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INDUSTRIAL DEVELOPMENT POLICIES  
IN THE AUSTRO-HUNGARIAN EMPIRE,  
FOCUSIONG ON HUNGARY'S INDUSTRY  
FROM THE AUSTRO-HUNGARIAN  
COMPROMISE OF 1867 TO THE WORLD  
WAR I

Review  
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**Abstract**

*This article examines the particularity and complexities of industrial development and business-government relations in the Austro-Hungarian Empire, especially in Hungary between 1867 and 1914. The paper looks looking into the interactions between the Hungarian government, the Viennese court and Hungary's most prominent companies from the pre-world war period. In the period under discussion Hungary was still mainly an agrarian country but after the compromise between Austria and Hungary industrial development increased and started to catch up with the Austrian competitors. The study highlights the main trends of the applied industrial development policies and their effects on the economy and the companies themselves.*

## INTRODUCTION

In the framework of this study, the authors intend to examine the concept of industrial development in Hungary from the Austro-Hungarian Compromise in 1867 to the World War I, how the state intervened to promote the prosperity and what policy instruments were used to stimulate the development of the industry. The mission of the state was to create the potential for development, the right legal environment, the provision of adequate capital and the quantitative and qualitative availability of adequate human resources for the industrial companies. The distribution of goods, the provision of raw materials and related infrastructure were also essential. So, the author investigated from this point of view how these areas contributed to the general prosperity of the state. The results of the research can be valid today, as industrial development can be considered as a long-term process and its effect are to be felt decades later. Nowadays, also there are initiatives for industrial development in Hungary, considering the large-scale industrial development projects such as the Modern Cities Program what promotes projects meant to create and develop new industrial parks and zones in Hungary.

### CREATING THE SUITABLE POLICIES FOR THE INDUSTRIAL DEVELOPMENT

Following the compromise of 1867, which settled the political relations between the Austro-Empire and the Hungarian Kingdom, the efforts to develop the industry also emerged. In the first round in 1872, the Act of Industry was approved in 1872 February 29 in the House of Commons, and on the 1st of March in the House of the Main Order, which stated in its first point: "In the Hungarian Kingdom every individual who is over the age of majority, regardless of gender, within the limitations of this Act, is free to work in any industrial sector, including trading, anywhere, independently" (Act VIII of year 1872 - industry law). The law provided equal conditions for all industries in the spirit of advanced age.

"By the mid-1870s, the debate on customs was intensified. The need to accelerate the industrial development became increasingly clear, and the state made significant financial contribution, which was a powerful policy tool (Gyarmati et al., 2000). Thus, it can be seen that the state considered the development of the industry as a strategic goal in this era and as an important instrument of regional policy. The goal was to strengthen the country's position inside the monarchy, to self-supply industrial products and to export products.

Initially, the government support for industry was of low because, "The Emperor only contributed with insignificant support to the companies, and especially to the silk industry which was close to the Viennese court (Nagy, 1961); basic support was given to the domestic industry and the craft industry. Based on the data collection from Gyarmati et al. (2000), the state spent 416, 420 crowns to support industry in the 10 years after the compromise. As it can be seen in Table 1 the amount of subsidies showed an upward trend in the following years (table 1).

Based on the Act of XLIV 1881 under §26 the citizens got more freedom; the law stipulated that in order for the industry and commerce to improve the citizens were free to set up institutions and individual citizens which could join in associations or unions under the supervision of the state and could set their own individual rules (Act XLIV of 1868 on nationality equality).

Under Sándor Hegedüs's mandate - who was the minister of Commerce (1899-1902) - the highest amount of subsidies for industrial development were implemented, which was spectacularly higher than 1-2 years before, and also 48 times more than it was 30-40 years earlier. The distribution of subsidies was not equal; the manufacturing industry received the largest part of the benefits: more than 70% of the total. The remaining 30% was shared by small industries, and some money was spent on support of industry education.

Act III of year 1907 provided additional benefits to industrial enterprises. The manufacturing companies were exempt from state taxes, local taxes, trade and industry fees, which was a novelty and really met consumer needs (Act III of 1907 on the development of domestic industry).

