffic.

According to direction, service and distance in the structure of local traffic needs characteristic tendencies have been dominant in recent years. Above all, the change in the motivation of the social demand for several long-distance journeys deserves our attention. Before the socialist industrialisation within the total output of travels — we shall disregard now the neighbourhood of the then existing Budapest agglomeration and some industrialised cities or mining towns — short-distance commuting directed at certain centres of employment was negligible, yet regular travelling for other purposes was not intense either. In fact migration and then moving back periodically in connection with seasonal employment across the county limits was more characteristic. The people employed in the broken up retail and peddling trade together with the populous group of craftsmen and civil servants constituted an important part of the crowd inducing long-distance traffic, only a fraction of whom can be classified as passengers travelling for private purpose.

From the 1950s not only short-distance commuting to work and educational establishments involved large masses but the number of those travelling short-distance for business purpose (within the districts and the county) also increased.

As a result of the extensive industrialisation practically restricted to Budapest and a few heavy industrial provincial centres, the great majority of the considerably increased profession (or job)-related traffic multiplied the demand for long-distance traffic — at the weekends as a rule — by means of the periodically commuting passengers. The strong cen-

tralisation of administration also contributed to it as a consequence of the inflated official and administrative machinery, traffic related to office and administrative work restricted merely to working days became more frequent. General experience shows that private cars are more and more frequently used as means of short- or medium-distance traffic for business purpose. In this respect passenger traffic providing long-distance services — continuing to meet the important needs for travelling for official purposes (mainly directed towards the capital) — should be directed more and more towards travels related to private life and foreign tourism. The means of traffic may differ according to routes. From the two routes related to the capital the macrostructure of our passenger traffic is characterised by the predominance of the railway lines which are traditionally of monocentric direction in reaching the capital, while in the transversal direction by that of the long-distance bus routes designed in principle to substitute the railway lines. The possibilities of the two constituents of the main network are not, however, by far equivalent in the creation of the actual connections. Despite the original intention the long-distance bus services became a suitable means of long-distance journeys only to some extent because of their slowness while this was not the case with the short- or medium-distance „chain traffic" involving a strong change of passengers. Thus the service provided by them but rarely ever used all along the route is more of a potential than functional value because of its contradictoriness. In the gravity zone relations, however, the performance of buses outrivals that of the railways.

1. Long-distance (inter-regional, inter-provincial, intercity) public transport links

The means of long-distance railway passenger traffic have been the fast and express trains for a long time as well as the so-called „bathing trains" which stop only in a few places and are provided mainly as a form of tourist service.

As opposed to the 20 main lines carrying also fast and mainly express trains starting from Budapest and branching out at the junctions which are distant in relation to the capital back in the 1950s there hardly existed one or two trunk lines of transversal direction, or fast train services in the southern half of the country (*Figure 3*). From the 1970s several new transversals were built in the northern half of the country, some of which, however, may be evaluated only as quasi-transversal because they link the large regions only via Budapest. The large regions separated

by the *River Danube* are linked by the *Pécs–Szeged* fast train running all the year round (and in summer by the fast train between *Szeged–Fonyód*) along a real transversal detouring Budapest. Between the large regions of the country lying east of the Danube, between the Great Hungarian Plain and the Northern Range of Mountains only the fast train running on the *Miskolc–Nyíregyháza–Szolnok–Szeged* route and the one running on the last three days of the week on the *Salgótarján–Jászberény–Szolnok–Debrecen* line and the fast train started every day in the better part of the year on the *Szolnok–Jászberény–Eger* line create a connection. The latter were favourable to the commutation of workers employed in the industrial region of *Nógrád county* and to reaching *Eger* town, a centre of tourism. The interregional connections between the large regions also greatly improved the possibilities of long-distance transport, cutting short the trips which formerly could be undertaken only at the cost of changing trains. The majority of (intra-regional) lines within one region connecting several county seats as well as settlements being exposed to tourism are the result of the past decade.

A large contiguous region not touched by the railway lines of central and transversal directions carrying the long-distance traffic can be found embraced by the *Budapest–Hatvan–Miskolc* and the *Budapest–Szolnok–Debrecen–Nyíregyháza–Miskolc* trunk lines bordered on the west by the *Szolnok–Hatvan* rail track in the northern part of the Great Hungarian Plain. The second largest remaining territory is made up of a triangle flanked by the *Szolnok–Debrecen* and the *Szolnok–Békéscsaba–Gyula* railway lines and by the *Hungary–Rumania* frontier section in the southern territory lying east of River Tisza.

The destinations of the long-distance buses starting from Budapest (*Figure 4*) are county seats only partly (15 county seats, altogether 17 regular lines). Nearly the same number of lines have destinations which are not county seats (13 other towns, altogether 18 regular lines) and even more, settlements which merely have the legal status of rural community (15 rural communities, altogether 17 regular lines). Only a few of the towns which are not county seats (*Balatonfüred, Keszthely, Siófok*) and a considerable part of the rural communities have the function of tourist bathing resorts or mountain holiday resorts. The bus lines starting out from the capital are not exclusively directed to the towns situated on the peripheries and accessible only with difficulty, since there are also towns among them lying by the trunk line, such as *Komárom, Pápa* etc.

We will speak more specifically about the transversal bus lines which are of greater importance than the central ones from the viewpoint

of the long-distance regional connections later on, when dealing with the connections between the county seats. Taking into account both the central and transversal lines it is remarkable that in the east-northern part of the country (from the *Jósvafő–Miskolc–Polgár–Nyíregyháza–Debrecen–Gyula* line to the east) there is a complete lack of long-distance bus lines which can hardly be justified by the substituting performance of the railways there. (The lack of bus services towards the capital at the middle reaches of *River Tisza* is presumably the consequence of the competition created by the fast trains which can run on the plain much faster.)

It is still an open question how much the long-distance railway and bus traffic are co-ordinated spatially with each other. In a speculative approach the two transport carriers have to be able to substitute and complement each other as much as possible in order to meet the demand for traffic. Yet the public road transport should be adjusted to the formerly established railway system. If — as is often the case — the railway trunk line and the arterial road carrying the bus traffic run in one direction, next to each other, connecting the same important settlements, the chances of both temporary substitution and of easing the burden are possible. This doubling of the track, which improves safety and continuity, however, is not required (e.g. between Budapest and Szolnok) therefore it has not been not realised in all the main directions of the country in the passenger flow.

a) Communications between the capital and the provincial towns

Our most important railway trunk lines leading to the capital were constructed as early as the mid-1870s. These lines connected the majority of the urban settlements. The main lines built later connected a strikingly low number of towns and the development of the regions, settlements lying nearby proved to be weaker as well, not being able to overcome the disadvantage they had in comparison with the formerly built trunk lines because of the delay. The only exception to this is the *(Budapest) Kelenföld–Komárom* main line with the coal-basin of *Tatabánya* town which was explored relatively late and the industries allocated on the coal-base. The long-distance bus service launched between the two world wars provided an alternative for reaching the capital on several routes but it was not able to compete with the railways yet.

After 1945 up to the 1960s the accessibility of the capital from the provincial towns did not change significantly. On the other hand, from the second half of the 1960s the possibilities provided by the existing

tracks and some branch-lines which had been reconstructed into main lines were made use of by starting fast through trains to the capital from *Zalaegerszeg*, *Makó*, *Eger*, *Gyöngyös*, *Mátészalka*, *Nyírbátor*, *Ózd* and *Kazincbarcika*.

The possibility of travelling between the capital and the provinces without having to change trains was also improved by the long-distance bus lines established in the 1950s (*Figure 5*).

With regard to the routes between the capital and the provincial towns and from the aspect of national public administration and tourism the accessibility of the county seats from Budapest is of the greatest significance. In comparison with the other routes these tracks meet the requirements to the greatest possible extent. All the 18 county seats are connected with the capital by the (predominantly first class) main railway line which ensures the running of fast, and even express trains (with the exception of *Szekszárd*, *Eger* and *Salgótarján* towns) and also by a trunk-road (with the exception of five county seats: *Szombathely*, *Békéscsaba*, *Zalaegerszeg*, *Kaposvár* and *Eger*). At the same time, the section of the trunk-road connecting the other towns with the capital is much longer than the road of second rank touching them. Only *Miskolc*, *Nyíregyháza* and *Debrecen* are not connected with Budapest by a direct bus line. (It is true, however, that the capital is connected with these remote areas by railway trunk lines of the highest performance, in the case of Miskolc there is no great distance involved.) The closeness of the connection between Budapest and the county seats (provincial towns in general) is determined essentially by three factors:

- their distance from Budapest,
- their position as a junction of trunk lines and the volume of transit traffic flowing across them,
- the size, socio-economic weight of the respective towns.

On the understanding of this principle *Székesfehérvár* town has the closest and *Zalaegerszeg* town the loosest connection with the capital.

On going beyond the category of the county seats and examining all the towns already worse proportions can be seen: out of 143 towns 31 (21.7%) have no direct connections with the capital either by railway or by bus services, a somewhat more than half of these (16) are situated in the Great Hungarian Plain, somewhat less than a half of these (14) are in Transdanubia and only a single town in the northern mountainous region.

b) Communications between the provincial regions and cities

Up to now it has not been possible to make the communications of the Hungarian regions with each other independent of the natural endowments. There are not enough bridges over our rivers. It is typical that while on the Yugoslavian section of the Danube river a dozen of bridges have been built since 1945, in Hungary not a single one. Disregarding the potential connections made possible by the use of several tracks and roundabout means (mostly via Budapest), nine of the regional centres are connected with others by main traffic roads. Only *Miskolc* city is in the exceptional position of having a direct railway connection with all the other regional centres. Even fewer connections were realised by means of direct bus services. Basically only in the eastern part of the country was established a chain of bus services between the regional centres (*Figure 6*).

In offsetting the role of Budapest, the junctions of the transversal links established with the purpose of forming a ring which connects the large cities, the county seats played a decisive role, but mostly in the bus service and less by means of the rail transport.

The traffic relations are essentially characterised by the fact how many of their counterparts the individual county seats have a through connection with. Only Budapest, which also has the function of a county seat, is characterised by a comprehensive mutual connection. The number of the connections of the other county seats is between 4–13, i.e. 22.2–72.2% out of the possible 17. The number of the connections shows only a very loose correlation with the population number of the towns of county status. Although the average value (10.8) of our regional centres is over the weighted average value (8.56) of the 18 provincial county seats, only two of them take the lead. *Debrecen*, for example, does not reach even the average value. *Miskolc* city has the highest number of connections, mainly of railway lines. *Szeged* city, however, owes the great number of connections with the other county seats to its motor coach services above all.

On the other hand, the favourable geographical and traffic position occupied in the network of the trunk lines (namely the regional functioning of the county seats as busy junctions, or their relative closeness to Budapest, the national monocentre of traffic, the situation relating to the central part of the country) is not positively asserted in the number of the connections in each case. Although in accordance with the gravity model the basic determining factor is the distance from each other, its impact is rather different even in the case of the roughly similar kilometre-catego-

ries. Relative closeness (a distance within 100 km) can be positively asserted if the investigated towns are connected by trunk lines (mainly by the ones leading to Budapest). If, however, only lower-grade roads are available in spite of the relative closeness of air kilometres, and if in addition there is a lack of rail connection, or there is a river separating the two counties from each other, there the relationship may be weak as well.

Therefore, in spite of the laudable results achieved in the development of the transversal public road transport, even today practically the monocentric-radial network forms the structure determining at the same time the direction of the inter-provincial connections also by means of the main traffic passages that it forms.

In the intercity relationships of a Hungarian town with all the other towns the weight of the railways is merely three-quarters of that of the bus services on the average. The differences between the various town categories are spectacular, these are, however, not always consistent according to the „curve" in relation to size. The relatively great role played by the railways in the county seats in accordance with the requirements is not only a consequence of their network junction position but in several cases also that of the running of long-distance trains on a railway network formed by means of long bypasses. In accordance with the original conceptions the railway positions of the non-county seat towns are already weaker, yet strangely enough, in the large urbanised rural communities the value of the railway is enhanced, rising to a parity value of the bus services in comparison with the former categories.

The traffic value of the individual towns is greatly influenced by the number of through connections and the number of the towns they have connections with. According to our calculations (*Figure 7*) in the system of connections of all our towns (similarly to the existing situation of the regional centres and county seats) *Miskolc* and *Szeged* form the two main foci. The value of Miskolc reached first of all on account of this railway is adequate with its size in this respect, too. The value of *Szeged*, however, reached on account of the overwhelmingly transversal interregional bus services is somewhat higher than its size might justify it. This is a great achievement also because its situation along the frontier is unfavourable from the aspect of creating a multi-directional system of relations. On the other hand, the public transportation companies which have a high esteem for the central cultural-scientific function of the town, practically „over-compensated" the disadvantage of its peripheral situation.

