

„Why not Europe? Sources of economic growth“

Tungsram's positioning strategies on the world market in the interwar period

Mária Hidvégi

GWZO/ZHS University of Leipzig

**INTRODUCTION**

My research paper aims to analyze the strategies of a Hungarian electrical enterprise, Tungsram, to enter and operate on the world market in the interwar period. Practically it is an attempt to analyse economic globalization at a microeconomic level, how Susanne Hilger had put it. I am particularly interested in the learning process: how and to what extent the strategic management of Tungsram was able to deal with structural political and economic changes in a flexible and innovative manner.

As my dissertation aims to examine the positioning strategies of two Hungarian electrical enterprises, namely that of Tungsram and of Ganz & Co. Ltd. Electrical & Mechanical Engineers, Railway Carriage Manufacturers & Shipbuilders, early considerations of Ganz & Co.'s strategies will be presented as well, as a contrast. Despite of their status as leaders of their respective fields on the Hungarian market and of an equally strong research orientation and high-quality products, only Tungsram was able to gain a more than marginal position in the electrical industry on the long run. As both companies significantly profited from Hungarian economic growth and contributed to it as well, identifying the factors of their performance could provide a deeper understanding of the resources of Hungarian economic growth.

The analysis is primarily based on archive material of Tungsram and on secondary literature of its main competitors.

Firstly, the enterprise in focus of the paper will be briefly presented. Then the main research questions, the hypothesis and the framework of the analysis will be outlined. Having sketched the basic local political and economic parameters and the main changes in the global economic environment the main actors of the electrical engineering industry are briefly presented. The overall latitude of the conditions which allowed Tungsram to formulate the basic lines of its strategies is highlighted in connection with patterns of thinking originated in

Hungarian business culture. Then the different strategies to operate on foreign markets will be presented. After a short summary, conclusions will be drawn.

#### THE UNITED INCANDESCENT LAMPS AND ELECTRICAL LTD., UJPEST (BUDAPEST), HUNGARY

The United Incandescent Lamps and Electrical Ltd. was founded in 1896, unifying five small companies of the Jewish Hungarian family Egger located in Vienna and Budapest. The reorganization which also moved the centre of the Eggers' business activities to the Hungarian part of the Monarchy brought a new shareholder, the Hungarian Commercial Bank of Pest (here "Commercial Bank") into the company. With a share of 37,5 % the Commercial Bank had ensured itself a right to veto any decisions, but practically the representatives of the bank only made use of this right concerning decisions of strategic importance. Having reorganised the high-voltage sector in the Vienna factory as a separate but a closely related company to Budapest, the Niederösterreichische Escompte Bank of Vienna represented itself at the company board in Budapest as well. Henceforth, Budapest concentrated on electric light bulbs, telegraph and telephone equipment, telephone exchange and railway security systems, light-current generators and parts for electrical appliances.<sup>1</sup> After its quite successful wolfram lamp trade mark, especially in English speaking countries, the company was soon called "Tungsram". Because of the cumbersome company name I will use this notation too. The establishing of telephone and telegraph infrastructure in Hungary offered opportunities of great public projects. Having constantly increased productivity and having established sales agencies in Milan, St. Petersburg, Madrid, Prague, Melbourne and Montreal, Tungsram became also a rapidly growing lamp producing company, whose position can be best illustrated by the market share in the European cartel for carbon filament lamps, called Verkaufsstelle Vereinigter Glühlampengesellschaften. Besides the respectively 22,633% of Allgemeine Elektrizitäts-Gesellschaft (AEG) and Siemens & Halske, the major European producers, the companies Tungsram and Philips received the biggest quotas with respectively 11,316 and 11,307 percent. After a vertical integration and the acquisition of a rival in Vienna during the First World War, Tungsram became for the interwar period the biggest Hungarian enterprise specialized on the production of incandescent lamps, radio tubes as well as telephone and telegraph equipment. Because of its long-term growth, well-founded foreign relationships, and various effects on Hungarian economic growth e. g. through influences on the educational and social systems, has Tungsram been chosen for this analysis.

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<sup>1</sup> Jeney, Károly: The history of Tungsram, Budapest 1990

## MAIN RESEARCH QUESTIONS

1. What kind of strategies, based on what kind of information and patterns of thinking Hungarian entrepreneurs formulated to entry and operate on foreign markets, particularly to regain positions established before the First World War?
2. Can a learning process be defined to cope with the challenges of global economic conditions? Which one of the main partners could serve as model of orientation for corporate growth?
3. How can the role of economic nationalism be seen? Only as a constraint of international business or did it push to changes benefiting for the company on the long term?
4. Risks and chances of transnational cooperation

## HYPOTHESIS

The preliminary results of my investigation have allowed me to formulate the following hypothesis: For a company from a “late-comer” country the establishment of networks with its competitors, banks and state institutions provided the basis for implementing of its market strategies. The combination of long term relationships with global players especially in international cartels on the one hand and lobbying for a protectionist economic policy at home on the other, and profiting from protectionist economic policies on host markets was the key of Tunggram’s quite successful positioning strategies on the world market. The presentation should serve as a test of this hypothesis and of the method of analysis.

## THE FRAMEWORK OF THE ANALYSIS

The analysis of the internationalization of Tunggram is based on the network concept of Johanson and Mattsson.<sup>2</sup> According to this model, establishing positions in new markets means to establish positions in networks of firms engaged in the production, distribution and use of the products and services the firm offers. Through the activities in the network, the firm develop relationships which secure its access to important resources and the sale of its products and services. The firm thus establishes positions to each of its counterparts in the network that is defined as a micro-position. The macro-position describes the position of the firm to the network as a whole or to a special part of it, composing of the identity of the firms

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<sup>2</sup> Johanson, Jan/Mattsson, Lars-Gunnar: Internationalization in Industrial Systems – A Network Approach In: N. Hood/J.-E. Vahlne (eds.): Strategies in Global Competition, Beckenham, Croom Helm, 1988, pp. 287-314, reprinted in: Dunning, John H. (ed.): The Theory of Transnational Corporations. The United Nations Library on Transnational Corporations 1, London: Routledge, 1993. pp. 201-223

with which the firm has direct relationships and indirect relations in the network, the role of and the importance of the firm in the network and the strength of its relationships with the other firms. Therefore, the international extension of the activities of a firm can be described as the establishment of positions in relation to counterparts in national nets those are new to the firm and the penetration of markets as the developing positions and increasing resource commitments in those nets abroad in which the firm already has positions. The increasing coordination between positions in different national nets is called international integration.

This basic idea and analytical framework will be specified through the description of the industry structure with the relational characteristics proposed by Gulati, Nohria and Zaheer<sup>3</sup>. These are firstly, the network structure, this means the overall pattern of relationships within which the industry is embedded (factors like network density, structural holes, structural equivalence, and core versus peripheral firms), secondly the composition of the network, that means the identities, status, resources, access and other characteristics of the members, and finally, the tie modality: the set of institutionalized rules and norms that govern appropriate behaviour in the network. However, a firm's activities on foreign markets not only rely on networks to its counterparts and to other firms engaged in the production, distribution and use of the same products and services. "Different coordination requirements are best satisfied by different network structures", as Marc Casson wrote.<sup>4</sup> Besides commercial networks, social and financial ones should therefore also be included into the description, because each of them provided Tungsram access to a different set of "key resources from its environment, such as information, access, capital, goods, services and so on that have the potential to maintain or enhance a firm's competitive advantage"<sup>5</sup>. "In fact, a firm's network can be thought of as creating inimitable and non-substitutable value (and constraint!) as an inimitable resource by itself, and as a means to access inimitable resources and capabilities"<sup>6</sup>, so Gulati, Nohria and Zaheer outlining the chances provided for business history research by including strategic networks into the analysis. Whether for Tungsram's positioning strategies the networks can be identified as a key resource the following analysis should help to decide.

## **POLITICAL AND ECONOMIC ENVIRONMENT**

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<sup>3</sup> Ranjay Gulati, Nitin Nohria and Akbar Zaheer: Strategic Networks In: Strategic Management Journal 21: 203-215 (2000) p. 206

<sup>4</sup> Mark Casson: Networks: A New Paradigm in IN Business History? Paper submitted to XIVth International Economic History Congress, Helsinki, August 2006. Innovation and Networks in Entrepreneurship. Session No. 40 Organizers: Mary B. Rose and Paloma Fernandez Perez

<sup>5</sup> Gulati/Nohria/Zaheer (2000), p. 208

<sup>6</sup> Gulati/Nohria/Zaheer (2000), p. 207

As Geoffrey Jones describes in his book, *Multinationals and Global Capitalism*, in the interwar years, sequestration of affiliates of enemy-owned companies, trade protectionism, migration control, the severe disruption and, after the World Economic crisis, the collapse of the international monetary system lead to a disintegration of the first global economy. Multinationals continued to operate, and even in some cases to expand, but their activities had to be reoriented in response to protected markets and changing ratios of exchange.