In the days of happy peacetime, between 1881 until the end of 1906, 838 new factories were founded and 43 existing factories expanded introducing new industries. In addition, 408 old factories also got subsidies, so the total number of beneficiary factories was 1289. It can be said that in the pre-World War I period decentralized multi-polar development policies were pursued, resulting in an average annual growth of 11.2 percent in industry (Bertényi and Gyapay, 1993).

44% of the beneficiary factories were agricultural distilleries, which indicates that the Hungarian industry already had a significant agricultural industry, but the number of the distilleries showed a decreasing trend and capital-intensive companies showed a more diversified overall picture. Table 2 shows the share of the total support for factories created under Act of 1898 XLIV and that the iron and metal industry companies, mechanical engineering companies, chemical and light industry companies such as weaving industry came to the fore (table 2).

According to Varga's research findings (1980), the statistical data of the industrial enterprises which received state subsidies should not be taken for granted: the Ministry of the Commerce department of industrial development prepared reports, but these could be inaccurate. During his research, Varga discovered a number of errors that could be corrected after the correct matching of industries and companies, but it was also possible to conclude from several inaccuracies that "the ministry did not have accurate information about which factories benefited from state subsidies, nor how many of these were put into operation, or how many actually benefited from the subsidies provided beforehand" (Varga, 1980).

### **CREATING THE ADEQUATE HUMAN RESOURCES**

However, in order to implement a successful industrial development policy by the state besides infrastructure, other needs are to be met: human resources and improved education. "After 1867 associations and unions played an outstanding role in the improvement of industrial education; this helped to overcome the major obstacle in industrial progress, the huge shortage of skilled workers and industrial leaders, which led to a dynamic development of industry." (Gyarmati et al., 2000). The associations themselves would not have been able to organize and run the educational programme as a substantial state subsidy was needed. Fully aware of the existing needs, Baron József Eötvös tried to find a solution to the educational situation and his Act, XXXVIII, 1868 provided the framework for compulsory education and master's degrees whose length of study varied from 6 to 12 years or even 15 years depending on the school (Halkovics, 1999).

Eötvös did not only work conscientiously on the legal advancement of industrial education in Hungary, but as a spiritual leader he helped to found the first industrial college, which was established in Košice (Kassa) in 1872, where the first and best mechanics were trained as well as carpenters (Fericsán, 1999). The training of the engineers working in the industrial sector was resolved in 1846, when József Ipartanoda institution was founded, being awarded the university title in 1856. Istvánfi (2015) stated that "In Hungary, the higher-education level, the university architectural training has been developed in the Budapest University of Technology for over 120 years. Until 1945, the training included engineering, technical and design art subjects, provided a balanced education" (Istvánfi, 2015).

Víg (1932) stated that the provisions of the 1872 act were not effective enough, therefore, "ten years after the law had been passed, Trefort decided to

introduce the schooling of industrial professionals by implementing the strictest measures of the Act on Educational Education." (Víg, 1932). Ágoston Trefort issued a training and organizational structure for industrial students in 1882, the length of training and the hours required for the skills to be acquired. The length of the studies was three years and focused on the following subjects: freehand and geometric drawing, reading and writing and arithmetic.

Later, in all sectors acknowledged by the Chamber of Commerce and Industry, the minimum target was to set up 2-2 industry schools. The implementation was still carried out by the ministry, which was supplemented by the foundation of the National Industry Education Council in 1892, acting as an opinion-forming syndicate.

### **THE RESULT OF THE EFFORTS MADE ON INDUSTRIAL DEVELOPMENT**

The right legal background and the right infrastructure conditions were created with the support of industry and the availability of skilled labour and developed greatly over a long period after 1848-49. It was a period of great success for the Hungarian industry until the outbreak of World War I. This period is mentioned by the society as a happy peaceful time.

From the era of dualism to the change of regime Faragó studied the archive data of the contemporary census and migration. He found that prior to the 1900s, inaccurate data could be found in the reports because the calculations were based on estimates, but the accuracy improved starting with the 1900s (Faragó, 2011). Table 3 shows the characteristics of the employment in today's Hungary as well as the share of worker population in the primary, secondary and tertiary sectors (table 3).