On the other hand, the inland cities of *Kecskemét* and *Székesfehérvár* with their connections with 44 towns each are competing for the second and third places „in a tie" and owe their high traffic values to the transit lines crossing and running within them. It is characteristic of both cities that a higher number of towns can be reached by means of bus services starting from and to them, but the ones which can be reached by trains as well also have a share of over 50%. The city of Pécs which ranks fourth (41 connections) is also in a fairly peripheral position but this is counterbalanced by the fact both north- and westward it has an extensive action scope in the southern half of the country. The railway has dominance in providing connections, in spite of the fact that over the Danube only the Baja Bridge leads to the Great Hungarian Plain. Despite its extremely favourable central position, *Szolnok* town has to make do with the fourth place, because its motor coach connections are relatively underdeveloped (in the „shadow" of its excellent railway connections).

The towns functioning as county seats are connected with 39.8 urban settlements. The formation of the values is moderately related to the size of the towns (the towns with over 100,000 inhabitants are connected with 41.9, while those with inhabitants below that number, with 33.2 towns, respectively) with the geographical situation playing only a subordinate role.

The average number of the connections of the other towns (17.1) falls significantly behind that of the county seats, and the connections of the large urbanised rural communities are even weaker than that (11.3). Some relation, however, can be shown between the size and the number of connections within the non-county seats. (The average number of the connections being 11.4 in the towns with a population below 20,000, 17.6 in the ones with a population between 20,000–40,000, 22.1 in those with a population between 40,000–60,000 while in the towns with a population over 60,000 it is 28.)

The long-distance connections are often hindered by the lack of access roads because of the county limits. The effect of the county limits interrupting the economic space, a kind of traffic discontinued on both sides of the limits is actually revealed in the lack of roads between the large rural communities (lying close to each other geographically). This is so because the Power motivated by the particular interests of the individual counties gave preference to the centripetal directed connections over the centrifugal ones. By the elimination of the lack of various types of connections, classes and functions, an extremely different weight or

significance of the regional and inter-settlement relations can be established.

The current lack of roads may be justified only by the existence of the natural obstacles which can be overcome only by using disproportionately high expenses. The ancient county limits were often demarcated on the forest-covered mountain ridges, or along the bigger streams or rivers which could be crossed only by means of a long bridge or a ferry. It is profitable to overcome the natural obstacles only when the expected consequence brought about is a significant improvement in the traffic connections both for the smaller and the larger region, which is rarely the case. Road construction is hindered again, if between the settlements to be connected a nature conservation area is situated, where only a limited amount of intervention is possible.

With the construction of certain roads the accessibility of some central settlements of the neighbouring county might become more favourable from some rural communities. Thus, there is a „danger" that the gravity zone of the present centre of settlements may lose the rural community in the functional sense, as well as the county from its administrative area.

2. Public transport links in the gravity zones

On account of its wide use this may sound as a commonplace that traffic has a decisive role in the formation and extension of the gravity zones, since all exchanges of material nature — indirectly the communication of ideas — between the central settlements and their gravity zones are mediated by the traffic. So the possibility of asserting the gravity of a central settlement is conditional upon the possible distance provided by the traffic connection. As this is an interaction, the gravity zones are generated by the traffic performances between the attracting and the attracted settlements. In Hungary the gravity zone-related traffic performances have a share of 90–92 % with regard to the whole of inland traffic.

In Hungary (with the exception of Budapest) the gravity zones are not large enough to have an independent suburban rapid-transit system with their attracted neighbourhood. The smaller the centre, the more the sections of long-distance traffic which are close to the centre become carriers of its relationship with the gravity zone. Railway traffic has a marked character of gravity zone only in the agglomeration of the capital — and somewhat beyond that territory — and commuter trains are run only in the gravity zones of a few larger provincial towns. One can travel

to small or medium-sized centres only by through or long-distance railway trains.

a) The relationship of smaller towns with their county seats

From among the needs for long-distance-intercity travelling the smaller the difference between the populations and functions of the investigated towns and the longer the distance between them is, the less the weight of travelling to work or on business becomes. In this respect the irregular, ad hoc, aperiodic travels — connected with visits, entertainment and tourism — for private purpose are more characteristic. The greater the differences of size and function between two towns are, the greater the possibilities of the establishment of traffic of gravity zone character towards the town of greater importance are. The latter includes the traffic connection of the towns with their respective county seats. Of course, the double, temporary character of this cannot be denied, since besides the gravity zone relationship and subordination to the county seats, which rank higher in the hierarchy of public administration, the relationship of the interconnection type also functions.

The basic requirement of a through connection of the urban settlements with their county seats was to be met not only under the former three-level system, but also under the new one-level management (based on the local governments of settlements) since it cannot be given up today either for the simple reason that the accessibility of the county seats service centres from the rural settlements is two-grade: the towns collect and mediate at the same time the traffic directed from the provinces towards the county seats. Basically our traffic meets this requirement. There are merely two towns that have neither railway nor bus connections with their county seats (*Gyomaendrőd, Csenger*), and from some of them the county seats may be reached only by rail without having to change trains (*Cegléd, Tokaj, Csurgó, Záhony, Mezőhegyes* etc.).

b) Accessibility of the central settlements from their zones

In connection with institutional centralisation and the increased demand of the rural population the role of the (public) transport of the gravity centres has been greater lately than before because

- on the one hand, traffic — together with other factors — which ensures the utilisation of the workplaces concentrated in the central settlements and that of the institutional services has the power of retaining the population,

– on the other hand, adequate traffic communication between the settlements belonging to the district is the criterion of the proper functioning of the centralised (not only administrative) institutional network, thus traffic may be interpreted as the primary condition of districtisation.

The regional system of public administration is formed from the elements of administrative-settlement constructions of different legal status put down in rules as a result of the clash, confrontation and reconciliation of the individual ideas and power relations often disguised as settlement-regional-communal conceptions and collective interests. (At best with taking into account the settlement-structural endowments of the counties as well as the local traditions.) In principle, the aspects to be considered should also include accessibility of the central settlements from the viewpoint of traffic. Although the legitimacy of this requirement has been declared time over again, in reality the connections in public transport often play a less important role than required.

The approximately complete system of the traffic connections within one region can be revealed by the investigation of the complicated scope of movement of the communication formed by the centres of different size and scope of authority. In this way it is possible to give an outline of the hierarchical regional structure of the inter-settlement traffic possibilities. To classify them we also have to make clear what needs the public transport is supposed to meet.

We have to take as a point of departure the system of the railway network and the service structure of public transport, at the same time singular needs of low frequency should be neglected on account of the ability of society to bear burdens. The network has to meet the regular needs of a large number of people for changing place and for services (in sub- or co-ordination) arising in certain flow vectors, mainly in connection with work (job-related traffic). The former principle, however, should be applied with adequate flexibility. In vain did regional development make efforts to decentralise the workplaces and services, these were basically allocated to the centres-settlements belonging to different grades of the hierarchy. Therefore, in the present stage of our socio-economic development the demand for the accessibility of the central settlements without having to change vehicles from the settlements that belong to them administratively formerly and also functionally now should be recognised as a civic right. The is the minimal demand, which may be enhanced by further demand for a number of daily services (over 1 or 2 even in the small villages) travelling to and from within the official

working hours (8–16 hours) or by the need for the adjustment of services to the different parts of the day etc.

The characteristics of the system of traffic connections are not independent of the fact how much the settlements have been explored for traffic, that is to what extent they are related to the public transport network. Only 31.7% of our settlements have railway stations, but today only a few of them do not have access to the bus network (within 3 kilometres). Among them such viable villages can be found which have only railway connections with their towns, and only some dwarf villages not being viable are deprived of any connection with public transport. There is, however, a higher number of those villages which are never entered by buses only as far as the road junctions, some 1–4 km-s away. For this reason in terms of today's needs we classify some 20 joint rural communities and also 6 dwarf villages having been annexed to other settlements as „quasi-provided" for.

Traffic with a gravity zone character has been formed most markedly within the environs of the county seats which function as the largest centres of employment and special service, and extended the most loosely to several counties, in road traffic and inter-settlement bus transport.

We investigated the accessibility of the county seats according to the following guidelines.

- From what part and what proportion of the county is it possible to reach the county seat and from where is it not?
- Where and to what extent is the traffic gravity of the county seat of the neighbouring county asserted within one county as against its own county seat?
- How is the territory of the counties belonging to the direct gravity scope of their own county seats structured on the basis of time of accessibility, i.e. at what „temporal distance" do the settlements lie from the county seat?

To give a reply to these questions we calculated the population number of the settlements in relation to the given area and also its proportion to the total population number of the county. The practical information value of this is much higher than e.g. that of the territorial proportions (calculated in km^2) greatly influenced by the settlement structure. It turned out that in none of our counties has been fulfilled the rightful demand to get access to the county seat without having to change vehicles. There are great variations as to the percentages of the population being compelled to do without this connection. The extreme values

characterise two neighbouring counties: 9.2 of *county Hajdú-Bihar* and 41.3 of *county Szabolcs-Szatmár*. Comparing the values of the other counties we cannot outline any real characteristics according to regions, yet some differences between the different parts of the county (the large regions) can already be noticed. The picture is more favourable in the Great Hungarian Plain in the regions which have large and giant villages than those in Transdanubia and the northern mountainous region characterised by the presence of small and tiny villages, where the values are higher. The situation of the county seat within the given county also exercises influence on the number of settlements which can be found in „traffic shadow": those situated centrally have advantages, while the ones lying on the very periphery (in focus situation) have perceivable disadvantages (*Figure 8*).

The majority of the regions lying in „traffic shadow" can be found on the peripheries of the counties containing the counterpart of their county seats. One of the main reasons of the existence of „shadow spots" is the historical function of the „counter-centre", the strong gravity of the fairly sovereign other town, as opposed to the county seat. The other reason is the small region, or rather microregion, being in a peculiar outlying position as compared to the general character of the county seat (e.g. sometimes in a tongue position or a dead end) and having been annexed here administratively. This is particularly so, if there is a small town functioning as an economic sub-centre in it which is acknowledged by the population as a viable, attractive settlement being able to assert its space-organising power. Of course, even the existence of larger spots cannot be fully explained with the help of these two reasons. In several places the fact of being situated by the state boundary has an influence as well as the (economic, cultural) „steeply declining" (differences), relative backwardness, or marginal position in an abstract sense. In some places the gravitation effect of the other region is stronger than that of the own county centre with which the traffic connection is insufficient. (As a consequence of the earlier construction of the tracks according to quite different regional considerations.)

Investigating the territorial proportion of the settlements which are not directly connected with the county seat according to the gravity zones, we can see that the proportions compared to the number of the inhabitants fall behind the proportions of the settlement, since the ones deprived of connections are mainly in villages which are smaller than the average.

Among the county seats Budapest has the strongest gravity in traffic, to such an extent that it has a through connection with all the settlements of several urban gravity zones belonging to its internal and partially external agglomeration ring on the territory of its county. The gravity of the other seats is enough only to be asserted within their own county in the town environs nearby, which is the result of the excellent connection and originally favourable endowments relating to the network or to the value of tourism.

At the other extreme can be found the gravity zones out of which from none, or from most settlements it is not possible to reach the county seats by through services. These areas and urban seats of diverse character both belong to a different category, thus the cause of the phenomenon is homogeneous inasmuch, as they lie in a traffic shadow.

In investigating the accessibility of non-county seats we calculated the road distance between the rural communities and their administrative urban centres, the mean values of which differ 1.56 times from county to county. The mean values show only a very loose relationship with the settlement structure of the counties. In the function of the road length the average size of the rural communities, the territorial size of the administrative city environs may play a greater role than the situation of the towns within the region.

In 51.2% of the gravity zones of towns the administrative centre may not be reached from every rural community either by rail or by bus. Behind the national average strong regional dispersion is hidden. In the Great Hungarian Plain there are deficiencies only in 43.1% of the city environs with regard to through public transport, while the same indicator is as low as 6.8% in Transdanubia, and as high as 71.7% in the Northern Mountainous Region. To give an explanation of the marked territorial differences according to these three large regions in a rough approximation it will be sufficient to refer to the average area size as the chief factor of influence. When, however, we go into fine details of analysis and examine the concrete relations of the individual environs as well, factors which can be traced back to inadequate administrative regional development also emerge.

The first type of factors includes gravity zones (occupying the same area as the former traditional districts having a great past) the centres of which have always had a central position and consequently, traditionally their traffic got under the influence of another gravity centre, or the orientation of traffic is divided by several centres. The second type is made up of the gravity centres which bear the consequences of the fusion

of former districts completely or overwhelmingly. The former district centres continued to remain sub-centres of production and employment as a rule and since the loss of their administrative function the economic potential of most of them has shown some moderate growth. All this made the maintenance of traffic oriented towards them on the same or nearly the same level indispensable, that is, their range of duties as traffic sub-centres had to be kept. At the same time, from the most remote communities — mainly from which the route led inevitably across the former centre — no through services were provided for the people travelling from the provinces to the new district centres with the purpose of dealing with their administrative affairs and making use of services. In this way the necessary change of the regional order of public transport fell behind the administrative regional changes. The so-called town surroundings (as former administrative units in Hungary), which are successors of the formerly fused districts, have to face the vital problem of the lack of through connections with the more remote communities being under their administration.