The interwar era is usually classified as the classic era of economic nationalism. It was often equated with high tariff levels or anti-liberalism, but this concept includes the whole process during which the inhabitants of a particular area aim to create an ethnic homogenous economy<sup>7</sup> resulting in an economic policy favouring the economic actors of the own nation over those of foreign nations. After the systematisation of Helga Schultz<sup>8</sup>, this economic policy can be oriented outwards imposing high tariffs and other non-tariff restrictions on foreign trade, various restrictions on foreign direct investment etc. The inward-oriented form of economic nationalism can not only be directed against ethnic minorities but aiming a self-sufficient economy functions quasi as a modernisation strategy, too, resulting in plans for industrialisation, an import substitution policy etc.. The role of the state in this concept is usually seen as a positive one, as a promoter of this process aiming to maximize the benefits for the nation as a whole. The tendency of moving from a free-trade to a more protectionist economic policy could be traced back well before the First World War all over Europe or even very strongly in the United States. However, the war and the turbulences of the global economy afterwards reinforced this tendency leading to its most intensive period during and after the World Economic Crisis, as this kind of economic policy promised to compensate some disadvantages of the economic subjects of the particular nation compared to their foreign rivals.

The dissolution of the Austro-Hungarian Empire after the First World War put an end to the slow adhesion of its different regions. The new national states all aimed to construct independent national economies, which naturally turned into protectionism. The particularly severe impact of the World Economic Crisis on the weak East Central European economies

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<sup>7</sup> Pogány, Ágnes: Gazdasági nacionalizmus Magyarországon a két világháború között: gazdasági homogenizáció és antiszemitizmus (Economic nationalism in Hungary between the two world war: economic homogenisation and anti-Semitism), paper prepared for the conference „Economic nationalism in East Central Europe”, Frankfurt (Oder) 17th-20th March 2005

<sup>8</sup> Schultz, Helga: Wirtschaftsnationalismus in Ostmitteleuropa – Thesen und Fragen in: Kubu, Eduard und Schultz, Helga (Hrsg.): Wirtschaftsnationalismus als Entwicklungsstrategie ostmitteleuropäischer Eliten. Die böhmischen Länder und die Tschechoslowakei in vergleichender Perspektive. Praha-Berlin, 2004, pp. 17-29, here p. 24

and political tensions between ‘the follower states’ made this region ‘the hotbed’ of economic nationalism.

Hungary lost two third of its former territory, therefore its home market shrunk from 20 million customers or 50 millions of the custom union of the Empire to mere 8 millions. The whole economy had to be restructured as resource bases were cut off from the producing centres, the capacity of some branches that had been mostly settled in territories now in independent countries were to increase, other ones had to be scaled down to a considerably smaller home market. Together with the consequences of two revolutions and the following occupation, hyperinflation, reparations payment and falling world food and raw material prices lead to a very fragile stabilisation of the economy at the end of the 1920s. “Having accumulated an enormous amount of foreign debts and gone bankrupt” during the world economic crisis, Hungary, parallel to Germany, “in 1931 introduced a strict exchange control policy, suspended the convertibility of [its] currency, and centralized the regulation of the currency rates.”<sup>9</sup> Thus, foreign business activities were seriously complicated as all transactions in foreign currencies had become a monopoly of the Hungarian National Bank, so only with its permission could money be transferred abroad and foreign credits and debts had to be announced. Because of the above described problems, Hungarian economic policy, like the ones of the other follower countries of the Habsburg Empire, followed an economic policy guided by economic nationalism.

Plans were quite popular concerning the role of Hungary as a transit country channelling Western capital toward East (that means the Balkan and the Near East) and delivering and partly processing Eastern products toward Western Europe<sup>10</sup>, and plans for economic co-operation in Central Europe were sympathised with. However, Hungarian industrialists not only found necessary a flexible and stabilizing economic policy with clear visions. They also wanted it to be guided by national interests and able to make Hungarian economy flourish.<sup>11</sup> Therefore, they lobbied for the protection of existing industrial branches and for the development of missing ones through an import substitution policy and the promotion of foreign trade, i. e. for the support of “the expansive ambitions of the Hungarian industry”<sup>12</sup>, as a strong and modern industry was seen to have a crucial role in sustaining an autonomous state, and the Hungarian nation, as well. These measurements, in turn, were partially in

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<sup>9</sup> Pogány, Ágnes: The currency rate and foreign exchange policy of Hungary in the German „New Economic Order”, 1935-1945 In: Századok, Vol. 138. issue 6. p. 1305-1326, here p. 1325

<sup>10</sup> e.g. Speech of Dr. Stein Emil in the Cobden Association, Budapest, 1923

<sup>11</sup> Kovács, Éva: A gyáriparosok sajtója, „melynek olvasóközönsége a magyar közgazdasági élet elitje”, 1900-1944. In: Társadalomkutatás ... p. 110

<sup>12</sup> Magyar Gyáripar 1. 2. 1925 Vol. XVI., issue 2. p. 21

contrast to a more embedded, co-operative position of Hungary in Central Europe. Likewise, the industrial development policies of the agrarian follower countries of the Empire and the agrarian ones of the more industrialised follower countries – aggravated by political tensions - had in 1936 already been seen as barriers to a Central European co-operation concerning tariff policies and eventually a closer economic co-operation.<sup>13</sup> Despite financial and trade relations especially to Western Europe, in the interwar period, Hungarian economic development remained strongly oriented toward Central Europe concerning sources of inspiration for economic policy (the Czechoslovakian and the Austrian economic development policies and export promotion systems often cited as models to be followed) and day-to-day foreign business activities (promotion of entrepreneurial spirit and innovation was a recurring topic especially referring to the manifold and energetic activities of German, Austrian and Czech companies and salesmen in gaining foothold on foreign markets), or performance measurement (“Already before the outbreak of the War we painfully felt our backwardness in world competition, especially related to Germany and Austria.”<sup>14</sup>) etc. Mira Wilkins<sup>15</sup> identified factors of home market structure, additional to the above mentioned growth of the market, orientation and the main elements of economic policy), as defining characteristics of foreign business activity of enterprises, namely the country-by-country different development path of multinational enterprises. Here, these factors cannot be analysed thoroughly, however, some main points will be mentioned at the appropriate stages of the analysis where these factors actually influenced the strategies of Tungstram.

## **INDUSTRY STRUCTURE**

The electrical industry emerged as one of the driving forces of the so-called second industrial revolution from the last third of the nineteenth century. The two main centres of development were the United States and Germany. The American development relied first of all on the huge home market. In contrast, the smaller home market made German companies extend their activities over the borders on an early stage of their development. In the interwar period the electrical industry was worldwide dominated by a few large companies, mostly of American and German origin, the cooperation and competition between them determined the scope of smaller enterprises.

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<sup>13</sup> Székely Artur: Közép-európai kereskedelmi politika In: Közgazdasági Szemle, 1936. Vol. LX. issue 9. pp. 594-605, here 604-605

<sup>14</sup> Speech of Chorin Ferenc, president of the Association of Hungarian Industrialist at the opening of the University of Economics In: Magyar Gyáripar November-december 1920, Vol. XI, issue 13-14.p. 8-9

<sup>15</sup> Wilkins, Mira: European and North American Multinationals 1870-1914: Comparisons and Contrasts In: Business History, XXX (1988), pp. 8-45

## The incandescent lamp industry: concentration process and shift of power in favour of the U.S.A.

The General Electric Company, New York (GE), built up a monopolistic position on its home market: together with its licensees<sup>16</sup> supplied around 90% of the US-American market and Canada, which, in turn, came up for around half of world incandescent lamp consumption. Especially during the First World War, General Electric increased its exports considerably and after the war wanted to fix these new market positions by binding the biggest lamp fabrics on the world to GE through licence agreements and owning stock in them. This should contribute to realise the overall priorities of GE, namely, securing the US-market from any challenging rival and GE's position in the world even after the expiring of its key patents concerning lamp production.<sup>17</sup> During the negotiations with Osram (see below) about a licence agreement the representative of IGEC, "the international arm of GE", put it simply: "But, after all we have to control the light bulb business in the world."<sup>18</sup>

The three big German lamp producers, Siemens & Halske, Allgemeine Elektrizitäts Gesellschaft (AEG), and the Auer Company (Deutsche GasGlühlicht A.G.) were cut off the world market during the war, their originally outstanding technical level could immediately after the war not keep pace with the American development and they suffered from a lack of capital. In addition, their sequestered affiliates emerged themselves as rivals on their main markets like in the United Kingdom. Therefore, the lamp making departments of the companies were merged<sup>19</sup> into the Osram G.m.b.H. K.G. (henceforth Osram) and a co-operation with the American rivals (GE and Westinghouse) turned out to be their key strategy to re-establish themselves as a global player.<sup>20</sup> Not only a technical co-operation was achieved (due especially to Siemens & Halske's and Auer's technical expertise) and financial support

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<sup>16</sup> Westinghouse and 16 resp. 18 smaller companies in the Incandescent Lamp Manufacturers Association 1897-1901 and in the National Electric Lamp Company 1901-19.., source: Leonard S. Reich: General Electric and World Cartelization of Electric Lamps, In: Kudo, Akira/Hara, Terushi: International Cartels in Business History Tokyo 1992 pp. 213-228, here p. 214

<sup>17</sup> Reich (1992) and George W. Stocking/Myron W. Watkins: Cartels in action, Twentieth Century Fund New York, 1946 p. 317, 327 Basic patents (GE obtained them/expiring date) Just-Hanaman: lamps with tungsten filament (12.2.1912/27.2.1929) and Coolidge: drawn tungsten filament (1913/30.12.1930) covered all lamps having a filament of drawn tungsten wire, either vacuum or gas-filled and Langmuir patent (1916/18.4.1933) covering all commercial forms of gas-filled or Type C lamps Source: Stocking-Watson p.308-310

<sup>18</sup> A. W. Burchard, President of IGEC, cited by Schröter, Harm: A typical factor German international market strategy: agreements between the US and German electrotechnical industries up to 1939 p. 160-170 in: Levy-Leboyer/Teichova/Nussbaum: Multinationals in a historical perspective, Cambridge: Cambridge University Press 1986, here p. 165

<sup>19</sup> That means patents, trade marks, technical expertise, innovations, production capacity and sales organisations In: Stocking/Watkins (1946) p. 317

<sup>20</sup> Schröter (1986)



was provided for through capital investment<sup>21</sup> and credits on very favourable terms. Having regained foothold on foreign markets by 1924 securing positions through the division of the world market were seen best achieved through this co-operation.