The success of industrial development is also evidenced by the growth of the industrial population, but due to the peculiarities of the age, which have been presented through Faragó's findings, certain sources may differ. Gyarmati et al. (2000) also concluded that the industrial population had grown significantly from the time of the compromise to World War I. According to their calculations, "the number of mining and industrial populations was only 694 729 in 1869 (10.1% of total workers), but in 1880 it was 832 851 (11.6%), in 1890 it increased to 950 687 (to 12.5%) in 1900 to 1 270 539 (14.4%) and to 1 543 507 in 1910 (17.2%)" (Gyarmati et al., 2000).

The booming industry had to be supplied with raw materials, iron in the case of machine manufacturing and railway construction. Accordingly, the country's iron ore mining had to

keep up with the increased demand, so from the compromise to the world war, it increased sevenfold compared to the previous period, reaching 1 million tonnes per year. The regional distribution of iron ore production had not changed compared to previous decades. At the beginning of the 1900s, 70-80% of the production was provided by 5-6 corporations and treasury mines; mining and metallurgy were entirely in the territory of historic Hungary. (Lóránt, 2017)

Iron ore mining and processing led to the development of the coal mining industry as coal was needed to heat up furnaces. At that time, the country had hundreds of smaller or larger coal mines. Krisztián (2018) found that after the compromise several companies located in the territory of the Hungarian Kingdom became dominant, such as the Salgótarján Coal Mining Company, which was a member of the Hungarian General Coal Company. "Treasury mining was organized to supply the coal to the national economy. Considering the prospects, the Duna Steamship Shipping Company of Austria decided to invest in the development of their existing mine in Pécs." (Krisztián, 2018).

The black coal - about half to half - was from Pécs's region and from Caraş-Severin (Krassó - Szörény), and the majority of brown coal was mined in the Esztergom Basin (32%), Sopron County (28%), the Borsod region (18%) and Nógrád (11%) (Bertalanfy, 1986). Production performance grew dynamically from 605 418 tonnes in 1863 to 9 860 037 tonnes in 1913, but the vast majority of coal-mining companies were foreign owned, with the Austrians being the most influential. (Gyarmati et al., 2000). In the Hungarian turn-of-the-century mining industry, the scale of the extraction of non-ferrous metals also showed an upward trend, but the spatial location of mines was reorganized compared to the previous decades. Before the 1860s, Kremnica (Körmöcbánya) and BanskáŠtiavnic (Selmecbánya) of Upper Hungary were considered to be the dominant sites, but with their exhaustion mining in Transylvania emerged, what later accounted for 70-80% of the country's non-ferrous metal extraction. The importance of Transylvania's mining is also demonstrated by the fact that salt production nearly doubled between 1860 and 1910 from 1.3 million to 2.3 million. The weight of salt mining is well illustrated by the fact that 20% of the country's mining production was extracted from the salt mines in Transylvania, which exceeded 34 million crowns in 1914.

What were the factories which supplied the raw material to the related processing industries and where were they located? During the years of the compromise, 11 new mechanical engineering companies were established, 9 were based in Budapest and by the 1880s the number doubled,

and 20 plants were founded annually. The increasing number of factories was associated with an increasing number of workers, but there is another method to measure the development by summing up the horsepower of the machines used by the factories. Gyarmati et al. collected the typical statistical data of the industrial sites at the turn of the century (Table 4).

Table 4 shows that between 1898 and 1906 the number of industrial sites increased by only 140, but the horsepower of the machines almost doubled. The increase in the number of workers follows the increase in the number of industrial sites, so it can be stated that either more machines were used by the factories or their efficiency increased (table 4). The former steam engines were replaced in many cases by internal combustion engines. The industrial use of electricity helped to spread electric motors and a variety of electronic devices which were produced by the electrical industry. In the seven-year cycle between 1906 and 1913, the number of industrial sites increased by leaps and bounds compared to the previous period, in 15 years the number of industrial sites doubled, and the capacity of power machines and tools increased by three and a half times over the period.