We are aware of the fact that the three main factors mentioned above become obvious only in some of the town environs. This is so because the situation of most town surroundings may be the result of the combined effect of several (partly unknown, or only suspected, but not confirmed) factors. Generally speaking, the size and higher hierarchical functions (county seat function above all) of the towns affect favourably the traffic connection formed with the neighbourhood, but the period of enjoying the legal town status and the degree of industrialisation are not asserted unanimously. The size of the town district area also contributed to some extent. In the evolution of the examined phenomenon the general development level of the traffic network, its spatial position relating to the centre as well as the configuration of terrain and the hydrographical relations influencing it, can be classified as special factors which have a great importance nonetheless. Anomalies emerged from two directions. On the one hand, developments were not adequate with the needs, on the other hand, the hasty designation of the administrative environs mostly left out of consideration the traffic endowments. In connection with the latter one examples can be found which cast doubt even on the use of the establishment of a given regional unit. For example, the establishment of the not too extensive large rural community environs of *Budaőrs*, from three-quarters of which it was not possible to reach its own centre without having to change vehicles and where the main vector of movement of the population towards Budapest is traditionally pro-

vided by the traffic. The fact, how much proximity to Budapest is not the source of anomaly, is proved by the counter-example of *Érd* town.

Obviously those settlements (and inhabitants) are at the greatest disadvantage, from which it is not possible to reach either the administrative towns, or their county seats without having to change vehicles. These settlements form islands in singles or in pairs, but some also form extensive territories consisting of (may be a dozen) places. As *Figure 9* shows, the most extensive ones can be found by the frontier in *county Borsod-Abaúj-Zemplén*. The territorial distribution of these and others proves that the state and county boundaries as well as the town district limits are capable of interrupting the spatial communication centres on the basis of separate regional interests. Therefore, we can conclude that even one smaller regional unit is able to form a periphery in the pejorative sense!

Up to 1990 until the establishment of the local (self-)governments in Hungary, one administrative unit was formed from several tiny villages. Then it was not negligible, how the central rural communities (county seats) could be reached from the joint communities by means of public transport (*Figure 10*). This problem, however, has lost significance with the smallest villages (former joint-communities) gaining independence.

Apart from the administrative centres described above, there are also centres of non-city status ensuring employment requiring the development of an independent traffic microsystem which would be of different texture from the one related to the administrative regional system (*Figure 11*). According to our calculations the percentage of the vacancies in the rural communities of the country was 10.7. Most of them were county seats, or they had an independent council, while 2.9% of the joint communities belonged to this category. In the territorial position of these — employment microcentres having aroused only some interest in the field of statistical and geographical research — only a few regularities can be pointed out.

3. The sphere of functions of the towns as traffic junctions

By means of the traffic junction value it is possible to classify the central local value of the settlements, or the degree of their suitability for becoming central places. Here and now we are going to examine only the traffic junction function of our towns, but in the next chapter we will also discuss the great differences in the utilisation of the development

potential arising from the junction position, and the causes of differentiated development, too.

The first public transport centres are railway junctions which have left their mark on the national map of junctions even after the development of bus traffic. The majority of the counties oriented the feeder or branch lines towards their seats. The orientation of most tracks towards the county seats was, from the first, possible only in the counties with an adequate number of inhabitants, adequate area size and branch-lines, administered from county seats which were definitely neither of highland character, nor insignificant. Yet within the framework of the mountain range embracing historical Hungary, in the counties of small area, situated in the valleys and cut across only by a few railway lines with small towns as their centres, because of the lack of the essential conditions even rational arguments could not be found to justify the endeavour to establish a county-seat-centred network.

Although the conditions of becoming railway monocentres were more or less the same for the county seats, on the edge of the basin our larger towns functioning as regional or county seats — formed on the flatland or highland areas — could become really dominant junctions. This phenomenon, however, has come to a standstill, in the case of the mid- highland or mountainous regions (which coincided with the geographical periphery of the country, where the pressure of multiplying the radial network was no more relevant) it could not be realised. The most dense junction-inducing networks were formed in the largest and richest counties articulated by the gravity centres of numerous small or larger central settlements in the low hilly country or flatlands with the highest productivity in agriculture. These counties had a multitude of branch-lines built for themselves, according to the provincial conceptions. Here the density of junctions as compared to the population, the number of settlements and the length of tracks had a favourable effect on the upswing and development of the activities in the gravity zones, the functional strengthening of the centres, the expansion of their scope. In this way the junctions indirectly contributed to the further regional differentiation of the various regions of the country.

In determining whether a town is suitable for becoming a gravity zone centre, we have taken into account considerations related to traffic. One of them is the number of the converging railway and bus lines (weighting it by their hierarchical rank which also indicates their productivity) and the other is the number of railway and bus services (*Figure 12*, *Table 1*).

Erdősi, Ferenc: Transportation Effects on Spatial Structure of Hungary.
Pécs: Centre for Regional Studies, 1992. 47 p.
Discussion Papers, No. 13.

Table 1

Values of the towns as traffic junctions by the number of the converging railway and bus lines in 1987

Settlement categories	Mean railway		Mean bus		To t a l	
	scores	%	scores	%	scores	%
County seat towns	9.4	49.5	9.6	5o.5	19.0	100.0
Other towns	4.8	45.2	6.5	54.8	11.3	100.0
Large villages with municipality	4.2	51.9	3.9	48.1	8.1	100.0

Professor *T. Lijewski* from Warsaw classified „the centrality of position" of the Polish towns on the basis of the number of lines, while „their centrality in traffic" on the basis of the number of services.

In the interest of correct weighting we converted the number of lines into scores. The main conclusions of the comparative analysis are the following.

- Out of the 165 examined Hungarian provincial towns 102 are non-railway junctions (16.7 % of the county seats, 62.4 % of the other towns and 78.2 % of the large rural communities, namely in comparison with T. Lijewski's data.
- As opposed to Poland, in Hungary the county seats are in a far better position than the other towns with regard to the railway lines converging in them. This also supports our proposition that the structure of the railway network was doubly centralised in a capital- and county-seat-centred way. Only in 6 counties (those of *Tolna*, *Heves*, *Nógrád*, *Veszprém*, *Bács-Kiskun* and *Zala*) the largest railway junction is not a county seat.
- The majority of our urban settlements — disregarding a few exceptions mainly of the Great Hungarian Plain — also fulfil the function of smaller or bigger bus transport junctions according to their hierarchical status.
- There are three cases where non-county seats are the largest centres of bus traffic. In Poland, however, the lines are concentrated in the county seats without exception.
- As opposed to Poland, in Hungary the number (or score value) of the converging railway lines has a fairly close correlation with the number of inhabitants of the cities, or rather with the proportion of the inhabitants making their living in the service sector. The formerly compared factors show a definitely close correlation with the number of bus lines.

In spite of the fact that the majority of towns have been junctions of railway traffic for a long time — being much more suitable for long-distance transport than the motor coaches are — owing to the several times denser network of bus traffic and also as a result of the more intensive passenger traffic sometimes of a suburban character which the towns formed with their gravity zones, the number of trains reaches or exceeds that of the buses only in a few cases. These are mainly weakly urbanised-industrialised market towns of the Great Hungarian Plain providing employment only for a few commuters and being situated mostly along the trunk line and also the so-called agglomerational „sleeping towns" related to the capital by suburban rapid-transit railways. The other extreme is represented by the towns not having a connection with the railway network (*Túrkeve*, *Letenye*, *Mórahalom*) and those being in end position at the by-lines.

The number of trains per working day is dispersed between 130 and 0 in the urban settlements. The population living next to the first ramifying junctions of the trunk lines originating radially from the capital are in the most advantageous position, with *Székesfehérvár* having 130 trains a day in the lead. From among the provincial cities lying a long way from Budapest only *Miskolc* could attain outstanding railway passenger transport (93 trains), although it was enough only for keeping the fourth place. The cities situated at the junction of trunk- and branch-lines have a moderately high number of trains. Occasionally the traffic of the towns situated along a single trunk line is greater than of those to be found at the junctions of smaller branch-lines because in the provincial areas the local traffic feeding is very little, transit traffic, on the other hand, plays a subordinate role.

As compared to the number of trains the formation of the number of bus services is more closely connected with the functional factors, such as the number of the commuters, the sphere of functions related to tourism as well as the way of connection with the network and the geographical position. Since the monocentric structure of the country leaves its mark on the overall structural conditions of the bus network, not only is the strength of the junctions according to the number of services represented by the spatial organizing power of the town (shown by the volume of the gravity zone traffic) but it is also influenced, distorted as it were, by the amount of transit traffic usually decreasing in proportion to the distance from the capital. (For example, the second place held by *Székesfehérvár* with its 470 services is strongly, the third place held by *Veszprém* with its 462 services is moderately influenced also by the transit traf-

fic.) A smaller part of the distortion is produced by the more significant transversal bus lines, therefore, their value may be noteworthy in their junctions.

In this way the (national) network endowments leave their mark on the volume of both the railway and bus traffic independently of the local forces. Consequently, in the field of travelling facilities the inhabitants of the cities may be in quite different positions. The good network endowments may create a privileged situation in the form of a „give-away traffic royalty" as an accessory advantage added to the initial individual endowments of a town, while elsewhere the towns may be compelled to offset the below-average network endowment by means of their own developments, the pace of which always lags behind the other productive and other functional performances and the traffic demand induced by them. The traffic demand arising in this way may be reduced by the operating of bus services of non-public use at the cost of the urban employers (the use of contractual, hired, special factory bus services is significantly more frequent in the places with worse endowments).

In the first approximation we evaluate the centrality of traffic on the basis of the sumtotal of train and bus services started from the urban settlements on a working day. The average number of passenger trains per town is 35 in Hungary, 82 in Poland, the number of bus services in Hungary is 126, in Poland 324, the sumtotal of train and bus services in Hungary is 161, in Poland it is 406.

Categorical differences can be indicated (with regard to averages) between the urban settlements in linearity according to the existing hierarchy (inversion could be identified only in the number of trains to the advantage of the large urbanised rural communities and also in the age of the towns relating to whether they were „socialist cities" or traditional towns, to the advantage of the latter).

The frequency of bus services is 3.6, in Poland 3.9 times higher than that of the railway. Since the buses (apart from a few exceptions) run between 5–22 hours, in our calculations they run from the cities every 8.2 minutes on the average, while in Poland every 3 minutes.

The population of the cities and the proportion of those employed in the service sector correlate with the number of trains only loosely in Hungary, while in Poland this correlation is tight. In the case of bus services the two contrasted factors correlate tightly, while in Poland somewhat less tightly.

On the basis of the total number of (train and bus) services, the urban settlements of Hungary can be classified according to the intensity of their public transport as follows:

- national monocentre Budapest with 1590 services,
- localities with outstanding main traffic: cities with services over 440 (*Miskolc* 625, *Székesfehérvár* 600, *Veszprém* 498, *Érd* 496, *Eger* 450, *Pécs* 447),
- main traffic localities with 340–349 services,
- localities with heavy traffic with 240–339 services,
- localities with medium traffic with 140–239 services,
- localities with some traffic with 70–139 services,
- localities with insignificant traffic, with services below 70.

In this case we do not use the word „junction" because in the majority of the urban settlements most of the vehicular traffic is added up from through traffic, thus the point in question is not only the (gravity zone) traffic induced by them and the related junction position, but also that of the traffic „suffered" and transferred by them. As a consequence of this the value of the traffic places correlates with hierarchical categories (county seats, other towns and large urbanised rural communities), yet within certain traffic categories often there is a lack of a moderately close connection with the hierarchical levels, and even more so with the population number of a given town.

The specific measured data of the services provide much more relevant information as compared to the absolute data. The hierarchy determined on the basis of the absolute data leads to quite a different ranking and the weight of our towns in passenger traffic becomes different in the light of the specific data. The urban settlements being in the most advantageous position all belong to the group of towns with a low number of inhabitants. At the same time it is clear that most of them obtain privileges by means of transit traffic. The first three taking the lead have no railways of their own. The towns of medium size are present within the range of 75–100 services, while the large cities within that of 50–75 services, yet most of them can be found among the ones with 25–50 services. The most surprising is the category with the smallest number of services (below 25), which includes in addition to our 3 largest cities (*Debrecen, Pécs* and *Nyíregyháza*) some small towns (*Hajdúnánás, Jászberény, Túrkeve, Balmazújváros* and *Tiszakécske*) as well.