The Philips company, founded in 1891 as a specialist lamp producer firm, having carried out successful research on the mass production of metal filament lamps prospered during the war due to the neutral status of Holland.<sup>22</sup> Cutting off from its German and Austrian suppliers, it built its own glass bulbs and argon gas factories and became a wholly integrated company, producing all kinds of incandescent lamps and the necessary lamp making machinery. The companies of „the warring countries had to concentrate their efforts on products essential for warfare and as a consequence devoted less attention to lamp technology.”<sup>23</sup> „Holland’s neutrality enabled Philips to expand its export of lamps to continental Europe and to other foreign markets at enormous profit. By 1929 Philips had become the world’s largest exporter of incandescent lamps.”<sup>24</sup> Agreements with the main rivals should first of all secure this position. The basis of them formed the agreement with GE, signed in 1919, respecting each other’s home markets and exchanging patents and know-how. Philips paid a licence fee to IGEC which in contrast took a 20 percent participation in Philips’ enlarged share capital.

As during the First World War in neutral countries and in the more fortunately situated Allied countries producers seized the opportunity of the falling away of Central European competitors a world wide surplus capacity of around 50% was built up<sup>25</sup>. The situation aggravated after Germany’s re-entrance into the world market which led to acquiring a share in going concerns or establishing new factories. A fierce competition was therefore clearly in view. Technology intensified competition and increased its hazards as well because „[l]amp producing became a largely automatic process involving large investment of fixed capital in extremely specialized plants with a relatively high proportion of overhead costs and low labor costs per unit of output.”<sup>26</sup> „An increase in the importance of fixed capital in the production process, plant capacity excess of normal requirements, and an inelastic demand, all made competition more hazardous and cartelization more attractive to the postwar incandescent

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<sup>21</sup> by 1929 IGEC owned already 16,67% of Osram, this share was extended to 29% practically for a withdrawal of Osram from Mexico In: Luxbacher, Günther: Massenproduktion im globalen Kartell Berlin: Verl. für Geschichte der Naturwiss. und der Technik, 2006, p. 314

<sup>22</sup> Heerding, A.: The history of N. V. Philips’ Gloeilampenfabrieken. Vol. 2. A company of many parts, Cambridge: Cambridge University Press, 1988

<sup>23</sup> Sluyterman, Keetie E.: Dutch Enterprise in the Twentieth Century: Business strategies in a Small Open Economy, London: Routledge, 2005

<sup>24</sup> Stocking/Watkins (1946) p. 318, Heerding, A.: The history of N. V. Philips’ Gloeilampenfabrieken. Vol. 2. A company of many parts, Cambridge: Cambridge University Press, 1988

<sup>25</sup> Stocking/Watkins (1946) p. 323

<sup>26</sup> Stocking/Watkins (1946) p. 324

electric lamp industry”, summarize Stocking and Watson the factors underlying the above outlined motives of the global players for a long-term and close cooperation. As by the end of the war the world’s leading lamp manufacturers were closely organized on a national basis<sup>27</sup> and a considerable community of interest also had developed among the more important national groups through exchange of patents and through stock ownership, Osram and IGEC could successfully promote the setting up of a world cartel for incandescent lamps. (see figure1)

The cartel, called Phoebus after its central organisation, the Phoebeus S. A. Compagnie industrielle du développement de l’Eclairage, Geneva, included all the main lamp producers in the world. The leading members of the cartel, were Osram, Philips, Tungsram, (British) Associated Electrical Industries, Compagnie des Lampes, IGEC (London), and three subsidiaries of GE in Brazil, China and Mexico, the so called Overseas Group, listed following their voting power in the General Assembly<sup>28</sup>. Anticipating an antitrust process GE did not join the cartel itself. So the cartel served for the division of the world market except the USA and Canada, (practically reserved for GE) and Russia, and for the exchange of patents and technical information among the members. Also the standardization of quality and lamp types was achieved, common price policies were outlined in the so-called Local Meetings, and the use of electric lamps was propagated through coordinated marketing. Outsiders were fought by holding back technical information, modern lamp making machinery, using “Kampfmarken” (fight trade marks) in price wars, and by a wide range of other legal and illegal measures. Therefore GE and the lamp producer organised in Phoebus could actually control around 90% of the world market.

Like the incandescent lamp industry, both the radio and the telephone industry were of oligopolistic structure, in the former being Radio Corporation of America, New York (RCA), Telefunken (a merger of the corresponding departments of AEG and Siemens) and Philips the

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<sup>27</sup> The British industry: The British Thomson-Houston, the General Electric Company Ltd., Siemens Brothers and Edison Swan established a close relationship. Including six smaller companies, the Electric Manufacturers Association was founded in 1917 which functioned as a national price and patent cartel. After the merger of BTH, Metropolitan Vickers (controlled by Westinghouse), Ferguson Company and Edison Swan into Associated Electrical Industries Ltd. in 1928, Associated, GEC and Siemens remained the big three of the British electrical industry. The French industry ranked fifth in dollar value of lamp exports. After merger of the lamp departments of the biggest electrical companies, Compagnie des Lampes S. A. (Paris) emerged in 1921 as the main French lamp producer further concentrating control of the industry by acquiring the stock of assets of competing companies and expanding its operations in foreign countries through subsidiaries”. Stocking/Watkins (1946) p. 319-321

<sup>28</sup> The Tokyo Electric Company, a GE-licencee too, and other smaller but technologically quiet advanced companies joined subsequently later on. Luxbacher pointed out that founding members and lately joined ones formed an A- and a B-league of Phoebus, with different voting power and access to technological information. Luxbacher (2006) p. 389-391

leading companies. Due to the emergence of International Telephone and Telegraph Ltd. (ITT)<sup>29</sup> the telephone industry was restructured in the 1920s. Western Electric Company, Chicago, in 1925 was merged into International Standard Electric Corporation, New York, the holding company of the equity shares in foreign companies of ITT, American Telephone & Telegraph Co. (ATT) restricted its activities on its home market. Henceforth on the world market competed Siemens, Telefon Aktiebolaget L. M. Ericsson, Stockholm (Ericsson), and ITT fiercely until a gradual shift to a more cooperative attitude due to the world economic crisis<sup>30</sup>.

### **DEFINING TUNGSRAM'S STRATEGY**

The structural change in the political and economic environment and the shifts in the electrical industry paved the way to redefining Tungstram's strategy. The end of the political turbulences in Hungary coincided also with a change at the top of the organisation: in 1921, the commercial director, Leopold Aschner had been appointed as general manager of Tungstram.

First of all the production profile was to be defined. Aschner had already in 1909 called for a concentration on the products that Tungstram was able to produce on equal terms to those of the global player concerning quality, price and service for the sake of survival in a highly competitive industry.<sup>31</sup> Motivated further by the technological gap arisen because of being cut off from the world market during the war years and by the considerably diminished financial power of the great Hungarian banks, he now realised this plan of concentration. The demand in incandescent electric lamps and shortly that in radio valves were defined as perspective increasing, so as the development of the communication infrastructure was expected in Central Europe. Tungstram could rely on considerable technical expertise in these fields as well and also on a good reputation on consumer markets and expertise in transnational co-operation. That's why three production fields survived the restructuring of the company, these were incandescent lamps, radio valves and telephone exchange systems. In these fields, however, almost the whole range of products were planned to produce in a quality measured by the globally players' products. A price leadership strategy was not a realistic alternative to that of relying on quality, as production costs were not low enough in Hungary. Japanese

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<sup>29</sup> Founded in 1920 as Puerto Rico Telephone Company by Sosthenes Behn, merging Western Electric Co., Bell Telephone Manufacturing Company (Belgium), Standard Elektrizitätsgesellschaft (Germany) etc..

