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THE GEOGRAPHICAL SIGNIFICANCE OF THE NARROW GAUGE RAILWAYS IN HUNGARY

Theses of PhD Dissertation

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1. The aim of the thesis

Railway service has a significant role in continental transport infrastructure. It is cheaper and eco-friendlier (Erdősi F. 2004) than public road's transport. It's most notable advantage is that a rail can trnasport huge amount of goods and people at the same time to the same destination.

However, railway service is not unified, diverse railway lines do not for a coherent system (Udvarhelyi D. 1992). This kind of transport can be aligned. Railway line's can be listed into three classes. The classes are based on the gauge's size. In my dissertation, I discuss one of these gauges. The classes are wide-gauged, normal-gauged and narrow-gauged (Jéger G. 2008).

I do not only analyze forestry railways, which are the classic narrow-gauge railways, but I examined every line, which is narrower than the normal – 1435 milimetre – gauge. In southern continents, this line form is wide-spread.

Narrow-gauge railways are important in Hungary too. Until the Second World War, this line form was notable. Not just in separated towns, but in whole areas, where economy was helped by the lines. Huge systems used to operate in the Alföld (Károlyi Zs. 1988), in the Bodrogköz (Bory E. 1990), or near Dombóvár (Balogh I. 2001). Nowadays, only some of these lines can be found, and their function comletely altered. Lines, which survived until the XXI. century, have turistical importance.

The main of my thesis is to get an idea about their economical, sociological benefits and their use. All these based on the narrow-gauged lines geographical postion, the building circumstancies. I did not only examined the existing lines. I collected and represented on maps all lines, that ever existed in the country.

Beside collectind and representing them, they also have to be categorized. Therefore, those areas can be seen, where narrow-gauged lines were extremely important. Beside the past's examination, it is also important to take a look at the present, and to draw a picture of the still existing lines.

2. Research methods

First and foremost, I had to collect and process the literature. I used primary and secondary sources about narrow-gauge railways in Hungary and in other parts of the world. Therefore, I got a better perspective about how they operate.

Primary sources were articles from archives, filing-cabinets and contemporary newspapers. That is how I found unprocessed datas from the Magyar Királyi Államvasutak from the perios before 1919 and Gazdasági Vasutak Igazgatóság from 1958. I got more than 25 000 datas, which I edited in an Excel table. I evaluated the data with SPSS programme. In order to be more visible, I transferred the data into charts and tables. Above all this, I complemented my thesis with self-made figures.

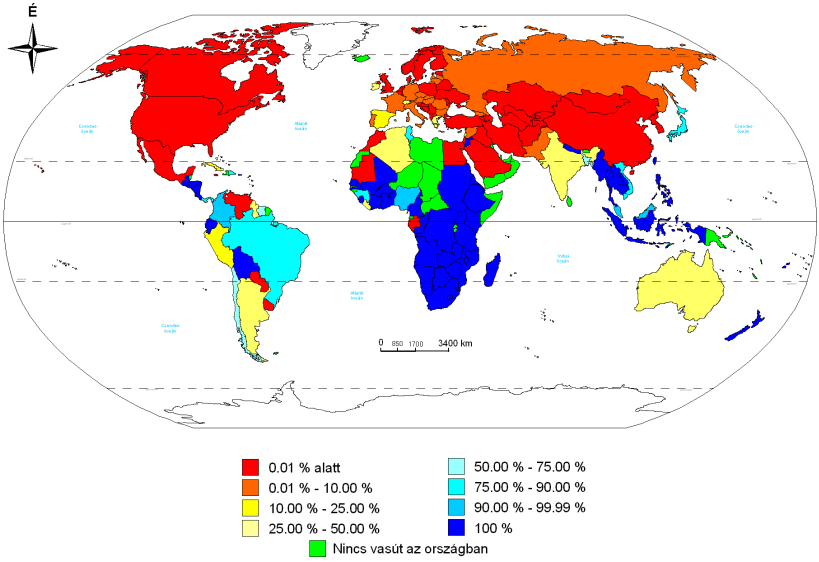
As secondary source, I used books, articles and thematic brochures from the mid. XX. century. I systematized the information I got. Changes in areas out of the Charpatian-basin are displayed in territorial disciple, while areas in the basin are displayed chronologically. Int he basin, through history, borders changed. Through the timeline, I examined the adequate area. Within this, in order to be more conforntable, I highlited in the maps the railway lines and their changes in the former area of the country. These maps can be found in the appendix.