In the overwhelming majority of the settlements (rural communities) belonging to the category of junctions of non-city status, the weight of the bus traffic is much greater even in comparison with the city junc-

tions. Their junction score value measured on the basis of the number of the converging lines only slightly depends on the population number, and even less on the function, because the number of secondary road junctions having a decisive role otherwise is also fairly independent of the examined factors. The correlation is loose, on the one hand, between the number of the services of the communities, the number of the lines converging in them and their population number, and there is not a close interrelationship with their function either on the national average. Although the large urbanised-industrialised rural communities being exposed to tourism to the greatest extent have attained a number of services above the average by means of the commutation induced by them, they are out-rivalled by the localities situated along the sections of the main traffic axes next to the towns, irrespective of their size and functions.

The circumstances of commutation and urbanisation are greatly influenced by the fact that in Hungary — as opposed to the international tendencies — the structure of employment is more developed than the development level of the economy, at the same time the level of urbanisation falls even behind the level required by the economic development level by some 15%.

As a result of the interaction of passenger traffic and commutation, there is a close correlation between the extent, intensity and distance of the commuting conditions as well as with the regional intensity of traffic. It is an open question, to what extent the statement above applies to the relationship of the public transport for common use and commutation. As a consequence of dependence on public transport to the extent of 95–96%, the territorial structure of commutation should be adjusted greatly to the regional structure of railway and interurban motor coach traffic for common use. In broad outlines it is a projection of the public transport structure shown above, but there is also significant incongruence, the main cause of which is the fact that the traffic network has to be formed according to the rules of traffic needs and network shaping function. Although job-related traffic has an average share of 50–60% from the total of passenger traffic, this rate is strongly (between 16–95%) dispersed depending on the concrete regional conditions of places of work and residence.

Namely, traffic is only a condition of commutation, and not its primary cause. Therefore, even a relatively low-performance traffic line is able to carry a relatively heavy job-related traffic, just like vice versa (under the conditions of overcrowdedness and moderate use for other purposes). The other cause of commutation not quadrating with the

structure of public transport is the fact that despite the fairly significant share of bus traffic for non-common use (nationally between 23–28%) has a performance which is undemonstrable by regions or routes.

Several employment centres went after the remote settlements inaccessible by scheduled services and got the recruitable labour force by means of special bus services. By this means a commutation zone of little intensity formed within 20–30 km-s is replaced inversely outwards by a more intensive zone in the region of the terminus of the special services in several places. Thus the distribution of commutation — in inverse proportion to the distance — with its regularities described in the technical literature applies only to the part „dominated" by the public means of transport for common use.

The tables demonstrating the labour force gravity zones of the cities show conspicuous differences between the Great Hungarian Plain and the large mountainous and hilly regions.

The following factors of the space-forming factors of commutation can be pointed out:

- the regional differences of the extent of commutation, their weight in the employment of the population as a result of the economic structure,
  (In the Great Hungarian Plain — as a consequence of the relative poverty in the non-agrarian workplaces and in certain places of the high labour demand of the intensive agricultural cultures — the rate of commuters is lower than elsewhere in the country, at the same time most of the commuters do not travel every day, only periodically, at longer intervals and long distance. The rate of commuters travelling daily short distance is higher in the western and northern parts of the country.)
- the dissimilar settlement structure of the labour-emitting region,
  (In environments with tiny villages thus in Transdanubia there is a strong dispersion of the commuters' domiciles.)
- the territorial relationship of vacancies and labour supply.
  (Within this the territorial distribution of the towns (their density and dispersion) is relevant. It is nearly exclusively characteristic of the Great Hungarian Plain that a lot of cities border on each other, they are not only twins and are often connected in a series interrupted by a rural community now and then, with real junctions and city concentrations — mainly in the region east of River Tisza — greatly restructuring thereby the formation of the gravity zones of some towns.)

It is clear then that factors other than traffic may also have a strong influence on the formation of the structure. As for the passenger traffic network influencing the commutation, the accessibility conditions of public transport are much more favourable concerning the towns in the Great Hungarian Plain with regard to both journey time and frequency of services because of the plain surface, the less densely situated settlements and the more direct routing of the roads joining them as well as that of the services.

Under the impact of the former factor in the Great Hungarian Plain the differences between the commutation gravity zones of the towns and the intensity of commutation directed to the towns is less marked than in Transdanubia or the northern range of the mountains. (In the regions with a scarcity of towns it is already the larger, urbanised-industrialised rural communities which fulfil the role of smaller employment centres.) On the whole, the labour force gravity zones of the towns in the Great Hungarian Plain (with the exception of the members of the town chains and concentrations) is more extensive, but has a looser structure, the „intensity curve" is less steep as a function of distance than around the towns of Transdanubia and Northern Hungary.

THE IMPACT OF TRAFFIC ON THE REGIONAL AND SETTLEMENT DEVELOPMENT

The fundamental question is in what forms the interactions of the traffic and settlement networks equally serving the most essential functions of the socio-economic life are revealed in the individual periods. The inter-relationship of the two networks has an alternating direction in both space and time.

Before the introduction of the railway the large-scale exchange of goods, the actual regional division of labour developed along the water-ways, the navigable rivers. Therefore, significant differences emerged between the settlements situated along the rivers and those lying far away. The majority of our towns with the highest liquidity and excelling in crafts and trade came into being along the main navigation axes of the economic activity along the Danube and the Tisza rivers (and to some extent along the *Dráva*, *Kőrös*, *Maros*, *Vág*, etc. rivers) induced mainly by the trade in agricultural produce and the distribution of salt.

Until the introduction of the railway there were not significant differences in the supply of overland transport (only periodically depending on the minor roads). As a result of the necessity determined by the limited transport possibilities, the economic relations (apart from a few exceptions) were taking place within integrated settlements (e.g. within the settlement system of a large estate). The central places being adequate with the horse-drawn vehicular traffic were constituted by the market towns providing certain elementary services for their outskirts situated densely, within 15–18 km-s from each other even in the regions of Transdanubia and the northern range of mountains characterised by the predominance of tiny villages.

Thus the mosaic-like spatial structure of the economy and the settlement network was synthesised from microregions in the pre-railway era. (The general underdevelopment of the socio-economic relations enabled only the powerful development of the county seats, some trading centres situated advantageously, and of the mining towns located on local mineral resources.) With regard to the relationship of the roads and settlements in those days the road was adjusted to the major historical centres, larger administrative centres (e.g. when *Sopron* town became a district region, roads were oriented towards reaching it by a more direct route even in Southern Transdanubia), and some settlements excelled under the impact of the road only once in a while. In the final account, changes in the hierarchical territorial structure of the public road network in the 19th century were sufficient directly for the modifications of the settlement network only at the local (microregional) level for a long time.

1. The strong impact of the railways

The model of the interactive system of the railway traffic as set up by us (*Figure 13*) has an economic orientation based practically on the multiplicator and accelerator effect of the railway.

The influence of the railways exercised upon the economic and urbanisation development greatly depended on their output, on the length of their span and the date of construction. With the construction of the trunk line system (of its early parts in particular) the settlements joined by them as well as those lying next to them obtained such a special privilege with which the regions lying a long way from the trunk lines could not catch up with even the help of modern public road transport. The high-performance, long-distance communications connecting the

capital with the regions as strong macrostructure-forming factors carried in themselves (practically pre-forming) the development axes and corridors which can be shown even today.

These were determined early by the overwhelming majority of the economic and urbanisation forces of the country and the local advantages recognised already a long time ago proved to be lasting and surviving even the large-scale motorisation of the public road, they have remained the chief elements of the country's general regional structure up to now. In this way the temporal priority became a regional advantage. There were, however, some towns (e.g. *Nagykanizsa, Székesfehérvár, Eszék, Nyíregyháza* etc.) which were the first to obtain railway trunk lines, nevertheless in the late 19th century their development came to a standstill. There is not an unambiguous explanation of this phenomenon. The regional distribution of the traffic may have contributed to it with the densification of the railway network as well as the decentralisation of trade. Yet it is not out of the question either that the internal energies of city development became exhausted because of the limited possibilities provided by the underdeveloped socio-economic conditions and the economic environment of the given settlement network. (Or the point in question may be that this is precisely the projection of the cyclicity of economic-regional development in settlement development.)

The sumtotal of the branch lines constructed in the second phase of the railway construction (particularly of the by-lines which created a „dead end" situation) is longer than that of the trunk lines. The former played an important role in the traffic exploration of the areas lying a long way from the trunk lines. But under our underdeveloped capitalist conditions the side lines play only a minor role in attracting industrial premises (with the exception of the mining districts) and in the development of the neighbouring (urban) settlements served by them. The reason for this is that their value for traffic and premises generally could not compete with that of the trunk lines. On the whole they were unable to bring about a dynamic development process of their own. Their construction in the form of a dense network made commutation technically possible, but the relative costliness of the fares and the season tickets — issued in Hungary only for the navvies at the turn of the century — prevented it from becoming general and large-scale.

In spite of all this the network of branch lines complementing the trunk lines has done away with the distance limits of the earlier interurban horse-drawn transport, which had a low carrying capacity, and also with the basically autarchic microregional system of the gravity zones

structured on the basis of the former. The branch lines enabled the most viable large rural communities and market towns having obtained an advantageous position under the new traffic conditions to become centres of the new gravity zones having a larger territory. The new centres expanded their functions and were differentiated as centres of provision for tens of thousands of inhabitants.

The gravity zone developing role of the branch lines was recognised early in several counties and attempts were made by them to use it for the development of their own county seats, which were usually the largest gravity centres. These chiefly included the county seats which had become comparatively significant towns already in the first great period of the railway constructions up to the 1880s. Thus in counties such as *Győr, Baranya, Somogy, Vas, Fejér, Szolnok, Szabolcs-Szatmár* and *Hajdú-Bihar* the network of branch lines was constituted later mainly according to patterns converging in the county seats.

The network of the branch lines was developed in a different way in the counties where the trunk lines bypassed the county seats and within the county other urban settlements became the chief centres of traffic, and thereby economic centres. The double-centredness of counties such as *Veszprém, Zala* and *Tolna*, lasting up to the present (*Veszprém* versus *Pápa, Zalaegerszeg* versus *Nagykanizsa, Szekszárd* versus *Dombóvár*) in fact can be traced back to this peculiarity of the railway network development. In contrast with the county seats which function as economic monocentres (e.g. *Kaposvár, Győr, Székesfehérvár, Szombathely, Szolnok, Debrecen*), in the county seats (*Veszprém, Zalaegerszeg*) there was hardly any — if any (*Szekszárd*) — concentration of the network of branch lines. The secondary centres became junctions only at the intersection of the trunk lines, thus before the period of the construction of the local railway they did not attract branch lines to themselves (*Nagykanizsa*) or hardly any (*Pápa, Dombóvár*).

Because of the multi-directional nature of their regional relations the development potential of the stations being in a junction position was of the greatest value. Quite a great number of the elements of our stock of settlements which did not have a city status but were situated at junctions contributed to and assisted the slow concentration of the productive forces. This can be accounted for by the fact that for the transportation-intensive industrial plants (e.g. brickyards, steams mills, sawmills, distilleries etc.), among others, it was advantageous to select premises here, since it was easier to commute from here to their schools and offices.

The most typical instance of the interaction between traffic and the settlements situated at junctions are shown by *Szolnok, Baja* and *Barcs*

towns above all, which also had the function of points of transhipment between river and railway. (The case of *Barcs* has model value: in the beginning it hardly excelled in population number and function as compared to the neighbouring settlements, then it rapidly developed into an economic centre of mezo-regional — in several respects microregional — significance. Another paradigm type of railway-induced upswing is demonstrated by *Dombóvár* town. Although its railway junction has a higher value than that of *Barcs* because of the convergence of trunk lines, it does not have a harbour. Here the development of the economic life was less complex because a significant part of the workplaces were related to the railway both organisationally and institutionally.

At this point, however, we have to conclude that in the intensity of the utilisation of the junctions as premises, there are not great differences between the regions of our continent, depending on the level of their economic development. In Western Europe there were hardly any junctions which failed to attract large-scale industry and to become demonstrably a city-developing factor. In Hungary — similarly to the other countries of East-Central Europe — in the majority of the junctions there was not any serious large-scale industry located. Because of the insufficient development, the convergence of the lines, the junction position was not definitive in itself: it was not enough for the unfolding of the economic life, the concentration of modern productive activities, or for the large-scale development of the settlements concerned. The socio-economic conditions of the day did not allow for the formation of the network of cities. Even the (significant and internationally busy) railway junctions situated in regions characterised by the scarcity of towns were not assisted by institutions with other central functions in the dynamic development of the settlements, at the same time the other development potentials were missing.

Going beyond the regional examples, it seems necessary to do a country-wide investigation of the impact of the railways. In the city monographs the authors often relate the appearance of the railway to the general, but mainly economic development of a given settlement. At the same time it is rather complicated to determine the numerical value of the relationship which does exist in most of the cases, though from the viewpoint of our topic it would be essential for us to know how differentiated the assertion of the impact of traffic upon the development of the individual settlements was. We are well aware of the fact that population growth in itself does not indicate every moment of the development of a settlement, namely it does not integrate all the (e.g. production, infra-

structural) development factors. For lack of something better, we are nevertheless compelled to measure the rate of settlement development by means of the formation of population growth and on this basis we should look for a correlation between the date of railway construction and obtaining the junction rank and the temporally changing rate of settlement development.