<sup>30</sup> Kümmel, Gerhard: Transnationale Wirtschaftskooperation und Nationalstaat. Deutsch-amerikanische Unternehmensbeziehungen in den 1930er Jahren. Zeitschrift für Unternehmensgeschichte Beiheft 89 (Hrsg.) Wilfried Feldenkirchen, Stuttgart: Franz Steiner Verlag, 1995, p. 225-232

<sup>31</sup> Hungarian National Archives (HNA), Z 44\_22

small lamp making enterprises could compete successfully this way worldwide in the early 1930s, after the expiring of GE's main lamp patents. In addition, the Hungarian market was too small to make profit from economies of scale to an extent like GE or even Osram did it, the leaders of the latter ascribed the productivity gap between GE and Osram to the necessity of production of a huge number of different types of lamps according to the various national norms in Europe and their other markets.<sup>32</sup>

To be able to compete in terms of quality and price, production had to modernised continually. In addition, the equivalents of all the lamp and radio valve types of the counterparts had to be offered to the customers. Especially in the radio industry was the direction of development so much open that it was considered to be advisable not to leave out anyone of the new valve types of the rivals from the production program.<sup>33</sup> Launching valve types not compatible with the ones of the counterparts that means in an apparat the valves could not be replaced or combined with by the valves of another company was also quite risky as fearing a technological dependence radio constructors, the main customers, were reluctant to purchase this kind of valves. The preservation of the position of Tungram as a lamp producer was also seen as if it was depending on its diversification into the radio business as, according to salesmen's reports, customers tended to purchase lamps from the producer of radio valves and apparatuses.

To come up with these requirements the intensifying of Tungram's own research and development activity and signing licence agreements with technologically leading companies of the industry were seen necessary. The 9-year-old plan of setting up a research laboratory could finally be realised in 1921, establishing actually the first industrial research laboratory in Hungary. Eager to recruit the best ingeneurs of the country, fundamental research and later on, in 1936, the establishing of a department for nuclear physics at the Technical University were also financed. Success in research became then an essential part of self-perception, represented f. ex. in a salesman's report about the Italian radio market complaining about the misestimation of Tungram's own position in the industry: „All the rivals, even the smallest American factories, can supply the new types [the latest American, mostly RCA-valve types] afloat. And we still cherish the illusion that only the biggest American valve factories like RCA and Argurus are decisive for us and the smaller ones cannot be can't compete with us.“<sup>34</sup>

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<sup>32</sup> Luxbacher (2006) p. 254

<sup>33</sup> HNA Z603\_44\_103 Bericht über die Besprechungen mit Philips und Telefunken

<sup>34</sup> HNA, Z603-44-103 Brief an Ujpest Bericht: Die italienische Geschäftslage. Betrifft: Reisebericht VIII., 10.10.1932

Based on Tungstram's own research strength, more favorable terms for licencing agreements or establishing technical co-operation on bi- and multilateral terms instead of the license agreements were headed for. Thanks to a licence agreement signed in 1912, for instance, could Tungstram use the patents of Western Electric Company, Chicago, for building the that time most up-to-date telephone systems. Concerning lamp production, in which section Tungstram's own research expertise could be traced back before the war, agreements about technical co-operation agreements of different intensity were established with the leading lamp producers in the USA (IGEC, 1921) and in Europe (Osram with the mother companies in 1913, renewed after the war, Philips, British-Thomson-Houston etc.). The cornerstone of these agreements was the agreement with General Electric according to which Tungstram had the right to use the American companies' lamp patents for a license fee and for a 10% equity share of GE in Tungstram. Tungstram had also the right to study the lamp factories of GE and received technical parameters of the lamp making machines of GE which enabled Tungstram to – after a necessary adaptation – build its own ones and therefore modernize its production. Considering the tendency for co-operation joining to the emerging global incandescent lamp cartel was also seen as highly advisable. Not only provided the membership Tungstram with the right (and the commitment on its turn) to use the patents and know-how of all other members during the life of the agreement for a fee and inspect the plants and laboratories of the partners, thus joining a global circulation of knowledge. The commitment of each partner to restrain the latest technical novelties, lamp making machines etc. from outsiders could have made using up-to-date technology more difficult and so the prospect for a long-term growth. Based on growing demand for incandescent lamps, remaining independent could have been a realistic alternative strategy. Though the development of the hundreds of new types of lamps<sup>35</sup> required a scale of financial and research capacities that a relative small company could hardly afford, concentrating on a smaller range of lamps combined with somewhat lower prices made outsiders possible a temporarily success e. g. the Just lamp company in Hungary. However, without a particularly strong financial backing or governmental protection could outsiders hardly protect themselves against the unified cartel firms fighting brutally for increasing their market shares.

Thus, this kind of transnational co-operation opened up various opportunities.

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<sup>35</sup> In 1946 more than 9000 different types of lamps were on the market In: Stocking/Watkins (1946) p. 310

First of all this was an indispensable source of information concerning the development of the industry. The commercial general director of Tungsram put it in 1909 as follows: „More important than constructing everything on our own is to be informed of everything the others do in order to profite from the experiences of the industry all the world. By concerning this point of view, a small enterprise can also be able to construct and produce in a modern and rational way.”<sup>36</sup> The radio licence agreement with RCA e. g., included the right of Tungsram to be provided in time with the technical description of the latest valve types which could spare a lot of research capacity.

Most importantly, through the membership in the cartel agreements (Phoebus and the Ardenner Vertrag, the cartel agreement of the leading European radio valve producers, Philips, Telefunken, and Tungsram, 1934) Tungsram had a say in setting the trend of industrial development, too. E. g. Tungsram was able to persuade Phoebus-members to concentrate on their marketing campaigns on the quality difference to compete outsiders. As part of this campaign, the Lumen (intensity of light in relation to energy consumption) stamps were introduced in Europe as a norm, setting Tungsram lamps jointly with other Phoebus-lamps apart from the lamps of the outsiders. The marketing strategy of Tungsram made use of these various technical co-operations in other forms as well. Perceiving a growing estimation of research achievements, relations to the scientific community of the industrialised countries, and the practical result of this activity, i. e. the ability to supply customers with high-quality products, arguments of this kind were often used in marketing campaigns as well. Especially in countries where political tensions made Hungarian products less desirable objects of consumer choice, a special emphasis was put on the scientific achievements of Tungsram, therefore on the quality of their products, like in a publicity of Tungsram in a guide of Prague from 1933. An „incessant” „reciprocal” technical co-operation with the „scientific institutes of the American industry that mostly belong to the corporate group the Tungsram-plants also belongs to” served here as an ultimate proof of modernity.<sup>37</sup>

Tungsram profited from the close co-operation with GE also receiving an inspiration for the organization of the company. Though in his public lecture<sup>38</sup> on his journey to the United States, Leopold Aschner did not forget to dwell on the more smooth public administration and the considerably lower taxes in America. He did put, however, emphasis on the latest organisational and social achievements of GE, Ford and other factories, the wide ranged

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<sup>36</sup> HNA, Z40\_22 p. 245 Julius Egger: Memorandum über die Frage des Commerc-schwachstrom-Geschäftes in Ujpest

<sup>37</sup> Zipek, Alois/Grmela, Jan/ Jarolimek, Ladislav (Ed.): Prag. Prag: Orbis 1933

<sup>38</sup> Lecture of Leopold Aschner about his experiences in America In: Magyar Gyáripár 1929. Bd. 12. p. 7-8

knowledge of their technical leader, the high efficiency of statistics in the private and public sector, and companies reluctance to product goods not bringing them profit. He made the point that though in Europe much will be discussed about rationalization, in the United States it has already been mostly realized. He finished by suggesting especially to all high functionaries in both the public and private sectors a study tour to America. Surely, he was not only disseminating these ideas for fellow industrialists. Tungstram's social institutions served as a model in Hungary. Engineers of Tungstram were consulted quite often from the partner companies and the technical director was a member, for a period, president, of Phoebus technical commission. Productivity increased considerably and it was constantly compared to that of the global players, just as well as the different factors of product quality. However, these partnerships represented also a potential source of risk. Relying on the opinion of a leading engineer of RCA, for instance, the very promising xerographic research was given up, as nobody was able to recognize the potential of this technology.<sup>39</sup> Important innovations could be not made full use of because of the opportunistic behaviour of the partners.<sup>40</sup> Also, these partnerships constrained freedom of manoeuvring considerably. Being the junior partner in the European radio cartel (Ardenner Vertrag signed in 1934), Philips and Telefunken, being on much friendlier terms, tried to inhibit Tungstram developing new valve types of its own and binding itself to produce the partners' valves in exactly the same quality as they do not providing<sup>41</sup>, however, Tungstram with the necessary technical data in time, or even giving false information to "make it impossible for Tungstram to bring the new products on the market at the same time as they do". Thus, the research capacity of Tungstram was occupied with the development, often redevelopment, of the mass production technology of the many new valve types of the partners, although "by the time the technical co-operation with Philips-Telefunken started, Philips-Telefunken did emphasize itself that they see desirable to bring common new types on the market, based on a joint research basis"<sup>42</sup>. However, shortly after the position of Tungstram concerning technological level and market share was temporarily shaken, an agreement which promised a, though moderate, increase in market share<sup>43</sup> and a technical cooperation with the companies setting the trend in the radio

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<sup>39</sup> Bődök, Zsigmond: Magyar feltalálók a hírközlés történetében. Nap, Dunaszerdahely, 2006 p. 74

<sup>40</sup> E. g. GE implemented in its lamp production the great-crystal technology, making the tungsten filament more resistant. GE paid the negotiated price (the latest lamp making machinery series) but had "forgotten" to register the patent by the US-patent administration – as negotiated, too. HNA, Z603\_69\_115 Ujpest Letter of Prof. Pfeifer to engineer Dezső Lendvai in New York, USA

<sup>41</sup> HNA, Z603\_44\_103, Pro Memoria, Ujpest, 4. 12. 1934

<sup>42</sup> HNA Z603\_44\_103, Report, without exact date,

<sup>43</sup> from 3,5% to 6,5% in Germany and 200.000 pieces in the other countries covered by the agreement In: HNA, Z609\_161\_103 Ardenner Vertrag p. 34-35

industry in Europe, was of essential importance and actually a proof of its relative strength. In 1936, Tungsram finally got the most urgent technical information needed from its American licence, RCA.