As part of the industry's infrastructure development, a decision was made regarding the direction of railway developments in the pre-compromise period. The Act of 1836 XXV in the first section of the Law on Private Businesses Enhancing Public Benefit and Trading in the Country, stated 13 points on the directions of the lines to be build. The building of the Budapest-centred economy was already evident from this law, out of the 13 points, 7 marked Pest as starting point with destinations from Vienna, through Fiume and Transylvania to the border, while the other points passed through the historical Hungary (Act XXV of 1836).

#### **PRESENTATION OF THE DEVELOPMENT THROUGH NEWLY FOUNDED INDUSTRIAL COMPANIES**

Thanks to these great state engagements, such factories could be established and consolidated so that some of them still exist in some form to this day. The next paragraphs show through the example of these companies, how the state-made developments were actually realized in practice and how Hungarian industry was able to become competitive. There were a number of areas where world-class product manufacturing was introduced, such as the Hungarian machinery industry and electrical industry, which applied innovative solutions, many of which are still in use today. "In the machine industry, new factories were founded year after year, and the Hungarian machinery

industry was able to compete with foreign products at home, and one of its special products gained Eastern, Western European and even overseas markets" (Halkovics, 1998). The most prominent company was Ganz which was founded by Abraham Ganz, a Swiss-born casting master who founded his company in Budapest. After its death the company got the name of Ganz and Co., and after being transformed into a public limited company, it was known as Ganz and Co. Ironworks and Machinery Ltd. Károly Zipernovszky was hired by Ganz, who graduated from the former József Polytechnic University and, after completing his studies, became the head of the electrical department at Ganz. During his years in Ganz, he was involved in research and product development; his first major invention was the self-powered DC dynamo, which was used in the factory's lighting system from 1878 onwards. Miksa Déri joined Ganz in 1882 and together with Zipernovszky developed the first self-excited AC generator. "This was followed a few months later by some patent application work of the greatest importance, the closed core transformer, with the help of Ottó Bláthy who joined the team." (Nagy, 2018). The transformer made possible to transport the electricity over long distances without significant losses. The Ganz factory built the first long-distance electric power plant in Switzerland, the basic electrical power supply system in Rome, and the first power plant in Timisoara (Temesvár). Timisoara was the continent's first city with public lighting (Antal, 2013). It is worth noting that the DC system in Timisoara was replaced by a Ganz two-phase AC power transformer with a voltage of 2000/100 V when a 3000-kVA turbo-generator was put into operation (Horváth, 2000).

Thanks to the Ganz factory's innovation and brilliant engineering performance, power plants started to spread quickly in the years before World War I. According to Antal (2014), in 1906, 120 power plants were established nationwide and produced over 93 million kilowatt hours. Significant quantity of the electricity was used for lighting purposes, approximately 44% (137 settlements used electric public light), the remaining capacity was used 20% in railway usage and 36% of the capacity was used by industry. Budapest's superiority in the Hungarian economy was already present at this age, as 60% of electricity was used in the capital. There was also dynamic development in the 1910s: 85 new power plant were built between 1909 and 1913; thus one year before the outbreak of the World War, 22 power plants were producing electricity. This new industry provided work for 5918 people and due to that the amount of electricity it increased to about six times compared to the 1898 production that was 215 729 thousand kilowatt hours (Antal, 2014). Other inventions were used to supply electricity,

such as the steam turbine, the production of which began in Hungary in 1905. Láng machinery manufacturing company started to develop and manufacture steam turbines in Hungary, owned by Gusztáv Láng and his talented engineer son László Láng who graduated from the University of Vienna and Charlottenburg. László Láng saw steam turbines at the 1900 Paris World Exhibition for the first time and realized its potential; he started to utilize it in the Hungarian industry. The Láng factory produced Zoelly-system steam turbines, which were delivered to the first customer in Moravia, Witkowitz mining and smeltery company; the machine had 300 horsepower performance; the same year the order of the Serbian state steel smeltery was completed in Varese. A year later, the factory produced 3000 horsepower steam turbines, which covered the needs of the domestic electricity industry, which required a lot of power as power plants and industrial companies used ever-increasing power generating machines. The factory built a 3000-horsepower unit for the Budapest General Electricity Co. in 1907. 10 000 horsepower units were built for the Budapest Electrical Works and the Budapest Road Railway Company in 1910 (Bencze, 2007).