These maps were made by MapViewer and ArcGIS programmes. Maps are essential in my dissertation. Maps illustrate and demonstrate the text. I represented some lines which were not mapped before. Every hungarian map I made are in EOV system.

3. The results

In my dissertation I made 9 tesis. Three are a global thesis, they can used all over the world and six, which are correct in the Carpatian-basin.

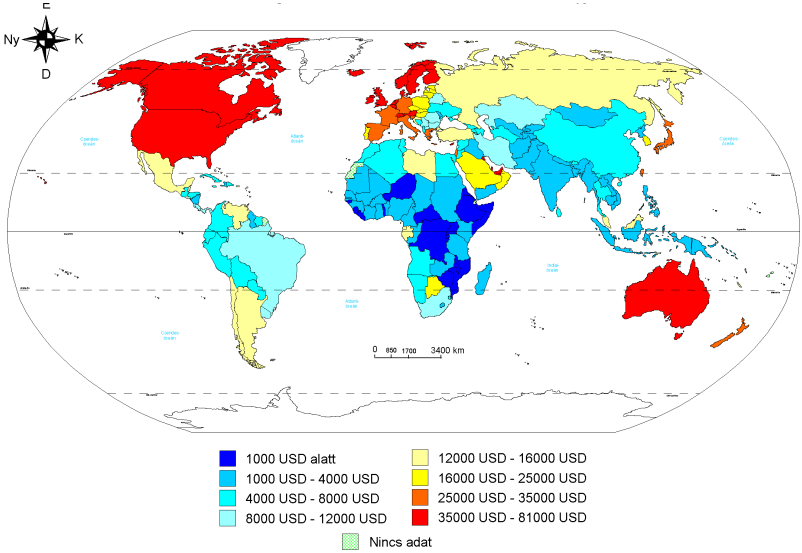
I have six thousands datas, about the countrys -of the World- railway lines (Bazant, M. J. 1961, UIC 1976, Turner, B. 2004, 2006, 2007). I made some table and maps, like the first map in this paper. About the tables and maps I draft the first thesis:



1. map: The rate of the narrow gauge railways in the countrys

1.thesis: The proportion of narrow gauge railways decreases worldwide. (The setback is more significant than at the normal- and wide-gauge railways). If this phenomenon continues, sooner or later, narrow-gauge railways will be crowded out from the line of public transport methods.

On the maps I see, that the narrow gauge railways are higher concentration in the south part of the World: Africa, South America and Souteast Asia. I analyze some variable, and find a correlation between the railway gauges and the GDP. The countrys GDP show the second map.



2. map: GDP per capita in the countrys of the World

2. thesis: In countries where the GDP is lower than 8000 USD/pers., the proportion of narrow gauge railways is

considerable. Whereas, those countries which are above the 8000 USD/pers. line, the examined line type is in minority. Therefore, the railway line's compound is a good pointer to estimate the country's state of economical development.

Not just, the GDP define the gauge. The topographical features are an important, maybe the most important coefficient, by the schoose of the railway lines:

3. thesis: The relief affects the gauge's size. When a line is built in high elevation, it is likely a narrow-gauge line.
The relief's arrangement is an even more important factor. As the relief becomes more and more articulted, it is more economical to build narrower gauges.

In our country the first narrow gauge railway line was build in Brennbergbánya (Lovas Gy. 2000). This railway line was a mining railway. This was a very prosperous project, and after it many other lines was built. First in the mines like Salgóbánya, Pereces and Selmeczbánya. After the mines, the narrow gauge railways are uesd in the agriculture and in the industrial plants, too.