At the time and after the formation of the junctions the rate of which can be regarded as average from the national perspective, long stagnating or hardly growing population number is characteristic of *Baja, Veszprém, Békéscsaba, Szentes, Vác* and *Pápa. Baja* belongs here presumably for the reason that by means of its harbour in the pre-railway period it enjoyed the uniquely privileged position of one of the most important commercial junctions of Southern Hungary. Not only did *Szabadka*'s (*Subotica*'s) becoming a junction of trunk lines prevent the further development of this unique function, but it also weakened it by detouring part of the transport (in the transportation of the grain of *Bácska*). Yet to evaluate this peculiar condition we have to be aware of the fact that in spite of the stagnating population number the town witnessed spectacular industrial development until World War I. Therefore our assumption that the railways did not have an insignificant role in this (through the assertion of the advantages of expanded transportation relationships) is not unfounded.

In the largest cities of today's Hungary (in *Debrecen, Miskolc, Pécs, Szeged* and *Győr*) population growth was taking place with some phase shift in time, right after they had become leading railway junctions. Although not to the same extent as the former cities, after their being promoted into significant railway junctions, fairly rapid population growth characterised *Kaposvár, Nagykanizsa, Sopron, Szombathely, Székesfehérvár, Szolnok, Kecskemét, Nyíregyháza* with significant phase delay as well. (Probably the transfer of the county seat from *Nagykálló* had to do something with the „leap" of *Nyíregyháza.*)

The second extreme category contains the towns which got only a by-line or a passing branch-line, where the lack of a constellation of other settlement developing forces impeded population growth. The most typical examples of this category are *Kalocsa* (although in Kalocsa the construction of the by-line was followed by temporary population growth), *Gyöngyös, Esztergom, Szekszárd, Kőszeg, Mohács* towns and, to some extent, *Ózd.* (The moderate development of *Eger* can be accounted for by the comparative closeness of *Gyöngyös* and the scarce possibilities

of trade restricted merely to its microregion in addition to keeping the archbishopric at a distance from the railway trunk line.)

The other towns are practically transitions between the two extreme types. Among them there are some towns where population growth took place independently of the railway construction. (For example, in the case of *Tatabánya* where impetus was given chiefly by the coal-mining and the basic raw material industry based on it, but of course, without the presence of the railway it would not have been able to unfold either).

Therefore, in the development of the Hungarian cities industrialisation did not play such a great role as in Western Europe, only in a few cases there is direct correlation between the two phenomena. Industrialisation cannot be regarded everywhere unambiguously as a consequence of the railway construction.

2. The weak influence of vehicular traffic

The third period of modern traffic history (when motorised road traffic became general in the countries with a dense or average dense railway network, thus also in Hungary) did not bring about a decisive change in the territorial structure outlined by the railway tracks. The reason for this is that road constructions and reconstructions were mainly adjusted to the traffic supply produced by the railways. Despite the very showy development of the output of vehicular traffic in the shaping of the spatial structure, it considerably fell behind the railway which proved to be an extremely lasting space-organising force even in the long run.

In the period between the two world wars, when the railway was not being built further and the bus network was still very underdeveloped, the settlement-developing-differentiating power of the traffic was significantly inactivated. Furthermore, as a consequence of the international relations modified also by the new state boundaries the good traffic situation, the privilege of being situated at a railway junction was not asserted in a number of towns (e.g. in *Nagykanizsa* and *Kaposvár*) while from among the others having similar endowments *Szombathely*, despite its proximity to the border, belonged to the group of our fast developing towns. At the same time becoming richer in infrastructure other than traffic proved to be sufficient for the further development of the smaller towns in spite of the traditionally poor traffic situation.

Between the two world wars in the Budapest-centred extension of the trunk line network the moment (not only of political significance) of

a decrease in the demand for maintaining relations with Austria also had an influence. As a result of this, the transversal roads lost much of their significance. (There are not any main lines among the transversal roads up to the present day and in the late 1930s there were few secondary lines as well.) For example, in Southern Transdanubia there was only one along the route of *Baja–Bonyhád–Dombóvár–Kaposvár–Nagykanizsa* joined by that of the *Mohács–Pécs–Dombóvár–Kaposvár* line with the *Sümeg–Celldömölk* transversal some way off. Between the two world wars the railway constructions producing only sporadic sections of a few kilometres did not have any effect on the territorial structures. (This was the case even with the *Dunaföldvár–Solt* track, which served over the Danube, having thus a unique geographical position.)

From the 1950s in the location of „our socialist cities" the traffic situation played only a subordinate role. (The mining town of *Komló* was built at the end of a railway by-line which had been constructed at the turn of the century; *Dunaújváros*, the centre of metallurgy by a branch-line; *Oroszlány* joined the trunk line by means of a by-line; *Leninváros–Tiszaújváros* by a branch-line (see *Figure 2*); only *Kazincbarcika*, a centre of chemical industry was located next to a secondary trunk line). The bad traffic endowment (which the quickly organised bus traffic could counter-balance only partly) greatly restrained the unfolding of the central supplying functions of the towns and conserved their character of „large-grown housing estates". The situation is even more contradictory, if we raise the problem of the strong transportation-intensity arising from their function in heavy industry, because transportation by water has a considerable role only in the iron ore supply of *Dunaújváros*.

The city development rate becoming independent of the traffic situation can be pointed out in the case of the smaller traditional county seats with a long historical past. *Zalaegerszeg* and *Veszprém* can be taken as examples of the most rapidly growing towns of the past three decades. The traffic situation is only rarely asserted in the formation of the hierarchy of cities. For example, when, among others, the county seats to be terminated were selected from the group of towns in a worse traffic situation, and the recently designated ones from among towns in a better traffic situation (the former include *Balassagyarmat, Hódmezővásárhely, Tata* — which are stagnating in spite of their development —, the latter include *Salgótarján, Tatabánya* and *Szeged*). The dispersion of the average development rate of the Hungarian towns between 1960– 1975 was influenced rather by the size than the function of the settlements, consequently, the traffic function did not get an important role. It deserves at-

tention that there is a difference in the effects of railway and bus traffic. The impulses starting from the economic action centres established along the railway lines resulted in the functional morphological changes of the settlements which were asserted to a long distance even in the hinterlands. The impulses starting from the settlements situated by the railway lines had an effect — even if to a shorter distance — from the end of the 19th century. Yet the regional differentiating effect of the bus traffic lines with a much denser network and often a higher frequency of services could not be pointed out in a measurable way, when they connected only a smaller part of the settlements. The causes of the differences between the two kinds of public transport systems concerning the different effects and spatial organisation arranging the settlements in relation to each other were rooted in the difference of their service performances and traffic structures.

Thus there is no doubt that nowadays from among the city developing factors traffic has a much more subordinate role than in the days of the establishment of the railway network. Namely, from the 1950–60s the „classical" developing factors were accompanied (or rather replaced) by new factors such as large-scale agriculture and building industry operating within the organisation of large-scale enterprises. The possession of development energies and the above-average traffic situation are not the only vital city developing factors. Town development requires other favourite circumstances as well.

In the field of regional development the planners often overestimate the effects of the development of the traffic endowments on the rural regions. Yet in our opinion, which is based on empirical facts and on the analysis of the impact of access roads carried out in the 1970s, the improvement of the traffic facilities in itself is not a panacea for bringing the decrease of the rural population number to a stop. Namely, the causes of the decline in the population number were complex: the reproductive ability of the too aged population is insufficient (a mere 40– 60%) and migration which might substantially change the process cannot be expected. The infrastructural developments, among others those related to the traffic of the dwarf villages, are unable to bring about positive changes in influencing the circumstances of life.

The „sleeping villages" which do not function as employment or provision centres but are situated close to the centre and are joined by the main communication channels, chiefly the railway lines, are becoming rapidly growing settlements of the city agglomerations by means of the people moving in from the rapidly emptying zones. Recently they have become capable

of attracting new workplaces, too. For the time being it cannot be predicted, how much this process can be reversed by the financial aids and support designated for the development programmes of the underdeveloped regions, and by the new employment policy which is subordinated to the efficiency of production. The cheapness of labour still to be found on the peripheries is not an attractive force by itself, the lack of skills, however, is clearly an obstacle to the location of modern innovative small businesses.

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FIGURES

Erdősi, Ferenc: Transportation Effects on Spatial Structure of Hungary.
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Figure 1