This ambivalence of technical cooperation could best be illustrated by the invention of the krypton lamps. The use of krypton as filling gas, patent registered by Tungsram in 1931, gave lamps a high efficiency and enabled an achievement in aesthetic terms as well, as much smaller bulbs were needed. The first litre of krypton used for test production engineer Bródy received from Linde A. G. only through Osram. Though the technology of gaining krypton from the air in quantities needed for industrial production was invented in Ujpest as well, because of the patent situation, gas plants could be established only jointly with the gas companies Linde A. G., Air Liquide and I. G. Farben. For erecting plants, they wanted to reach an agreement with Phoebus as a whole, as a guarantee for the purchase of all the krypton produced. However, Osram and Philips, promising themselves greater profits from the types of lamps they were developing, held up negotiations. Finally, in 1936, Tungsram alone could reach an agreement with the Gas Group and erected a krypton producing plant in Ajka, Hungary, with the support of the Hungarian government. Mass production of krypton lamps was therefore put off several years because of the wish of coordinating various interests of Phoebus parties. The market share, guaranteed for Tungsram in the cartel agreement, however, must have considerably added up to the commitment to bring up capital to follow the whole invention process through.

To summarize, considering restraints of the political and economic environment and the nature of the competition and co-operation of the global player of the industry, Tungsram opted for a strategy of concentration on high quality products in three sectors. In two of them, incandescent lamps and radio valves, an almost complete product range was aimed. The development of the own research capacity made technical co-operation with the global player of the industry possible on fairly good terms, providing access to information about tendencies in the industry development, to patents and the latest lamp making machinery needed for keeping pace in production technology, and inspirations for organizational change could also be gained from this cooperation. Most importantly, an involvement in the trendsetting process in the respective industries was also provided for. Thanks to the above mentioned circumstances, in the lamp industry, this trendsetting capability manifested itself in a fairly big share of the voting power in the General Assembly of Phoebus<sup>44</sup>. It might be

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<sup>44</sup> With the voting power of the Kremenezky Group (factories in Vienna and Budapest) taken over by Tungsram in 1930/31 amounting to one sixth, having the third biggest voting share in the cartel, according to



supposed finally, as well, that the cartel membership lead to the completing of some research projects. Investments into a totally new field may have been seen as too risky for a firm with the financial capacities of Tungsram exactly because of the lack of this kind of market sharing agreements. Though clearly contributing to the development of the company's core competencies, these co-operations, however, could also lock Tungsram in an inferior position vis-à-vis its counterparts by restraining its own research projects and making use of its technical achievements for a restricted compensation.

## **EXTENSION**

As outlined above, because of the small home market, Tungsram had to rely on sales in foreign markets at a very early stage of development of both its lamp and radio valve departments. To enter foreign markets, first of all, international trade agreements should assigned this right. That's why Tungsram was very active on its own and in the chief association of the industrialists<sup>45</sup> lobbying for a trade policy promoting export, like establishing official contacts and signing a trade agreement with Soviet Russia in 1924, abolishing bureaucratic barriers and so on. Largely corresponding to pre-war Hungary's economic growth based on a territory including great parts of post-war Romania and Yugoslavia and on an extension towards the Balkan states, Tungsram called the government's attention on various occasions to the dependence of Hungarian economic growth upon a privileged access to the Balkan states. In 1931, e. g., the secretary of trade was successfully applied for the assignement of the building of state radio stations to Hungarian enterprises, thus, preventing the German counterparts from making further publicity in the Balkan states against the Hungarian ones with the argument that the Hungarian industry is not much appreciated even in its home country. Together with Hungary's unlucky political situation, this kind of governmental actions could point to an erosion of Hungarian industry's position as exporteur to the Balkan. Western capital, badly needed in Hungary, could therefore be withdrawn from Hungarian industry and relocated in the more absorptive Balkan states.

Considering the experiences gained in the European coal filament lamp cartel (Verkaufsstelle Vereinigter Glühlampenfabriken, 1903-1914), joining to the Phoebus cartel promised to be the most profitable and most secure way of establishing long term presence on the world lamp

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Stocking/Watson, (1946) p. 333. However, other studies and archival sources convincingly point toward a more decent share of around 7,5%.

<sup>45</sup> Magyar Gyáripárosok Országos Szövetsége (Association of Hungarian Industrialists) and Magyar Vasművek és Gépgyárak Országos Egyesülete (Association of Hungarian Iron Works and Machine Works)

market. Firstly, because of standardisation measures, in the framework of Phoebus, one of the first global standardized products emerged, which in turn, made a production for extended regions easier and more profitable. Secondly, the market division and the system of penalties and compensations secured its home market and fixed a quota for Tungsram in each of the regions of the contract territory. The quota allocation system should serve to guarantee actual market positions, to profit from worldwide growing demand on lamps<sup>46</sup> and to remain overrepresented on markets they preferably served. Purchase and exchange of quotas were, however, quite usual.<sup>47</sup> Furthermore, Philips, Osram, Overseas Group and Tungsram, after separate agreements with other cartel members (like Compagnie des Lampes), in the early 1930s reallocated their quotas for each of the European and Overseas Common Territory according to their preferences to economise transport and marketing costs. In Europe, Tungsram's sales were thus concentrated on Yugoslavia/Albania and Romania (around 70-90%), and considerable shares were given to it in Greece, Poland and Danzig, Czechoslovakia, Estonia, Latvia and Denmark (between 33 1/3 – 18%). In the territories overseas, Tungsram's core market was Egypt (more than 50% market share), further sales concentrated especially on Uruguay and Argentina.<sup>48</sup> Thirdly, economic nationalism caused difficulties by entering and operating on foreign markets. The general manager described this situation to IGEC president C. H. Minor in 1936 as follows: „Business. The situation is normal. We have great difficulties in overcoming the self-providing efforts of different countries, beside the restrictions operating as regards imports and payments. Still, with hard work and energy we have so far succeeded getting round these troubles.”<sup>49</sup> This “hard work” was partly alleviated by the co-operation in the lamp cartel. Not only sales prices were preferably – if outsiders' competition allowed it - fixed on a level that enabled to make a profit despite of increased tariff rates. Phoebus-partners also exerted themselves to make import quotas allocated to their partners and not outsiders. These efforts reached from information about plans of the respective home government to unified lobby of cartel members to this aim.

However, cartel rules also made it more difficult to compete with outsiders on price terms, as the prices of lamps with the main trademarks of the members were not allowed to diminish. Market shares were not only to defend from outsiders but from cartel members as well. Clemens A. Wurm stated that „international cartels do not abolish competition. They shift the

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<sup>46</sup> “In every ten years the world's electric consumption roughly doubled and the demand for incandescent lamps increased at a similar rate.” In: Jeney, Károly: The history of Tungsram, Budapest 1990, p. 60

<sup>47</sup> Luxbacher (2006), p. 369-371

<sup>48</sup> HNA, Z609\_107\_83 Agreement on establishing of lamp sales agency with Osram-Philips-Tungsram-Overseas (Pool-VVP-Olco) 1931-33

<sup>49</sup> HNA, Z601\_133\_622 Letter from Leopold Aschner to Clark H. Minor, Ujpest, 14. 1. 1936

arena and change the rules according to which it takes place.”<sup>50</sup> Small cartel members were often simply taken over by their bigger counterparts for their quotas. The marketing efforts of Philips in Poland, reaching a level „over all imagination”<sup>51</sup>, was just another way to gain long term market positions by ruling out all other competitors, „in-”, or „outsiders”, compensating the insiders, however, for their losses. The argument of being a „national producer” was more and more extensively used in this competition. According to a Tunggram salesman’s report from 1932 Philips argued successfully with its being a „national” producer, though only the end phase of lamp production was carried out in the Philips factory in Poland and a few very simple radio apparatuses were constructed there. Being clearly surprised, the salesman described that „Philips are acting up everywhere as the only Polish radio valve factory, making strongly use of the national momentum in its propaganda, on this reason it receives all government grants and it is appreciated very much by costumers” – so much added he that they can’t even imagine any other valve supplier. He also mentioned that Telefunken could only make sales on greater scale in the German-speaking part of Poland.<sup>52</sup> Here noticing the tendency with great surprise, Tunggram was not too late to follow his counterparts and made its utmost to profite from the status of a national producer wherever it was possible. (See below) Cartel membership restricted the geographical extension of foreign business activities, too, but for Tunggram this circumstance was of a rather small importance having a quite small pre-war market share in Canada, e.g.