4. thesis: Hungary's narrow-gauge railways evolved due to developing cole mining. The growing production required higher hauling capacity. Narrow-gauge railway was a great solution for this problem. By reason of being economical and useful, narrow-gauge lines soon became dispersed. At the end of the 19th century, above the existing 300 railwork, narrow-gauge machine manufacturing showed up too.

I had 25 thousands datas from Hungary. I made from the datas a historical background and some group for the lines. This groups are, about the long, the gauge, the aplly, etc. Before me, some categories was made Akos Vaszko in 1960. But his categories has not work for all narrow gauge railways in Hungay. Some lines is out of the categories. I make now new categories for all lines which in the past and in the present worked or works in our country.

One group where I made new categories are the gauges. Now, I know about 71 narrow gauges from 400 mm to 1415 mm, which are used. Akos Vaszko have categories just for narrower 600 mm, 600, 760 and 1000 mm (1/a table). I made this for all gauges (1/b table).

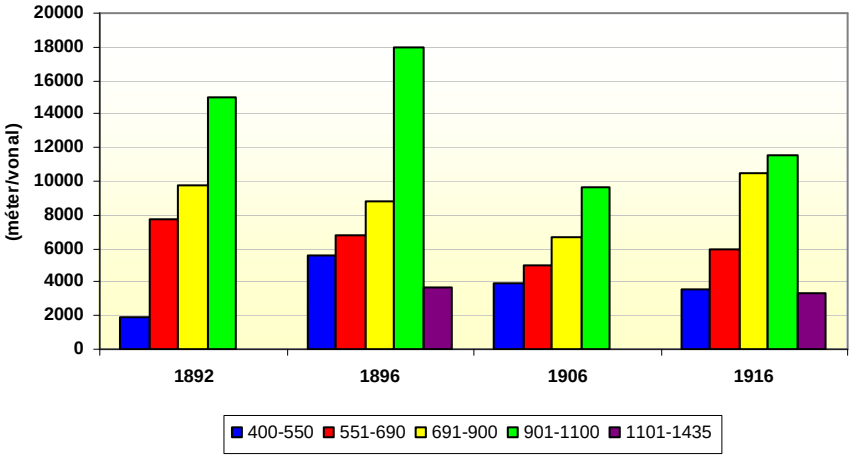
To compare the categories and the longs of the railway lines, we can see a correlation. This correlation show, the gauges and the longs are in ratio with each other (1. illustration). I draft this thesis about the datas from the end of XIX. century and the first decades of the XX. century (MÁV 1893, 1897, 1907, 1919). It is important, because many lines was rebuild. So my thesis is correct with the gauges in the time of the building.

5. thesis: Narrower-gauge means, the average line length is shorter.

1/a és 1/b táblázat: The groups of the narrow gauges by Ákos Vaszkó Ákos and by Jéger

	Ákos Vaszkó 1960
1	narrower like 600 mm
2	600 mm
3	760 mm
4	1000 mm

	Gábor Jéger 2010
1	400-550 mm
2	550-690 mm
3	690-900 mm
4	900-1100 mm
5	1100-1434 mm



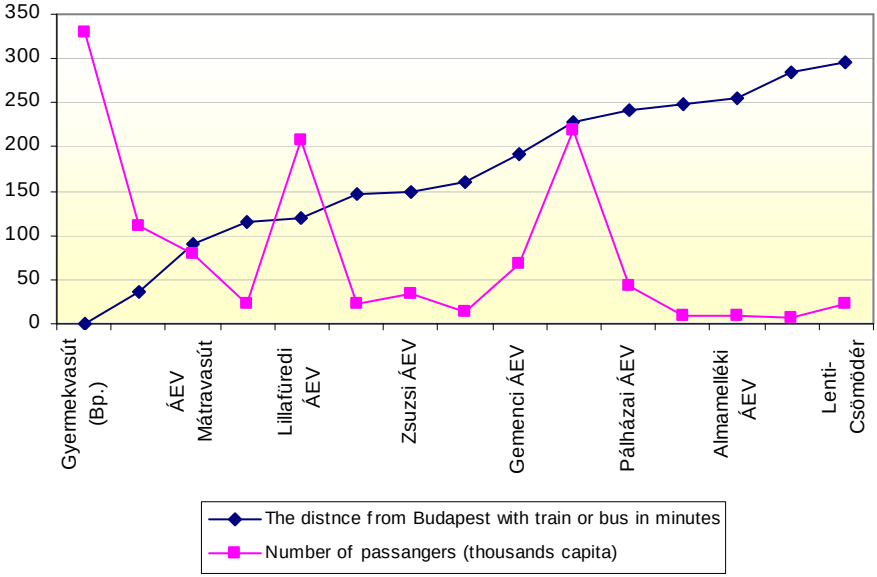
1. illusration: Railway lines longs, for one line in the gauge groups