The motor-way network in Hungary

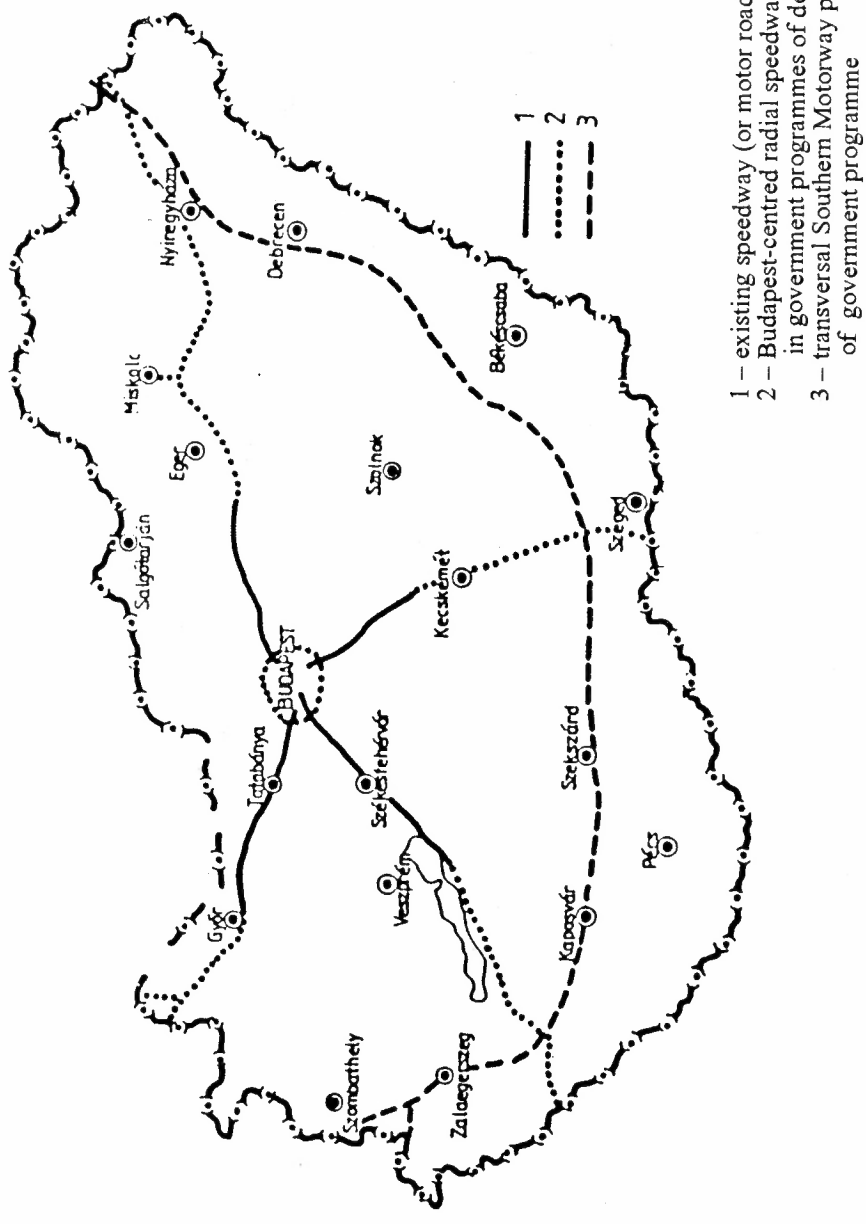

Figure 2

Changes in the standard-gauge railway network

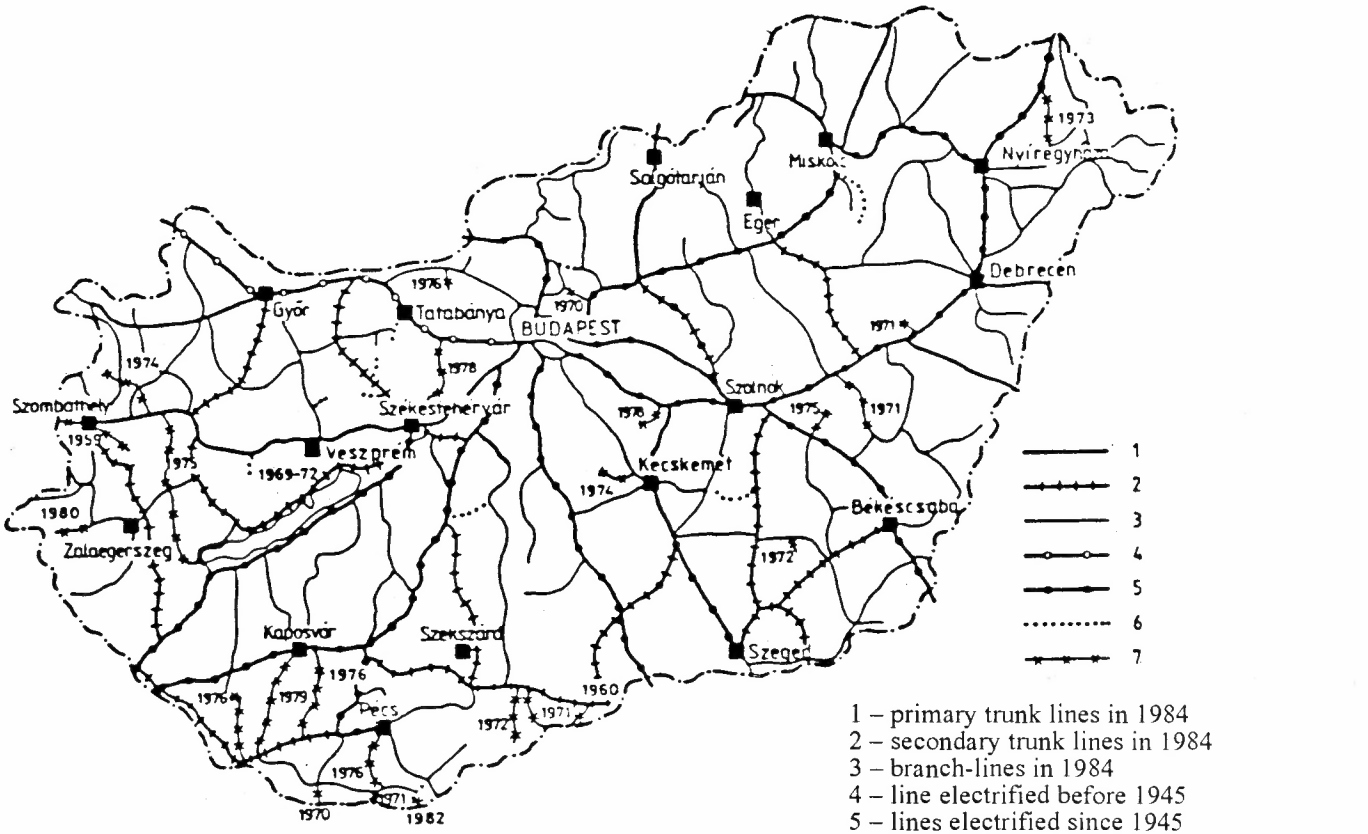

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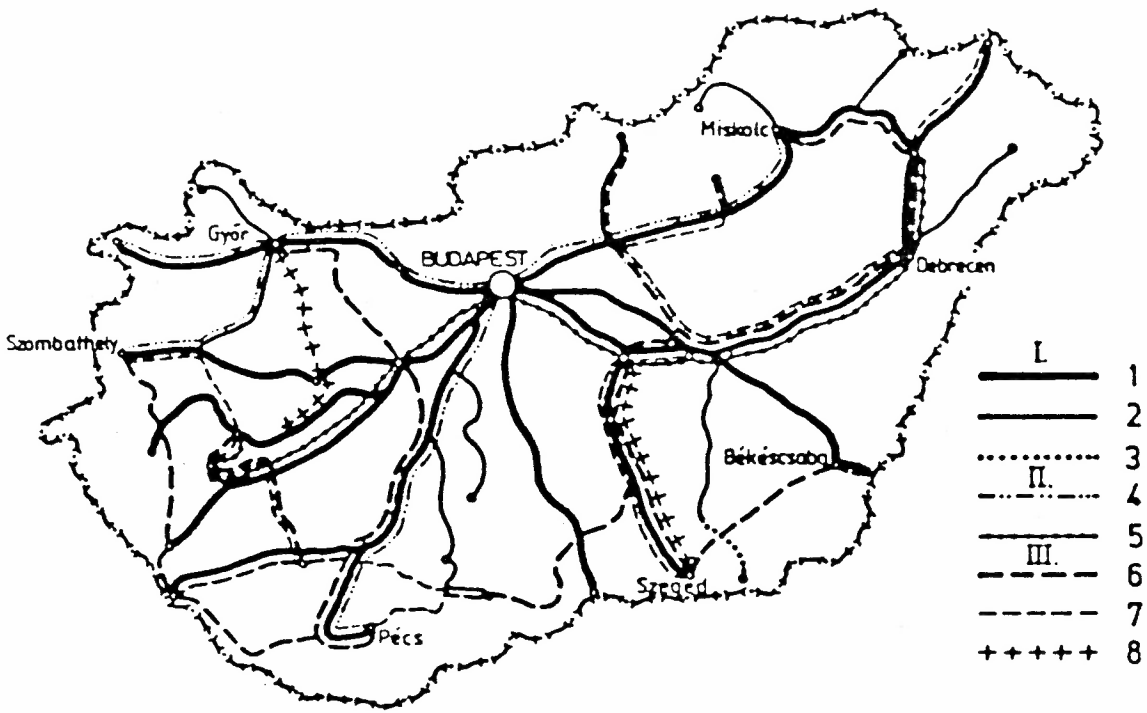
Figure 3

Long-distance railway connections in 1987



I. Central long-distance trains (converging in Budapest)
1 – express
2 – fast
3 – long-distance slow trains

II. Quasi-transversals (inter-regional railway connections through Budapest)
4 – fast trains
5 – seasonal fast trains

III. Transversals
6 – fast trains
7 – seasonal fast trains
8 – slow trains

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Figure 4

Budapest-centred central network of bus lines in 1988

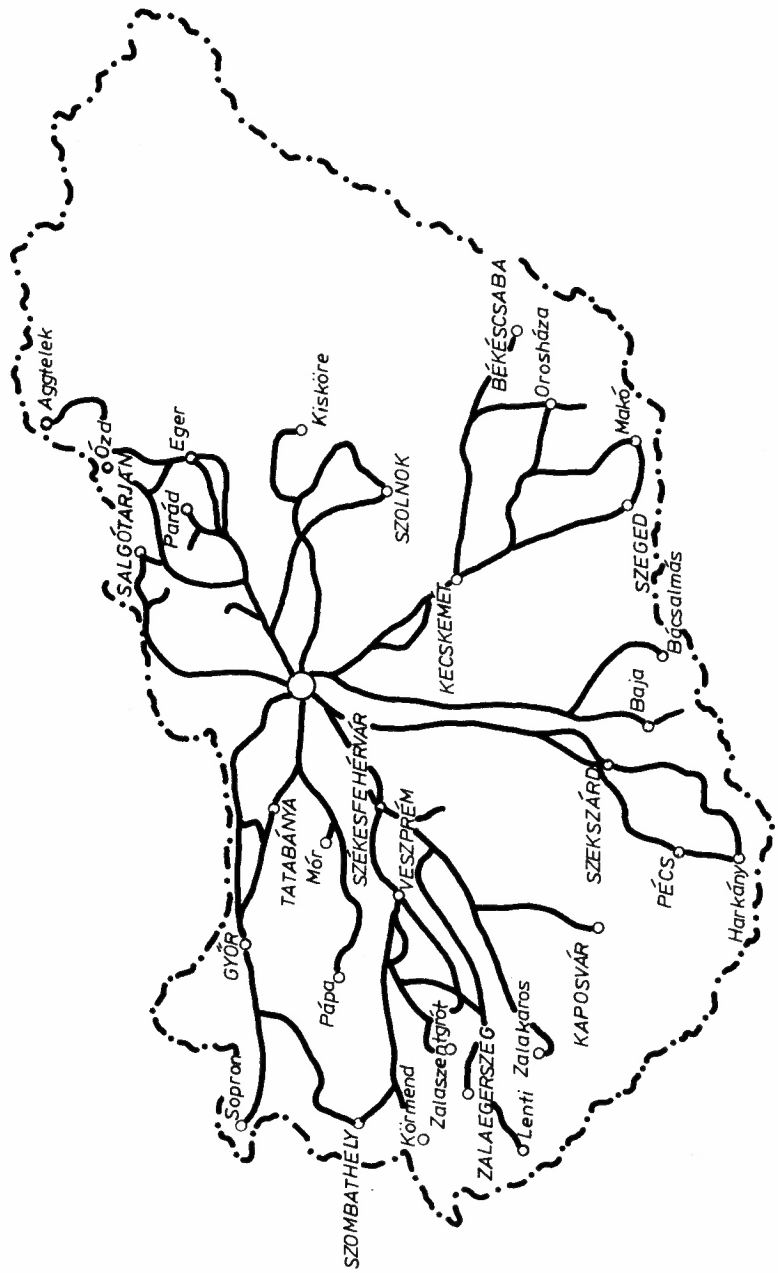
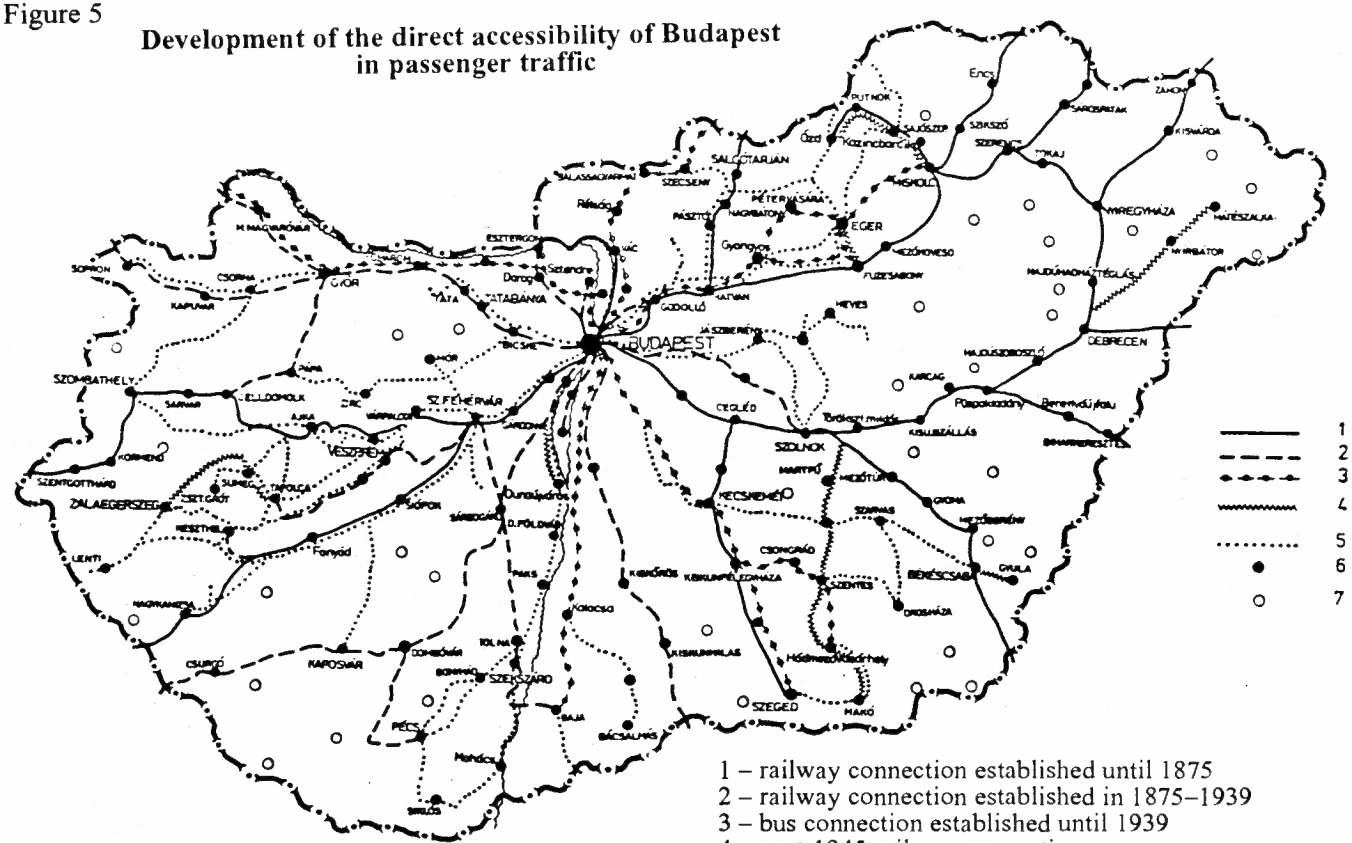


Figure 5

Development of the direct accessibility of Budapest in passenger traffic



1 – railway connection established until 1875
2 – railway connection established in 1875–1939
3 – bus connection established until 1939
4 – post-1945 railway connection
5 – post-1945 bus connection
6 – urban settlements directly connected with Budapest in 1987
7 – towns not being directly connected with Budapest by public transport for common use