The agreements about the concentration on the core markets seems to have hid a potential risk of being tendentially restricted to these regions – concerning new, still not cartelised, products as well. Considering the low purchasing power of the core markets (Romania, Yugoslavia/Albania, Bulgaria) lead to a several year lag in starting systematic research on television-valves. The ‘ingénieur délégué’ of Tunggram by RCA had already urged for research on this field as early as 1932 and the technical director of Tunggram agreed with him. However, the general manager not allowed to establish a television research laboratory until the receipt of the report of Tunggram-engineers about the Telefunken-exposition in Berlin in 1936. They reported on the latest achievements of the competitors, on the start of commercial television within one year in big cities of Europe (so confirming information from other sources), and on the most promising kind of TV-valves. This being still on a level of

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<sup>50</sup> Clemens A. Wurm: International industrial cartels, the state and politics: Great Britain between the wars In: Levy-Leboyer, Maurice/Nussbaum, Helga/Teichova, Alice (eds): Historical Studies in International Corporate Business, Cambridge University Press, New York, 1989 p. 111-122, here p. 111

<sup>52</sup> HNA, Z 604-5-5 Reisebericht Andor Raab, Januar-Feber 1932

research „that each laboratory [could] start with an equal chance in competing for the development of a version fit for mass production”<sup>53</sup>. As we see that the enterprises’ long term growth depends more heavily on their capacity to compete in new segments than relying solely on their existing positions in the old ones these time lags could prove to be dangerous even if research failures, necessarily attached to experiments in a new field, were partly avoided. However, in this case research could achieve the world standard as early as by the end of 1937.

To sum up, because of the small home market, Tungsram had to gain foothold on foreign markets for the purpose of long term stability and growth at an early stage. In the 1930s, 92% of the incandescent lamps and a similar share of radio valves were already sold on foreign markets. Lobbying by the Hungarian government to support foreign business activities of Hungarian enterprises and particularly those of Tungsram the company contributed to reinforce and partly to shape economic nationalism in Hungary by providing the government with new arguments for a protectionist economic policy. Membership in different cartels opened chances of market extension even against protectionist trade policies of the home markets but it could be the means of constraining Tungsram’s research efforts in new fields.

## **PENETRATION**

One form of the consolidation of the position already established in a foreign market is the setting up of production units in potentially important markets. Besides following the rivals, increased tariff, import restrictions, exclusion of foreign companies from (public) submissions and other forms of outward economic nationalism gave Tungsram the decisive incentive for setting up lamp and valve factories all over Europe<sup>54</sup>. In Yugoslavia, for example, in the 1930s three local lamp factories were established due to the industrial development policy of the government. Protected by the government, these factories threatened to exclude all Phoebus-sales, that means mostly Tungsram, from Yugoslavia. After a thorough examination of the juridical situation, i. e. whether Tungsram Zagreb would be regarded as a local

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<sup>53</sup> HNA, Z601\_17 Report of Vámbéry and Gábor

<sup>54</sup> Factories of Tungsram in the interwar period in foreign countries: Vienna (Austria, lamp factory 1917), Milan (Italy, lamp, 1910 or at the end of 1920s, ambiguous data), Warsaw (Poland, lamp 1921), London (United Kingdom, 2 valve factories 1930 and 1933, lamp factory 1936), Tilburg (Netherlands, lamp, radio valve, radio apparatus, 1931), Paris (France, lamp 1937), Bukarest (Romania, lamp 1936), Stockholm (Sweden, radio 1931), Pancova, Zagreb (Yugoslavia, lamp 1936, lamp 1938), Madrid (Spain, lamp 1937), Prague, Bratislava (Czechoslovakia, lamp 1938, lamp 1937), Buenos Aires (Argentina, lamp, 1938). HNA, Z601\_138\_687 and Koroknai, Ákos (Ed.): The history of Tungsram, Budapest 2004 p. 87 Because of contradictions in archival data, respectively between archival data and studies on Tungsram, here all fabrics mentioned in the various sources are listed. Production was definitively not started in Argentina before the outbreak of the war, other data should be checked in further archival sources.

producer, two of the three factories were jointly purchased by Osram, Philips and Tungsram, the one in Pancova was modernised by Tungsram for the production of its lamps. An agreement was reached relating to the third factory about its gradual switch-off of the lamp business for a financial compensation. This way, coordinated cartel efforts undermined economic nationalism and protectionism proved to become a profit source for the remaining partner being a 'national producer'. The Tungsram factories in Yugoslavia were in fact, as all the other ones, after a starting period, almost entirely run by local workforce and in the board of directors, local personalities with outstanding connections to political, economic and scientific circles of Yugoslavia were invited, selecting based on the local knowledge of the Commercial Bank.

In the radio industry, the fabrication of valves and apparatuses were still mostly separated. Tungsram also had originally been a valve producer. Only with the take-over of the Kremenzky Group, Tungsram entered the apparatus fabrication business (Orion radios), its importance remained largely behind the valve production. However, to set trends in the industry, the valves of a factory had to be used in the newly constructed apparatuses and not only to serve as replacement. Furthermore, the valves had to be compatible with the competitors' products, especially smaller and not so well-known valve producers had to undertake this obligation claimed by the apparatus constructors. That's why the agreement was made with Marelli Ltd., the biggest Italian radio apparatus constructeur in 1931. It was a big step forward „to supply a substantial part of the market here and to launch our trade mark excessively”<sup>55</sup>. This chance of establishing a favorable position in the Italian radio industry network could not be seized, however, because of Tungsram's inability to satisfy consumer demands in the latest European and American type valves at the same time.

Establishing stable market position could be considerably aggravated in unfavorable political atmosphere. In Romania not only some radio apparatus factories denied to use Tungsram valves „for national reasons”<sup>56</sup>. Government pressure could also be used in different forms against companies who had become vulnerable because of their dependence of the respective market and because of their nationality. In 1934, e. g. through the Hungarian secretary for foreign trade, the Romanian government made the three biggest Hungarian exporter enterprises known that their business in Romania could suffer serious losses but for instructing their subsidiaries in Romania to subscribe for a five times higher amount to the recently issued

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<sup>55</sup> HNA, Z603-44-103, letter to Ujpest Report: The Italian market Re: Journey Report 10. 10. 1932

<sup>56</sup> HNA, Z601\_296\_1058, Andor Raab: Report about my journey in Romania in November 1931, p. 10

Romanian state loans than previously planned.<sup>57</sup> Therefore, here is an example about another form of market penetration, the establishment of positions in different branches, i. e. in different production networks. This example seems to be very informative not only about one branch of Tungsram, but about the influence of transnational co-operation paired with technological weakness and economic nationalism on company growth as a whole. The outsourcing of the telephone and telegraph department in an independent limited liability company was fulfilled at the request of the American shareholders of Tungsram. ITT, which took over the shares of Western Electric in Tungsram, wanted to have the company directorship entirely devoted to get the submissions in the „challenging” Balkan countries for the modernisation of their telephone systems. In the 1920s Eastern, Central and South East European countries, struggling with financial difficulties, tended to cede the building and operation of their communication systems to the multinational corporations ITT, Siemens and Ericsson and rented these from them. The decision between the rivals was usually influenced by political motives as well. As after founding of the new company, the Standard Electrical Company, Ltd., Budapest, Tungsram remained able to influence those managements decisively<sup>58</sup>, Aschner committed himself for the task. Using his personal and Tungsram Bukarest’s commercial and personal networks the long negotiations were carried on. In 1930 ITT did sign the agreement with the Romanian government, mostly, however, due to Prince Carol’s coup d’etat that lead to the wish of breaking up with the old regime - and so with Siemens, too, having formerly established formidable contacts to the Prime Minister, the Finance Minister, the Minister of Traffic and the General Director of the Post. The concession was given to ITT, being less ‘compromised’ in the new government’s eyes<sup>59</sup> – because of working with Tungsram. A press campaign, launched by Ericsson at the end of the negotiation process, could not hinder signing the agreement but the Romanian government explicitly excluded any Hungarian (and German and Russian) participation from the fulfilment of the order. Aschner reproached himself for not having acted more directly in his company’s interest and ITT for not having been really willing to take steps for the Hungarian caompan’s sake – as usual in Balkan states. Thus, Standard, that means in 1930 still partly Tungsram, could not get foothold on the Romanian market even as a junior partner of an American corporation. After similar events in Yugoslavia, Standard remained wholly

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<sup>57</sup> HNA, Z604\_1\_1, Correspondence of W. Rosenfeld, export director, Telephone report, Ujpest, 12.12.1934

<sup>58</sup> A 49% share remained by Tungsram and ITT obliged itself to make use of its voting power only to the extent of 50%. In: Pecsí Vera: Standard

<sup>59</sup> Schröter, Harm: Siemens and Central and South-East Europe between the two world wars In: Cottrell, P.L. and Teichova, Alice (eds.): International Business and Central Europe, 1918-1939, Leicester University Press, Leicester, 1983, pp. 173-192, here p.183

dependent on the Hungarian market as it only had a right to use Western Electric patents in these three countries.