During that period, several small private companies operated in the railway industry. The Hungarian State Railways (MÁV) was established only in 1868, but at that time the railways were typically in the hands of private companies. In 1870, the Hungarian Royal State Railways Machine and Car Factory was founded; later in 1959 the company's name changed to MÁVAG, in 1959 MÁVAG and Ganz merged and established a new company Ganz-MÁVAG. The goal of the State Railways Machine Works was to ensure the provision of quality railway vehicles in developing domestic railways and indirectly in the whole industry. The company showed the first locomotive produced in Hungary at the Vienna World's Fair in 1873; it was the 335 series and was put in service on January 3, 1874, in a ceremonial event. (Bödök, 2005) Several railway factories were established to satisfy the needs of the railway industry.

In 1896 a private enterprise, the Hungarian Waggon and Machine Factory, was established in Győr with a million crown funds. It also dealt with railway wagon manufacturing successfully: four years later after its founding, they participated in the Paris World's Fair where they showed their passenger and freight cars. Since 1910 they also dealt with steel casting, and in 1914 they made the first car produced in Győr (Tabiczky, 1972).

Over the years, several wagon and machine factories were established in Hungary: the Weitzer's Wagon Factory in Arad and the Machine and Railway Equipment Factory in Kistarcsa; their products had a broad range from flat wagon to luxury passenger cars. These companies had

extensive export networks, and shipped their products to a number of countries; the wagons were used in Western and Eastern Europe, Russia, but also in South America, Africa and India (Gyarmati et al., 2000).

The first car engine in Hungary was made by János Csonka in 1883. It was still powered by gas which was also used for public lighting in the towns at that time. The meeting with Donát Bánki in 1886 gave a boost to Csonka's inventive career, and their collaboration was very fruitful. Together they started developing gas-powered engines and tried to replace gas by liquid fuel, which was a practical solution: liquid fuel was easier to transport more available. At that time, they used kerosene as fuel, and their biggest innovation, the carburettor, provided the solution; the basic idea came from a simple flower sprayer which was used for irrigation. (Trudeau, 1990) While Csonka and Bánki focused on the development of a gas-kerosene engine, a similarly liquid-fueled engine having a different ignition structure was developed; it was the Diesel engine. This also had influence on the turn-of-the-century Hungarian industry. The Budapest Weapon and Machine Factory (FÉG) started to produce Diesel engine parts as a result of market demands. The selection of the company seemed to be an ideal partner as a supplier. Both weapon and car manufacturing rely on the precision and quality of their performance. As a result, on February 10 1899 with one million crown capital a new company was formed called "Diesel Engines Company" established by Oscar Epperlein. Through the production of diesel engine parts FÉG was able to adapt itself to manufacture the exact engines. FÉG acquired the patent rights from Krupp and Diesel which granted license on December 30, 1899 and thus met all consumers' needs in Hungary, Austria, and Bosnia (Sárközi et al., 1988). The Hungarian Wagon and Machine Factory's engineering team played an important role in the developing Hungarian automotive industry. The world's first four-wheel drive vehicle was built in Győr and it was operated with a four-cylinder petrol engine; its primary task was towing, making it ideal as a military vehicle. The four-wheel drive solution was prepared by Koroknay, who took the crankshaft rotation to the four wheels through the hollow axle. Each wheel was rotatable and centred around its centre of gravity. The Daimler company presented their own four-wheel drive armoured car one year later (Tabiczky, 1972). The shipyard sector was unable to recover until the mid-1870s and only one company, the First Danube Steam Shipping Company (DGT), survived carrying 2.5 million passengers and 13 million quintals of goods (Szekeres, 1961). In 1879 the shipbuilding sector started to grow and the shipyards were able to produce all year round, with Romania and southern Russia being among the