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Figure 6

Network of transversal long-distance bus lines in 1988

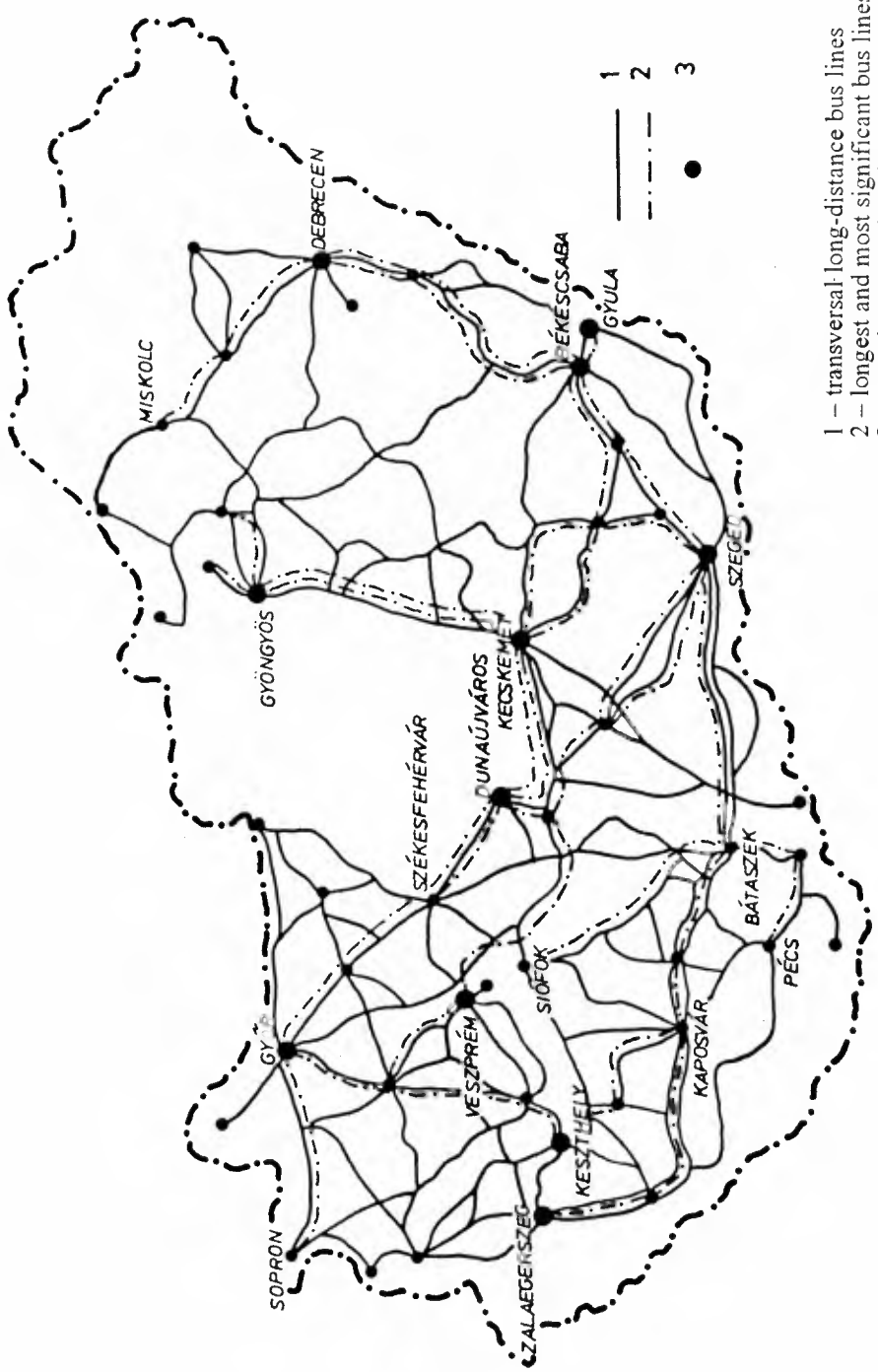
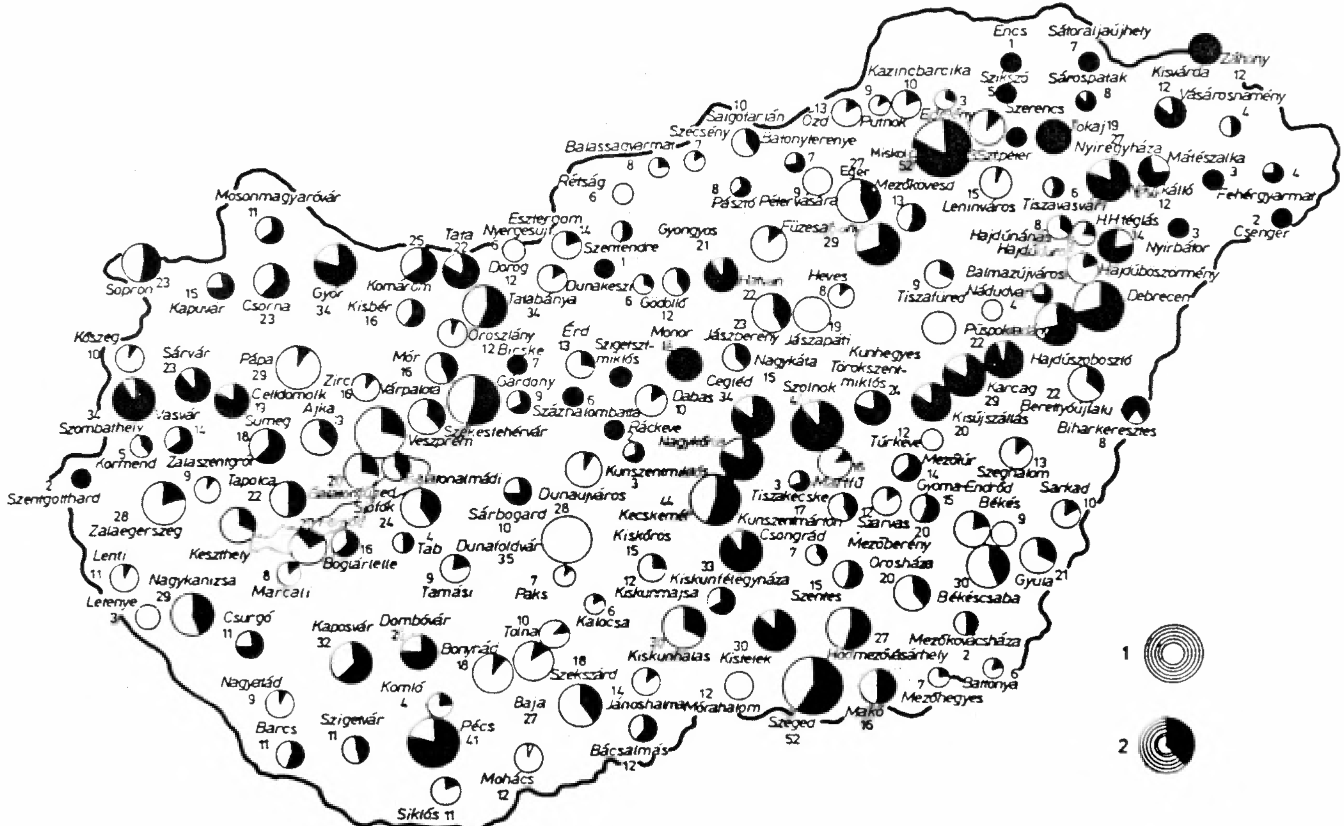


Figure 7

Number of intercity public transport connections in 1987



1 – number of connections with other towns
2 – % of these accessible by railway

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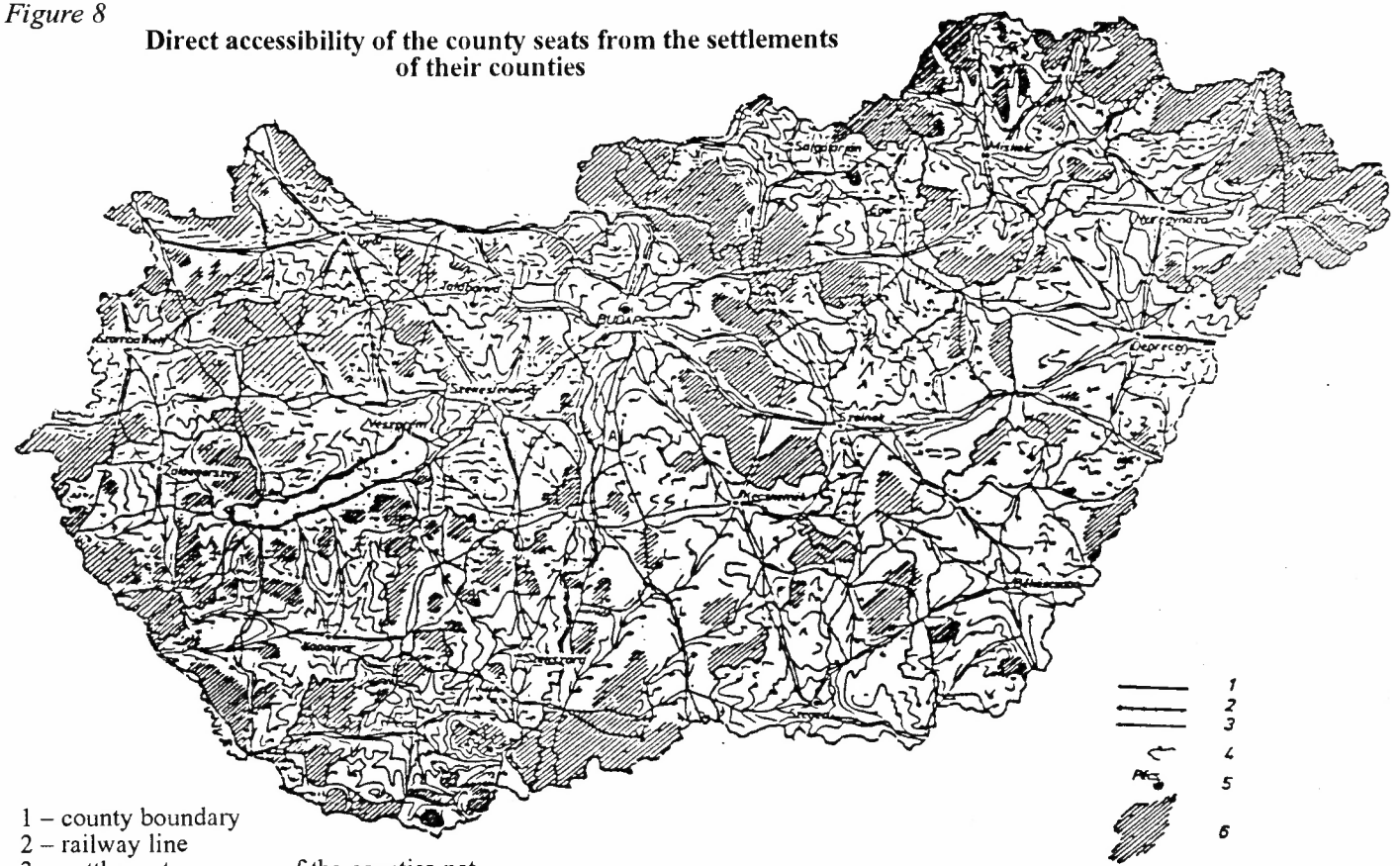
Figure 8

Direct accessibility of the county seats from the settlements of their counties



1 – county boundary
2 – railway line
3 – settlements or zones of the counties not accessible directly from the county seat by means of public transport services for common use
4 – county seat