Thus, once entered a foreign market the position in the industrial network could be strengthened in different ways as establishing long-term relationships with end producers, distributors, entering divers branches or setting up production units. However, though Tungram arrived at an agreement with the Hungarian National Bank about a partial relief from exchange control regulations introduced in 1931 (see above), being able to retain a part of the foreign exchanges from export deliveries for purchasing raw materials, currencies for investments abroad were still not easily allowed to be used. Therefore it was vital that joint cartel efforts diminished in some cases the costs and risks of these investment, like in the above described case of Yugoslavia. However, technological dependence could lock the company in a position that did not allow flexible reaction on changes in the political environment. Strong national resentments could, thus, not be overcome through a kind of transnational co-operation in which the interests and power positions of the partners so widely differed as in case of ITT and Tungram/Standard.

## **INTEGRATION**

The co-ordination of positions on different foreign markets was an important means for economising costs or becoming more responsive to local needs. In some distant countries sales agencies were abolished to be able to concentrate efforts on core or more promising markets. E. g. in 1934, Tungram joined the China United Lamp Company (Culco) which coordinated Phoebus-sales, that means sales of General Electric (China General Edison Company, Sanghai, lamp factory), Osram and Philips in China. Though for a restricted period the own agency, China Engineers Company Ltd., Sanghai, were still run, gradually sales were effected by Culco. Even the interests of Tungram were represented on Culco's board by IGEC. Rather untypical for a Hungarian enterprise of that time, Tungram did recognize the importance of the Chinese market. The willingness to pay \$ 1,6 million to IGEC for the shares of Culco in a time so scarce of hard currencies clearly indicates that. Being part of this joint sales organisation enabled Tungram to remain present on the Chinese market (like in the case of Osram and Philips, besides exports from Budapest, CGE produced lamps with the Tungram trademark) facilitating a full return considerably.

## **CONCLUSION**

Making use of the network concept of Johanson and Mattsson, my paper aimed to analyse Tungsram's strategies in the interwar period to enter and operate on foreign markets, particularly to regain its positions established before the First World War.

The dissolution of the Austro-Hungarian Monarchy and the harsh cutting of Hungary itself aggravated by the consequences of the war required the restructuring of business activities to a considerably restricted home market battling with structural economic and financial problems throughout the whole interwar period. The volatile and risky world economic environment and especially the particularly harsh protectionism after the world economic crisis made enterprises from small countries extremely vulnerable being more dependent on the foreign economic policies of the big countries, their main markets. Political tensions between the follower states of the Monarchy and their economic nationalism aiming to create modern, self sufficient economies further exacerbated the situation of Hungarian industrial enterprises counting on this area as their core markets. Furthermore, as to Tungsram's core product, massive overcapacities built up during the war and technological development made the lamp industry a more and more automatised, rationalized, and therefore costly, business in which only mass production and ongoing modernisation allowed for long-term growth. Considering the restricted, highly contested and, because of financial difficulties, slowly growing home market, a dependency on sales abroad was clearly recognised as allowing mass production. Because of relative high production costs in Hungary a strategy founded on price competition was not a realistic alternative, and based on former technological position, also not desired by Tungsram. The line of a quality producer was therefore taken, concentrating the limited sources of the company on three promising fields, i. e. incandescent lamps, radio valves and telephone exchange systems. Furthermore, research capacities were built up only for the two former, based on earlier technological achievements respectively the chances of an entirely new industry. Considering the concentration respectively cooperation tendencies in these branches agreements with their global players were seen as the key strategy to establish Tungsram's position in the industry as a 'small player of the A-league', i. e. nearly the global players' equal as respects product quality and reputation even if not on financial terms, market share and power. The future of the telephone section seemed to be ensured by firstly a licence agreement with Western Electric Co., Chicago (later on belonging to ITT), one of the tree giant conglomerates having developed their own telephone exchange systems and dominating the world market henceforth. Secondly great public investments were expected in the communication systems of Hungary, Romania and Yugoslavia, where - according to the modified licence agreement - Tungsram could use Western patents. Extended public contracts



for modernising parts of the Hungarian (and in a much lesser extent the Romanian) telephone system did make prospered this department during the short recovering period at the end of the 1920s. An agreement with the worlds' biggest lamp making company, the General Electric Company, about the exchange of technical data for a licence fee on Tungstram's side and a partition of GE in Tungstram's share capital on the one hand, and the membership in the incandescent lamp cartel paired with a closer coordination with the biggest European lamp firms within the cartel on the other hand, were steps of seminal importance for the lamp department. The lamp production and these agreements were the core of Tungstram's business. In the emerging radio industry Tungstram at first ambitioned the position of a main trendsetter in Europe and in Latin-America (in Argentina and to a smaller extent in Brazil<sup>60</sup>). Occupied with problems of the organisation of mass production the research staff fell behind the achievements of those of the main rivals. Agreements with the biggest American radio enterprise, the Radio Corporation of America (1931 sending of a consultant engineer to RCA, 1933 licence agreement) and a cartel agreement with the biggest European radio companies, Philips and Telefunken, including market division, patent exchange, however for a licence fee on Tungstram's side, and technical cooperation concerning new valve types should have helped Tungstram to regain a position of a somewhat smaller but still important company in the radio industry.

To build up positions on foreign markets, exports relying on a network of sales representatives and own sales agencies and, concerning radio valves as an intermediate product, establishing long-term contacts with radio apparat constructors were considered as the most desirable means. Because of protectionist tendencies, and also following the rivals, production units were established in whole Europe to not to lose markets. In some cases, like the Balkan countries, FDI could certainly be based on superior technological and management skills and sometimes even on a greater financial capacity. These could be hardly made use of, however, if market sharing agreements with the main foreign competitors on the special markets had not been allowed it and means of overcoming this kind of difficulties had not been implemented imitating the rivals or sometimes inventing them together. Thus, a careful search of the environment for new ideas and opportunities, and an early orientation toward the America, rather unusual for Hungarian enterprises can be recognized.

The membership in the incandescent lamp cartel became on the long term not because of its financial advantages so important for Tungstram. Gaining access to the transnational know-

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<sup>60</sup> where first business contacts could be established relying on European and Hungarian immigrants

ledge circulation, taking part in setting technological trends and in a common learning process to deal with protectionism, to promote electrification, i. e. creating new markets, to organise cooperation, and to compete with other means as price only, turned out to be the main advantages. Therefore the cartel was of seminal importance in extending Tungstram's activities on new markets, penetrating old ones and integrating the different positions on the different markets. Furthermore, competing under more or less stabilized circumstances encouraged to bring research projects to an end and allowed to concentrate research capabilities on Tungstram's own projects (great-crystal tungsten filament, krypton lamp etc.) than the development of all the equivalents of the rivals' lamp types and on entirely new fields like electron tubes and radios. Being a junior partner of the two dominant European companies, Philips and Telefunken, the radio cartel failed to play this role for Tungstram, it rather locked it into a follower position. However, securing a considerable share on its core markets (18% or 12%<sup>61</sup> in total), allowing to penetrate these markets through supplying radio apparatus constructors with its products, using the partners patents, and letting Tungstram free to operate on other markets of already vital importance respectively a perspective of long term growth (UK, France), this agreement, outlined in 1934, signed finally in 1936, could have been of great use on the long term had it not been whipped away by the Second World War. Especially the cooperation with RCA could have helped to strengthen Tungstram's technological position to an extent as to being able to make valid the paragraphs on technical cooperation. This special type of commercial networks, the cartels, therefore, burrowed various risks, too. Tungstram's general manager postponed its television research bearing in mind the limited purchasing power of the markets Tungstram most likely would be allowed to serve. The history of the krypton lamp showed that complementing invention processes could be delayed, too, because of the lack of cooperation of the partners. However, remaining outside, keeping pace with production development would have been made difficult, sales should have been made on prices allowing a smaller margin left over for research, harsh joint cartel actions could have been feared and even the position on the home market could have been seriously shaken on the long term as for the sake of the agrarian export Hungary was only able to protect its industry with relatively lower tariffs.

Transnational cooperation, therefore, though careful balancing between the global players and the constant strengthening of the own technological position remained indispensable, could support an enterprise from a small and relatively late-comer country to establish a macro-

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<sup>61</sup> Contradictory sources have been found yet.

position in the industry that can be described as being in close contact with all the leading companies of the industry, playing the role of the Balkan-specialist, being able to play its part in setting trends in Europe and contributing to the technological development of the industry with some important inventions. However, if this cooperation was not at all a truly transnational one, i. e. a severalfold interwoven one with a say in establishing the rules of the industry, just a mere licence agreement, for example, it could easily lock the enterprise in a very vulnerable position (see the example of the telephone section cited above).