largest customers. In 1885 the Hungarian shipbuilding industry had 5 large sites. At the initiative of Gábor Baross, the Hungarian Royal River and Freight Shipping Company (MFTR) was founded in 1894, which was responsible for organizing and managing traffic on the rivers. In 1896, the company Danubius-Schoenichen-Hartmann United Ship and Machinery Factory was established by merging several smaller factories. The Danubius Machine Factory in 1906 expanded further with a view to taking part in sea shipping, so it founded a shipyard in Fiume. The founding of the factory supplied not only the corporate partners but also warships of the Imperial and Royal Navy (Halkovics, 1998). Danubius engineers, together with engineers from the Navy, started to build warships in the new factory. On December 1, 1906 the Navy ordered 6 destroyer ships and 10 torpedo boats, the machines of which were manufactured in Budapest. The building of the new factory in Fiume was so difficult that the work began only in 1907 and the ships ordered in 1906 were handed over to the navy in November 1909. Later on, 800-ton destroyers were built followed by the Novara cruiser and the unfortunate St. Stephen battleship in 1914 (Krámlí, 2000).

## CONCLUSION

Successful industrialization and industrial development depend vitally on the ability to adapt to the world's changing demands; with the right policies and regulations the government has a significant effect on the economic structure. During the research the author found that the importance of industrial development was already known in Hungary in the 19th century. The opportunities for development were created by appropriate laws regulating autonomous and free trade, which was established in 1872. Individuals were allowed to group in unions or associations. In 1907 further benefits were granted to those industrial enterprises which produced goods that had not been produced in the country before or had met real consumer needs. Those companies were exempt from state taxes, local taxes, trade and industry fees, and as a result sufficient capital was available to carry out the development. Also, industrial education flourished in Hungary and the newly created regulations helped to set up the first upper school, and then regulated and organized industrial learners' training. As part of the industry's infrastructure development, the building of the Budapest-centred railway started, which led to a Budapest focused economy: 7 out of 13 lines had Budapest as a starting point and Vienna, Fiume and Transylvania as destination. Industrial development was successful during the 1867-1914 period; thanks to the government's great engagement, factories

were founded and consolidated, some of which still exist in some form today. This can be an example to follow in creating today's industrial development strategies such as the Modern Cities Program.

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**APPENDICES**

**Table 1.** Development of governmental industrial subsidies 1868-1906

Period of time	Total subsidies	Average subsidies
1868-1880	416 420	32 032
1881-1890	1 259 530	125 953
1891-1899	4 386 412	487 379
1900-1906	20 698 187	2 956 883

Source: Halkovics(2002)

**Table 2.** Share of total support for factories created under Act XLIV of 1898

Industry	All	Percentage
Weaving industry	144	20,22
Chemical industry	133	18.68
Stone clay and glass industry	102	14.33
Iron and metal industry	91	12,78
Mechanical industry	89	12,5
Food industry	69	9,96
Wood and Bone Industry	35	4,92
Paper Industry	32	4,49
Clothing industry	10	1,4
Leather industry	5	0.70
Duplicating industry	2	0.28

Source: Gyarmati et al., 2000

**Table 3.** Characteristics of employment in the territory of today's Hungary (thousand persons), 1896-1920

Year	Agriculture	Industry	Services	Total	15-64 year	Employment rate
1896	1740	279	383	2402	3026	79,4
1900	1735	422	684	2841	4159	68,3
1910	1685	558	810	3053	4587	66,6
1920	2127	563	875	3565	5095	70

Source: Faragó, 2011

**Table 4.** Characteristics of the industry, 1898–1913

Year	Number of industrial sites	Horsepower of machines / tools	Employment number	Production	National income
				Value in 1000 crowns	
1898	2545	262 070	220 577	1 366 917	767 423
1906	2685	405 406	247 216	1 815 726	–
1913	5333	845 545	429 030	3 157 407	1 694 379
Index: 1898=100					
1898	100,0	100,0	100,0	100,0	100,0
1906	105,5	154,7	112,1	132,8	–
1913	209,5	322,6	194,5	231,0	220,8

Source: Gyarmati et al., 2000