I was made a new research. I made categories about the apply. One of my thesis is after this research:

6. thesis: The forestry-, farmland-, mine- and industrial-lines were formed with the same reason, in different milieu. The difference in their name is based on this. Forestry lines operated int he hills, and served logging. Farmland's lines operated int he Alföld, and helped the agriculture. Both line type operated as a method of public transport, serving the inhabitants. Mine tramways transported raw materials, while industrial rails carried semi-finished and finished products.

Nowadays the narrowgauge railways we used just in the tourism. It was important, to show how connected the lines to the pageant. I searched the „time" distance from Budapest, our capita (2. illustration). And about it I draft the seventh thesis:

7. thesis: Based on the journey time we can appoint, that the distance between the notable touristical and vehicular centre (Budapest) and the starting point of the narrow-gauge railways is in reverse order with the number of tourists. We can talk about exception, if there are other remarkable attractions near the railway.



2. illustration: Attendance and time distance from Budapest on the narrow gauge railways

On the second illustration we can see two high value. One by Lillafüred and one by Szilvásvárad. They have some other attraction

over the narrow gauge railways. It is the reason, why have they so much passangers.

8. thesis: Narrow-gauge railways operate as attractions and transport methods. In most cases, these are tied together: we can travel to an attraction with an other attraction. The railways turistic values is determined by the value of it's surrounding.

The touris is very important today in hungary for the forestry and other narrow gauge railways. But it is not enough. Very important the EU, because the tourism have lower receipts, like the cost of the operate.

9. thesis: In Hungary, narrow-gauge railways have only turistical role. Although, it is not enough to be economic. Therefore, it is important to operate not only as a mthod of public tansport, buta s a method of transoporting goods. It is also important for the operators to follow the example of Lillafüred, Gemenc or Szob, and handle tenders. Without financial sources from competitions, the still existing lines could easily close , just as the Tiszakécske line did.

4. Summary

The main aim of my doctoral dissertation was to survey the hungarian narrow-gauge railways from the early times. Beside the survey, I examined the line's geographical significance. Above this, I examined the past, revealed and drew up geographical regularities. These findings were essential when I formulated opportunities for the future.

At beginning, I analysed not only the Carpathian-basin. I studied narrow-gauge railways worldwide. Therefore I got a sharp image of processes, that affect railway service sin other parts of the World. In addition I had the chance to survey trends, which passed o fin Hungary and in foreign countries, foreign continets too.

I focused on examining Hungary's transport. Through my thesis, I assayed hundreds of exsting or partially existing railway lines. Based on it, I have a notion about hungarian narrow-gauge railway lines int he last hundred and fifty years. During historical prosecessing I assimilated thirty thousand datas. These datas were the base of some thesises in my dissertation.

It can be said, that the narrow-gauged railway transport begun with the mine tramways, but soon, other fields implemented this kind of transport. When „simple" railways came into sight, it was a real breakthrough. This kind of line configuration allowed qiuck and safe transportation thruogh temporarily laid lines. After First and Second World War ended, notable narrow-gauge railway constructions begun. However from the 1960's, government did not sympathize with narrow-gauge railways. Therefore, at that time, the railway system, which was more than 5000 kilometres long, constantly began to diminish. Nowadays only 8% of the original system has left (400 kimoletres) if we count the lines, that operate in mines, and those, which still operate on the surface.