Economic nationalism was without doubt a serious constraint of foreign business activities which was tried to overcome alone or in concert with the cartel, also learning from each other ways and means of doing this. However, economic nationalism could be made good use of. Relying on its manifold personal, commercial and financial networks, Tungsram lobbied with more or less success, in vital private cases, however, successfully, for public submissions, signing of trade agreements, a currency and industry policy supporting exports etc. Documents revised yet allowed to outline Tungsram's ultimate goals lobbying by the Hungarian economic government briefly as follows: firstly, the protection and support of emerging industries and the encouragement of industrial self-organisation, and secondly, an (nationalist) economic policy allowing a privileged access to the Balkan and promoting foreign business activities of Hungarian enterprises in general, though with practical measures as modernising the Hungarian railway system and diminishing its tariffs for exports, were seen as the key of long-term Hungarian economic growth. Efforts to profit from economic nationalism on foreign markets could be discovered as well. As Jones described, in the interwar period multinationals' subsidiaries acted more and more as 'nationals' of their host markets. Marketing in a broad sense turned out to be an important factor in this process. Protectionism and economic nationalism were also incentives pushing Tungsram (and other companies) to create a web of production units on foreign markets helping to maintain market positions during the Second World War. Thus, enterprises and their cartels not only tried to overcome economic nationalism, but trying to profit of this phenomenon, they supported and reshaped it as well.

The strategies of transnational cooperation and making use of economic nationalism, therefore, were closely interconnected. Besides a reliable partnership and technological inventions privileged contacts to the Balkan, the function of a kind of the intermediary, were for the Western partner, especially for the American ones, essential cooperating with Tungsram. Hungarian economic politicians seem to have been willing to support Tungsram's ambitions not only because of its being a company with a workforce of around 6000 in

Hungary<sup>62</sup> but also because of the amount of hard-currency gained from its foreign business activities, of its being a proof of Hungarian economic development usefully presentable in establishing foreign contacts, and very importantly, of the services Tungstam was able to offer as a connection between Hungary and leading enterprises of the industrialist countries, especially those of the United States of America, i. e. functioning as a portal to the global economy. Formulating it in another way, networks seem to have been served as basis of the formulation and implementation of strategies to enter and operate on foreign markets, to establish a more or less stable position as a company of second rank in the industry but still with a say in setting its trends in Europe and in a lesser extent worldwide. The status of Hungary as a “not-too-late-comer” concerning industrialisation seems to have opened, therefore, “windows of opportunity” in emerging industries.

As a contrast, briefly some early considerations to Ganz & Co., one of the two big Hungarian machine works and the leader of the heavy current industry in Hungary. The small family business founded by Abraham Ganz, a Swiss foundryman in 1844 and was developed by Andreas Mechwart, a Bavarian engineer, recruited by Abraham Ganz in the 1860s, to an entrepreneurial enterprise from 1867. In around three decades, greatly profiting from the autonomous Hungarian economic policy aiming to develop a national industry and also contributing to its success especially by developing machines revolutionising the milling industry and greatly contributing to the success of the other leading sector of this period, the railway building, the Ganz & Co. joint stock company became the technologically leading company of Hungary in machine building and in the heavy current sector. Though via sales agencies and participating on public submissions Ganz & Co. aimed to be present in almost all over the world, from the very large range of products, however, only its “special products”, i. e. products based on its own R&D and its own patents, could successfully compete with those of the large producers of the USA, Germany, UK etc. As a vertically almost fully integrated concern with factories in Ratibor, Germany from 1869 and Loewensdorf, Austria from 1887 Ganz & Co. followed the development of the great German counterparts engaging itself in the building and maintaining of the electrification system of whole cities - thus creating its own markets – and founding the Internationale Elektrizitätsgesellschaft in 1889 with the Union bank in Vienna to come up with the financial needs of such projects. Studies on the company’s history seem to be unanimously agreed for the reason of a downturn in

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<sup>62</sup> and another more than 4000 abroad, data from 1931 – in contrast: Philips’ workforce amounted to 29.000 in 1929 and to 19.000 in the Netherlands and another 26.000 abroad in 1939

Ganz & Co.'s impressive development: the Hungarian General Credit Bank, getting a decisive share in the company in 1894, guided Ganz & Co.'s strategy relying merely on former technological achievements to become practically only a "milking cow" for the bank. Together with the particularly severe structural problems of the Hungarian machine industry after the First World War, and especially with the financial constraints of the Hungarian state hindering it in carrying out major development projects like those of the electrification of the railway system, however based on the inventions of the general manager of Ganz & Co., should lead to the company's considerable loss of importance in the world electrical and machine industry from the turn of the century. My early research findings seem to modify slightly this picture. Firstly, the cooperation with AEG at the turn of the century seems to have influenced Ganz & Co.'s own research capacity on a more severe way due to AEG's not very hidden intention to degrade the Hungarian company to a mere assembling factory. The motives for and the consequences of this agreement should be therefore analysed more profoundly. Secondly, the impressive research of Kálmán Kandó, engineer and later general manager of Ganz & Co., on railway electrification was mostly carried out working by the company in the late 1890s and from 1915 till the early 1930s, so R&D may have not restricted to an extent as the literature suggests. Thirdly, and maybe most importantly, we should ask for the reasons for and consequences of Ganz & Co.'s not joining the international cartels of the branches the firm competed first of all the International Notification and Compensation Agreement (1930). The severe restriction of the home market in terms of the number of consumers, state's financial capacity etc. could have only been offset by a considerable extension of Ganz & Co.'s foreign business activities. Therefore as a hypothesis it can be formulated that the failure of building up extensive networks and so profiting from transnational cooperation of the industry, respectively the choice of the wrong partners considerably contributed to the long-term deteriorating of Ganz & Co.'s position in the industry and so those of the Hungarian machine industry as a whole.

Figure 1.

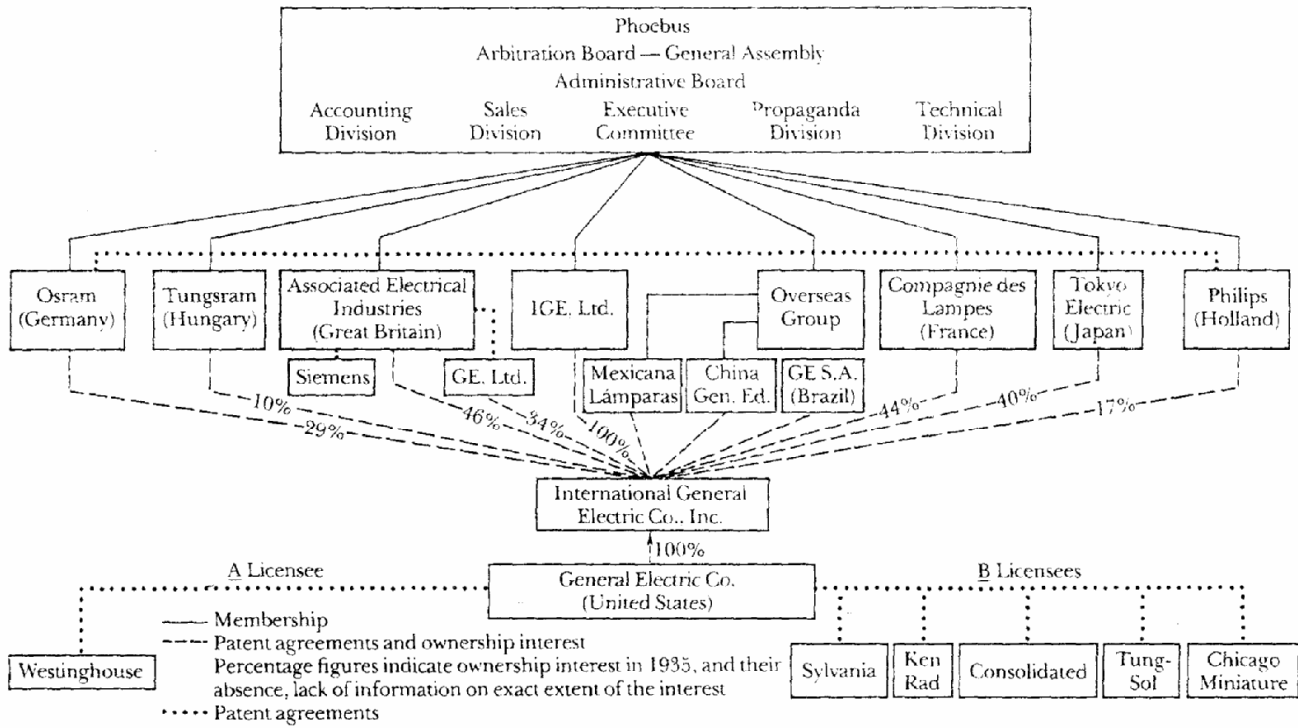


FIG. 1 Structure of the Phoebus Cartel, 1925-39

Source: George Stocking and Myron Watkins, *Cartels in Action* (New York, 1946), p. 334.