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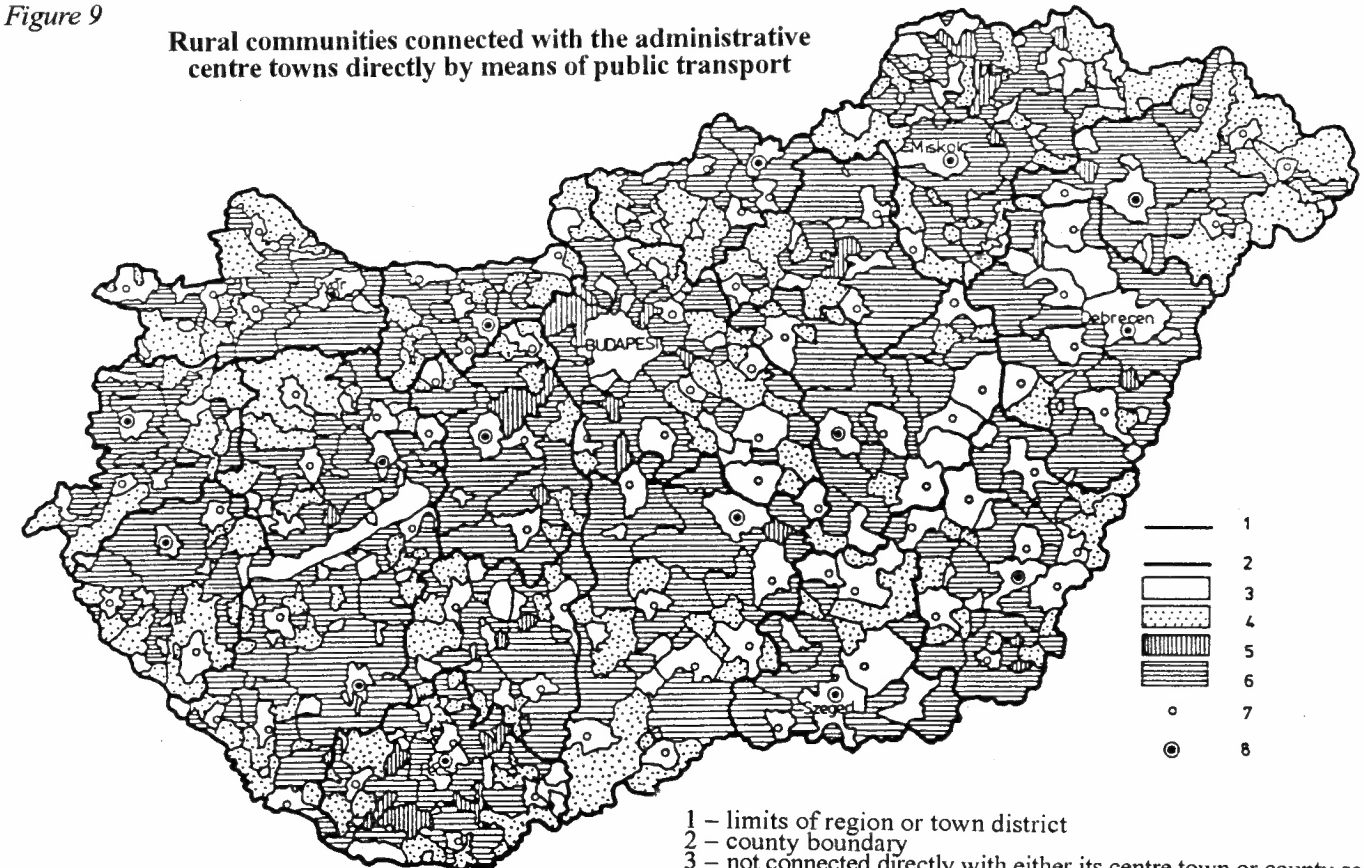
Figure 9

Rural communities connected with the administrative centre towns directly by means of public transport



1 – limits of region or town district
2 – county boundary
3 – not connected directly with either its centre town or county seat
4 – directly connected only with its centre town
5 – directly connected only with its county seat
6 – directly connected with both its centre town and county seat
7 – towns
8 – county seats

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Figure 10

Joint rural communities accessible on the roads of the other rural communities having a joint council in 1988

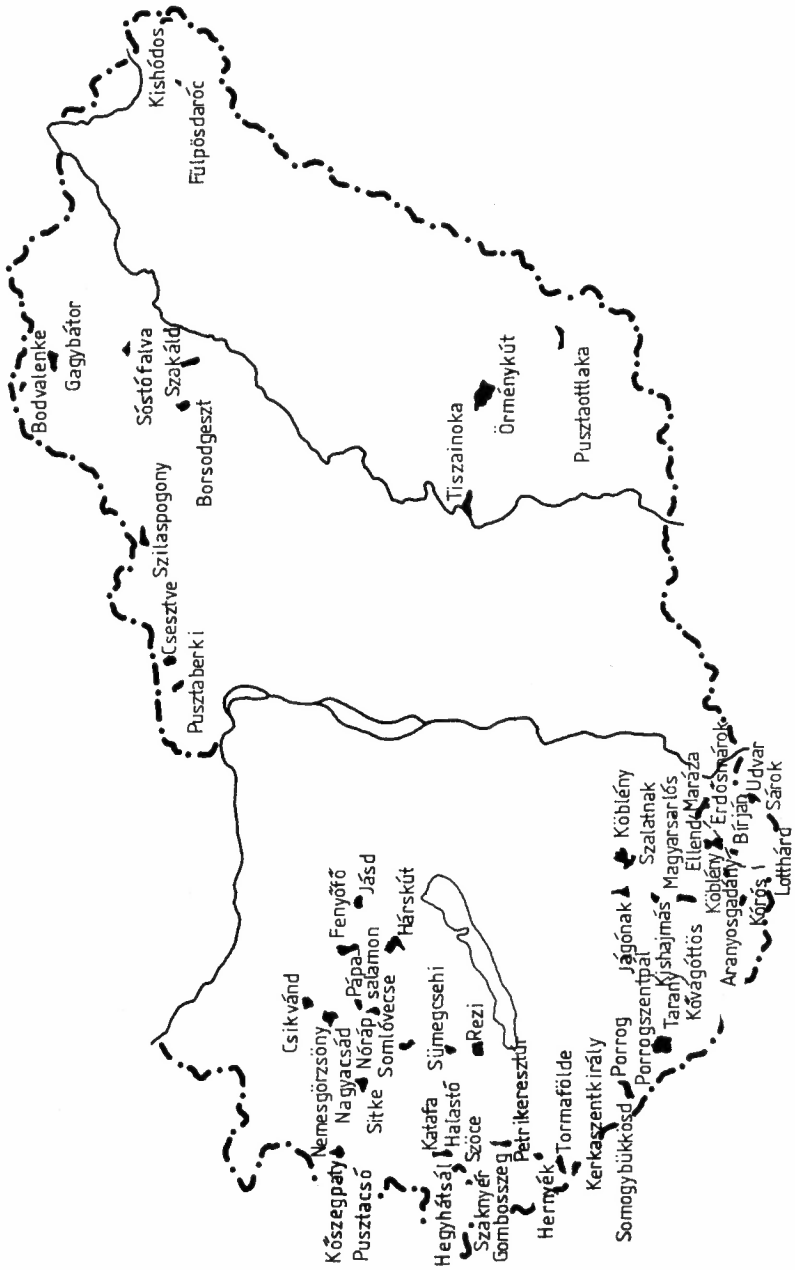

Figure 11

Employment centres of non-town status (large urban communities with town rights) (the balance of the out- and in-commuting people is positive, i.e. the number of the in-commuters is higher)

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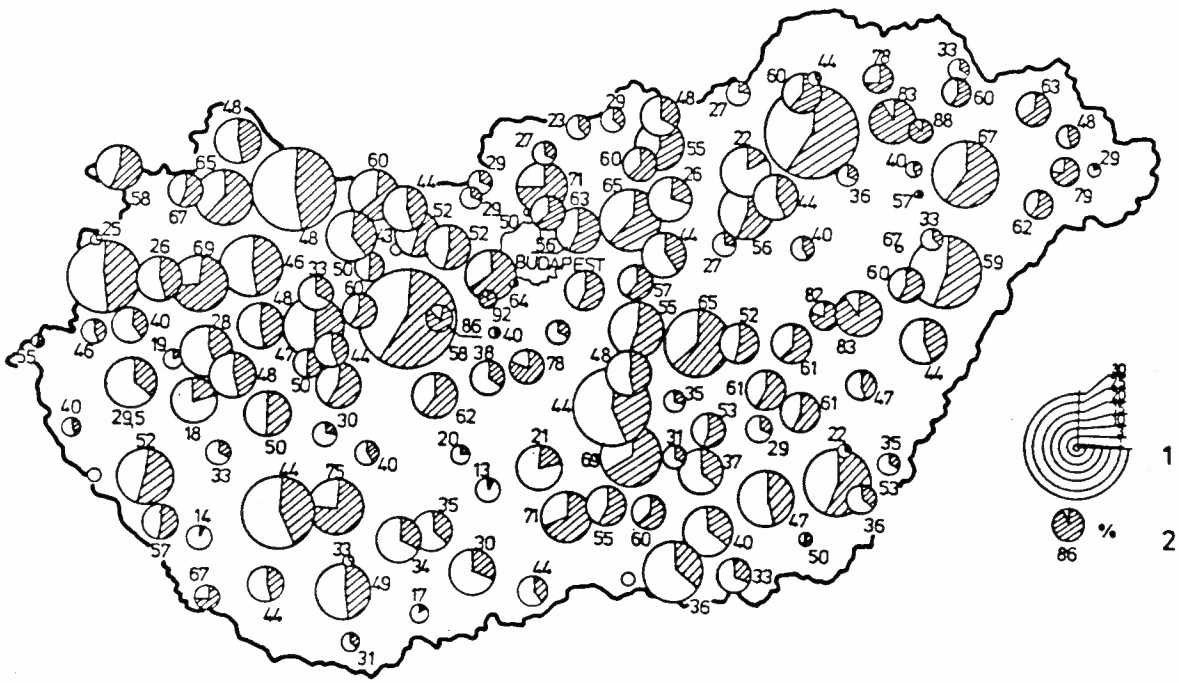
Figure 12

Values of the towns as traffic junctions by the number of the converging railway and bus lines in 1987



1 – total score value by the converging railway and bus lines
2 – the percentage of railway lines of the total value in %

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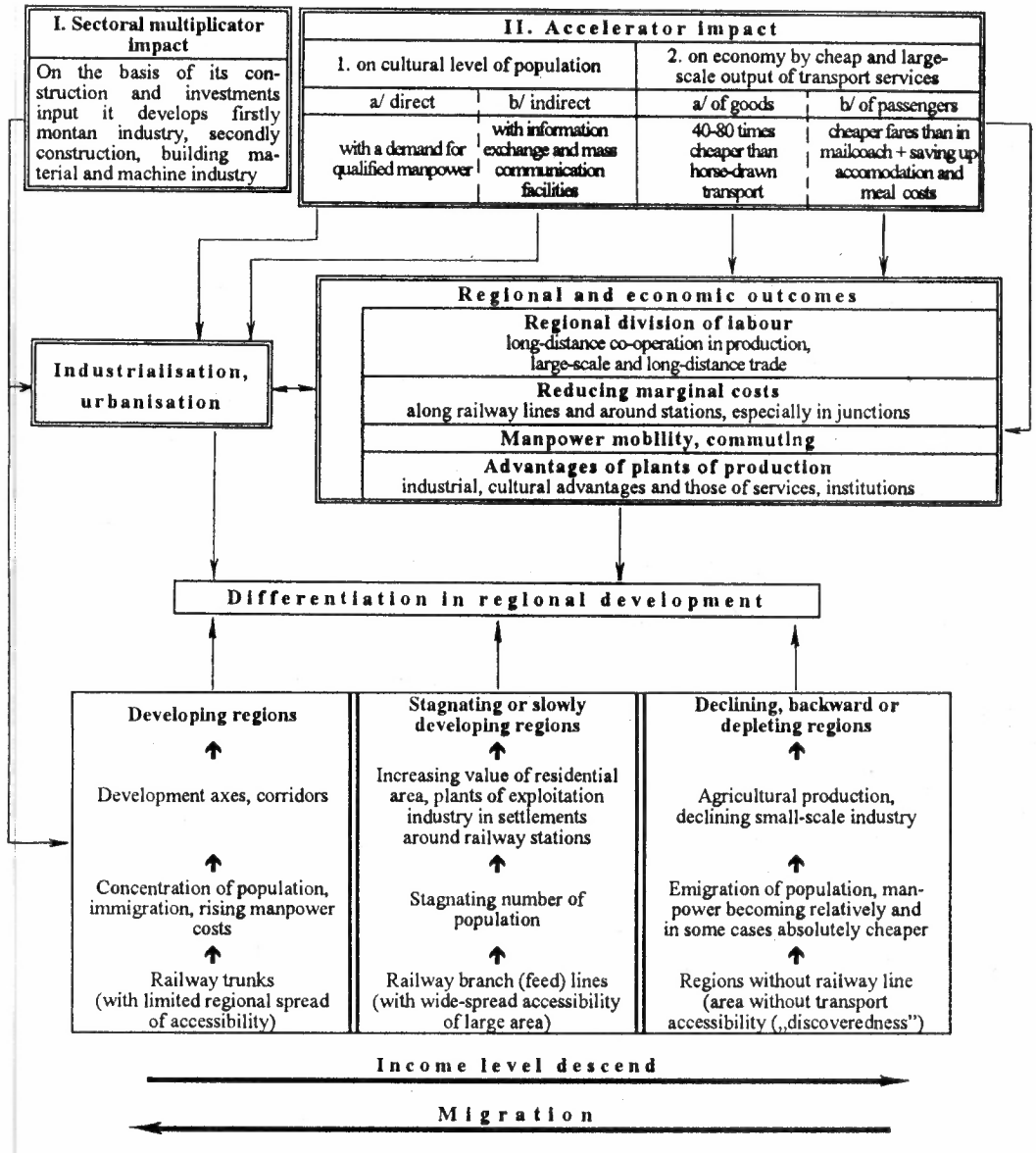
Figure 13

System of economic impacts of the railway traffic



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