In our days, narrow-gauge railways only have touristical role. It is a big attraction and a method of public transport. Public transport in itself is not enough to keep up the lines, therefore it is essential to have other financial resources. The Europian Union's financial support permits the renewal of lines and vehicles. These improvements assure the operation of narrow-gauge lines for a few

decades. If operators do not make a bid for EU competitions, their lines could easily break off.

Int he future, it is necessary to brush up the transit, and to have stronger and dynamic marketing in the field of tourism. These changes can contribute to the line's economic functioning, therefore narrow-gauge lines can serve tourist for decades.

5. Bibliography

Balogh I. 2001: Fejezetek a Dombóvári Gazdasági Vasút (és a Dombóvár környéki kisvasutak) történetéből, Parragh Produkció, 30 p.

Bazant, M. J. 1961: Les Problemes poses par les differences d'ecartement des rails dans las chemins de fer Europeens, in:Revue Generale des Chemins de fer 1961. február, Párizs, pp. 107-113

Bory E. 1990: Fejezetek a Bodrogközi Gazdasági Vasút történetéből, in. Vasúthistória évkönyv 1990, KÖZDOK, Budapest, pp. 411-425

Erdősi F. 2004: Európa közlekedése és a regionális fejlődés, Dialóg Campus Kiadó, Budapest-Pécs, 639 p.

Hegedűs A. et. al. 2009: The raletionship between railway gauges and topographic features ont he example of the Hungarian Bükk Mountains, in.: Acta Universitatis Sapientiae Agriculture and Environment, Kolozsvár, pp. 155-161

Horváth F. 1999: Az Alföldi Első Gazdasági Vasút – a MÁV Alföldi Kisvasút története (1894-1971), Magyar Államvasutak Rt., Budapest, 1999, p. 92

Jéger G. 2008: A gazdasági fejlettség és a vasúti nyomtávok kapcsolata Európában és Ázsiában, in: IV. Magyar Földrajzi Konferencia, szerk.: Szabó Valéria, Orosz Zoltán, Nagy Richárd, Fazekas István, Debrecen, pp. 396-402

Károlyi Zs. 1988: Az Alföldi Első Gazdasági Vasút, MÁV Alföldi Kisvasút, in: Vasúthistória Évkönyv 1988, KÖZDOK, Budapest, pp. 311-319

Lambert, A. 1996: Switzerland by rail, Bradt Publications, Bucks, England, 404 p.

Lovas Gy. 2000: A brennbergi bányavasút, in. Vasúthistória Évkönyv 2000, MÁV Rt., Budapest, pp.217-231

MÁV 1893: A hazai vasútügy fejlődése 1892-ben, Pesti Könyvnyomda Részvény Társaság, Budapest, pp. 268-283

MÁV 1897: A hazai vasútügy fejlődése 1896-ban, Pesti Könyvnyomda Részvénytársaság, Budapest, pp. 51-429

MÁV 1907: A vasutak 1906. évi állapotáról és üzleti eredményéről valamint az 1891-1906 évi. összesített eredményekről, Budapest, pp. 168-191

MÁV 1919: A vasutak 1916. évi állapotáról és üzleti eredményéről valamint az 1891-1916 évi. összesített eredményekről, Budapest, pp. 182-210

Molnár M. 2010: Bányavasutak a Dorogi-szénmedencében, Bányászati és Kohászati Lapok, 2010/3. szám, Budapest, pp. 30-35

Turner, B. 2004: The statesman's yearbook, Palgrave Macmillan, Basingstoke, Nagy-Britannia, 2072 p

Turner, B. 2006: The statesman's yearbook, Palgrave Macmillan, Basingstoke, Nagy-Britannia, 2081 p

Turner, B. 2007: The statesman's yearbook, Palgrave Macmillan, Basingstoke, Nagy-Britannia, 1564 p

Udvarhelyi D. 1992: Vasúton a világ körül, Műszaki Könyvkiadó, Budapest, 140 p.

UIC 1976: A vasutvonalak hossza és a nyomtávok megoszlása (normál-széles-keskeny), kézirat, Budapest, 16 p

Vaszkó Á. 1960: A keskenynyomtávú vasutak szerepe a magyar közlekedésben, VTKI Évkönyve 1959/60, Budapest, pp. 593-614

6. My papers on the topic of the thesis

JÉGER G. 2008: Miskolc városának turisztikai fejlesztési lehetőségei a Lillafüredi Állami Erdei Vasút fővonala mentén, in: Geographia generalis et specialis, szerk.: Szabó J. - Demeter G., Debrecen, pp. 373-379

JÉGER G. 2008: Keskenynyomközű vasutak Erdélyben, A táj változásai a Kárpát medencében, Az erdélyi táj változásai, Környezetkímélő Agrokémiáért alapítvány és Szent István Egyetem, szerk: Füleky Gy., Gödöllő, pp. 38-44

JÉGER G. 2008: A gazdasági fejlettség és a vasúti nyomtávok kapcsolata Európában és Ázsiában, in: IV. Magyar Földrajzi Konferencia, szerk.: Szabó V. et al. Debrecen, pp. 396-402

HEGEDŰS A. – **JÉGER G.** - VÁGÓ J. **2009**: The raletionship between railway gauges and topographic features ont he example of the Hungarian Bükk Mountains, in.: Acta Universitatis Sapientiae Agriculture and Environment, editor: Albert B., Sapientia Universyti and Scientia Publishing House, Kolozsvár, pp. 155-161

JÉGER G. 2009: The Pereces 1000 mm gauge railway's environmental effects, in.: Acta Universitatis Sapientiae Agriculture and Environment, editor: Albert B., Sapientia Universyti and Scientia Publishing House, Kolozsvár, pp. 169-175,

JÉGER G. 2009: Keskenynyomközű vasutak a Dél-Dunántúlon, in.: Mdeiterrán Világ Kulturális folyóirat 11. szám, főszerk.: Szilágyi

I., Veszprémi Humán Tudományokért Alapítvány, Veszprém, pp. 189-207

JÉGER G. 2009: Napjainkban is működő keskenynyomközű vasutak a Bükk-hegységben, CD kiadvány, Geográfus Doktoranduszok IX. Országos konferenciája, szerk.: Bajmóczy P., Szeged

JÉGER G. 2009: A közlekedés szerepe a turizmusban, CD kiadvány, Geográfus Doktoranduszok IX. Országos konferenciája, szerk.: Bajmóczy Péter, Szeged

HEGEDŰS A. – HUDÁK É. - **JÉGER G.** - VÁGÓ J. **2009**: A vasúti nyomtávok és a domborzat kapcsolata a magyarországi Bükk-hegység példáján, in.: V. Kárpát-Medencei Környezettudományi Konferencia, szerk.: Mócsy I. et al., Ábel Kiadó, Kolozsvár, pp. 355-360

JÉGER G. 2009: Az egykori perecesi 1000 mm-es bányavasút hatása a környezetre, in: V. Kárpát-Medencei Környezettudományi Konferencia, szerk.: Mócsy I. et al., Ábel Kiadó, Kolozsvár, pp. 361-366

JÉGER G. - VÖRÖSKŐI ZS. **2009:** A Dorog környéki közlekedési rendszerek változása a bányászat hatására, in: Települési Környezet, szerk.: Szabó Valéria, Fazekas István, Debrecen, pp. 321-326

JÉGER G. – SPÉDER F. **2009:** Harangod-vidék közlekedésföldrajzi változásai a XX. század folyamán, in: Települési Környezet, szerk.: Szabó V. - Fazekas I., Debrecen, pp. 327-331

JÉGER G. 2010: A Nyírvidéki kisvasút jelentősége az általa bejárt térség életében, in: VI. Kárpát-Medencei Környezettudományi Konferencia, szerk.: Szabó B. – Tóth Cs., Bessenyei György Könyvkiadó, Nyíregyháza, pp. 421-426